RAYMOND W. SERAILE, DBA, MAEL

San Jacinto, CA 92582 619-419-9105 ksabjj@gmail.com linkedin.com/in/raymond-seraile/ dr.seraile.net

PROJECT MANAGER & BUSINESS SYSTEMS ANALYST

March 16, 2022

Heidi Morgans
Senior Publications Coordinator
Review of Economics and Statistics
Office of Communications and Public Affairs, Harvard Kennedy School
Phone: 617-495-2111 | Web: https://www.mitpressjournals.org/loi/rest
Email: heidi_morgans@hks.harvard.edu

Dear Heidi Morgans,

I am writing this letter to express my interest in the Review of Economics and Statistics Fellowship for the National Bureau of Economic Research Summer Institute. My current university affiliation is with California Southern University in Costa Mesa California. I have recently concluded and defended my Doctoral Project titled "Lived Experience of Municipal Leaders Regarding the Economic Benefits of Emergent Technologies". This was defended February 12, 2022. My Degree was conferred February 14, 2022. My current research activity consist of finding ways to utilize the work of my Doctoral Project. I hope to participate in conferences and find ways to make meaningful contributions through publishing.

The Summer Institute session I am most interested in attending is the SI 2022 Urban Economics Session on July 28-29, 2022, Organized by Edward L. Glaeser. My resume, and most recent research paper are attached. If there is a need for further clarification of information provided, please contact me at the telephone number listed above or e-mail at dr.seraile.net@gmail.com

Warm Regards,

Raymond W. Seraile, DBA, MAEL

RAYMOND W. SERAILE, DBA, MAEL

San Jacinto, CA 92582 619-419-9105 ksabjj@gmail.com linkedin.com/in/raymond-seraile/ dr.seraile.net

PROJECT MANAGER & BUSINESS SYSTEMS ANALYST

Highly accomplished, versatile professional with experience managing projects from planning to successful completion, establishing systems and processes, and overcoming business challenges. Exemplified technical dexterity and leadership skills to ensure the implementation of an innovative solution and nurture the team's capability. A well-versed leader with a commendable track record in sales, customer service, web development, and marketing strategy while identifying business needs and determining opportunities to increase project productivity. Proficient at organizing progress reports to ensure projects are completed within budget and schedule. Commended for influencing business decision-making and keeping abreast with the trends to secure the organization's stellar reputation.

CORE COMPETENCIES

Project Management | Data Analysis | Photo & Video Editing | Budgeting | Continuous Improvement | Technical Documentation | Drone Photography | Information System | Conflict Resolution | Leadership & Supervision | Training & Coaching | Teamwork & Collaboration | Organizational Skill | Problem-solving skill |Verbal & Written Communication Skill

PROFESSIONAL WORK EXPERIENCE

SAN BERNADINO COUNTY DEPARTMENT OF BEHAVIORAL HEALTH *Colton, CA*
Business Systems Analyst June 2021 – Present

Present a proposal or recommendation and supervise team members to harness their full potential and achieve business goals.

- Adhere with the gathered business requirements to support applications and IT-related projects while creating forms or templates and transforming work processes into the established business and functional specifications, driving business consistency.
- Handle the fund request process and facilitate cost estimates and analysis to secure successful project completion.
- Coordinate with customers, staff, vendors, and external agencies regarding projects, system interfaces, as well as IT issues to address escalated business problems through strategic information technology solutions and opportunities.
- Play an integral role in organizing the project's operation, plans, and schedules while delegating duties to the team members, monitoring progress, creating status reports, and managing change orders in compliance with the quality standards.
- Manage the prototype's approval and specifications and support the plans and test implementation to secure designs' viability.

CITY OF ESCONDIDO *Escondido, CA*
Web Design Technician Jan 2014 – Apr 2021

Directed the modification, design, and installation of processes and systems to secure that the city's runs smoothly and accurately.

- Programmed and established six websites, intranet as well as the city's main websites with quality content, web banners, and graphics PDFs to cultivate the city's brand reputation while responsible for the career growth of team members.
- Undertook the documentation and summary analysis of projects and streamlined web traffic through statistical reports.
- Administered complex contracts and oversaw the acquisition of enterprise content management software to secure efficiency.
- Provided expertise in published videos, headed the establishment of communication software tools like Siteimprove and citysourced, and served as the first non-police and FAA commercially licensed drone photographer to drive workflow process.
- Spearheaded the content administrator training program to engage individuals with web capabilities organization-wide while handling the preparation and deployment of press releases for news outlets as well as local and national publications.

KONG SUBMISSION ACADEMY *Spring Valley, CA*
Program Manager/Owner Jan 2011 - Oct 2016

Oversaw the academy's short- and long-term goals by providing strategic program initiatives and motivating team members.

- Coordinated with the community to increase their engagement in the outreach program and facilitated the training programs of six staff and a hundred members in compliance with state and federal guidelines.
- Administered duties, including budgeting and purchasing materials and managing contracts to minimize project risk.
- Identified customer feedback and devised appropriate solutions while establishing a policy to provide guidance and consistency in curriculum, sales, and promotional events.
- Developed appealing social media content in newsletter and blogpost to revitalize the academy's reputation and increase admission.

UNDISPUTED FITNESS & TRAINING CENTER *El Cajon, CA*
Program Manager Jan 2008 – Oct 2010

Displayed work ethic, professionalism, and creativity in directing the annual and long-range programs to their successful completion.

- Cultivated the professional development of twelve staff and over a thousand members in administering the training program operation.

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Lived Experience of Municipal Leaders Regarding the Economic Benefits of Emergent Technologies

by

Raymond W. Seraile, III

A Dissertation Submitted to
School of Business and Management
at California Southern University
in Partial Fulfillment of the Requirements for the
Doctor of Business Administration

California Southern University
2022

Date of Defense: 11 February 2022

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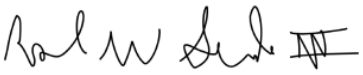
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Approval Page

This applied dissertation was constructed and submitted by Raymond W. Seraile, III under the direction of the committee listed below. It was submitted to the School of Business and Management at California Southern University and approved in partial fulfillment of the requirements for the degree of Doctor of Business Administration at California Southern University.

DocuSigned by:
Stephanie Hoon
270322B3C5FF464...

2/14/2022

Dr. Stephanie Hoon — Date

Committee Chair/Dissertation Mentor

DocuSigned by:
Gyongyi Konyu-Fogel
7CA966C6ACA7495...

2/12/2022

Dr. Gyongyi Konyu-Fogel — Date

Committee Member

DocuSigned by:
Jimmie Flores
0562A6EF1E54457...

2/12/2022

Dr. Jimmie Flores — Date

Committee Member

DocuSigned by:
Steven Hess
DC20C8A0D7C341E...

2/14/2022

Dr. Steve Hess — Date

Reviewing Dean

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Dedication

I dedicate this first and foremost to my family: my wife Kirsten, my daughter Audrey, and my son Raymond IV. You all have been my greatest support and motivation. I strive to learn and do more with you guys in my heart. Second, I would like to dedicate this to my late father, Raymond Seraile Jr., and my late grandfather, Raymond Seraile Sr. I am thankful for the guidance and example that you both set for me. Although you are physically no longer with us, I believe that your spirits have been guiding me along the way and are pleased.

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To the staff at Cal Southern University, my Committee Chair, Dr. Stephanie Hoon, Committee Member, Dr. Gyongyi Konyu-Fogel, Committee Member, Dr. Jimmie Flores, and the Reviewing Dean, Dr. Steven Hess, thank you for your patience and help through this process that at times has been challenging and seemingly unattainable. Special thanks to the coworkers I have had through this process that provided help and assistance along the way. My two biggest cheerleaders were my mother, Kim Seraile, and my cousin, D'Angela Hogan. I hope to live up to the standard you all hold for me. Thank you for your support. To my buddies Otto Lai and Ralph Alvarez for listening to me vent when I reached points of frustration. To my fraternity, Alpha Phi Alpha Fraternity Incorporated, and the host of brothers that supported me both directly and indirectly—including, but not limited to, my sponsor, Mr. Marlon Long, my recommender, Mr. Dwayne Hester, and my line brothers, Kudumo Tano, Dr. Marlon Ware, Mr. Eric Lane, Mr. Keven Jones, and to the late Nathan Jordan Jr. To the endless number of friends and family that endured through this with me, thank you.

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Abstract

Emergent technologies in information systems have the potential to improve efficiency at the municipal level. The specific technologies explored in this study, which was guided by two research questions and the DeLone and McLean information system success model, were machine learning, unmanned aerial systems technology, cloud-based computing, and data-based decision-making. The purpose of this qualitative interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems in the area of their constituency. Data were collected through individual, semistructured, virtual interviews with 15 participants, and the transcripts were analyzed using the interpretive phenomenological analysis methodology. Three themes arise from the qualitative analysis: (a) implementation of emergent technology, (b) effects of emergent tech use, and (c) economic considerations with emergent tech. The recommendations for practice include for municipal leaders to communicate the potential gains of a new technology with funding sources in order to increase funding in this area, ensure that there are open lines of communication between different employees interacting with new technologies, and remain flexible during implementation.

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Chapter 1: Introduction

Technology use is critical for the success of organizations in both the public and private sectors (Armanios et al., 2020). Over the years, there has been a concerted effort to incorporate emergent technologies in information systems into the public sector (McGregor, 2020). There are unique challenges to the successful implementation of these tools (Eskridge, 2019). Based on the existing literature, the traditional approach to study impact has been separate examination of economic outcomes and examination of phenomenological occurrences. Little is known about how municipal leaders perceive the economic benefits of implementing emergent technologies in their municipalities. There have been attempts to quantify aspects of technology implementation; however, there has been limited qualitative research on the topic.

There are different forms of emergent technologies. To narrow the focus of the current study, the researcher focused on machine learning, unmanned aerial systems (UAS) technology, cloud-based computing, and data-based decision-making. Each of these emergent technologies has impacted municipalities in the way they conduct day-to-day business in terms of enhanced efficiency (Nica et al., 2020); however, there have been shifts in user interaction (Rotuna et al., 2019). Traditional studies have progressed on an individual basis and have considered individual applications and implementations of emergent technologies (Rotolo et al., 2015). Previous scholars have focused on the definition of emergent technologies but have not focused on the lived experience of those involved in the discernment or implementation of emergent technologies in information systems and their economic benefits in municipal settings (Rotolo et al., 2015).

Background of the Problem

Information systems has broad implications concerning the economic activities and performance of municipalities. Information systems have been a crucial component of

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organizations in facilitating various responsibilities geared towards their citizens. As organizations, municipalities do not have the same relationship to economic motives as do other for-profit organizations (Buelens & Van den Broeck, 2007).

The difference in financial motivation for cities and conventional business causes a different relationship between need and ability (Buelens & Van den Broeck, 2007). Municipalities are service-oriented, and the cyclical usage and expense of cities drive information system needs. The need to utilize information systems to find efficiencies in technology that allows for cost savings is ubiquitous (Krishnan et al., 2020).

The process and procedures that enable municipalities to do their jobs often have little incentive to be changed or updated (Parikh & Zhaochen, 2017). Economic pressure can influence the needs of efficiencies. In cities, security and consistency are highly prized qualities of a system, process, or procedure. These motivational factors contribute to understanding the influence of technology on municipalities' economic development (Parikh & Zhaochen, 2017).

Emergent technologies in information systems have the potential to improve efficiency at the municipal level. Machine learning influences many of the current forms of emergent technologies (Mitchell, 1997). The use of enterprise databases has moved along with the advance of machine learning (Mitchell, 1997). Web-based interaction is another emergent technology. The use of UAS has become a contentious subject over the years with municipalities (Scott, 2018). UAS has allowed for specific tasks that were previously costly undertakings to be handled much more efficiently. Looking at the impact of these forms of technology requires a thorough understanding and explanation of the municipal economic environment. Understanding what happens in a city and how the city makes money (Rogerson, 2020) can aid scholars in further uncovering the potential impact of integrating these emergent technologies.

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Problem Statement

Waste of funds from failed or delayed project implementation can be devastating to a municipality (Parikh & Zhaochen, 2017). Cities depend on technologies to revise workflows and identify efficiencies (García-Navarro et al., 2019). The problem is that local governments often underestimate the skills and resources required to derive maximum benefit from implementing emergent technologies. The technology expenses needed to deliver services such as utilities, water treatment, public safety, fire prevention, and upholding community standards is often miscalculated (Sytsma & Laming, 2019). Finding new and innovative means to deliver with minimal impact on these needs to accommodate increasing populations is a stable municipal government (Van Raan, 2020). Municipalities are continually working with information systems departments to adopt new technologies, and there is a need to leverage technology to create economic opportunity. The costs of obtaining goods and maintaining systems supporting increasingly complicated municipal structures are ever-growing and expanding (Tian & Li, 2019).

The specific problem that the researcher addressed through this study was that the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems were not known. The need to do more with less and solve efficiency problems through technology is imperative to improve economic efficiency at the municipal level (Tian & Li, 2019). The implementation of emergent technologies can often meet requirements related to municipal economic development (Armanios et al., 2020). These technologies' performance can offer unique outcomes beyond those initially perceived (Krishnan et al., 2020). Understanding the lived experiences of those involved in implementing these technologies is essential to research.

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Purpose Statement

The purpose of this interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. Information was collected that addresses the values, opinions, behaviors, and social context of those in charge of implementing various machine learning-based emergent technologies (Silverman, 2016). By gathering information through virtual interviews, in-depth descriptions of the lived experience of key people with relevant experience in implementing emergent technologies in municipal information systems projects were generated.

Nature of the Study

The researcher selected the qualitative methodology to guide this study. Qualitative research is an approach that is ideographic in nature, focusing on the essence of the individual experiences and perceptions of participants about a specific phenomenon (Fossey et al., 2002). Unlike quantitative research, qualitative research is not concerned with making generalizations because the focus is on uncovering perceptions that cannot be easily captured in surveys (Fossey et al., 2002). Qualitative research also relies on descriptive and non-numerical data in the process of interpreting the view of individuals (Fossey et al., 2002; Marshall & Rossman, 2014). These methodological and theoretical features of qualitative approach justify its selection for the current study, in which the researcher aimed to explore the lived experience of municipal leaders regarding the implementation of emergent technologies in information systems.

An interpretive phenomenology design was used in this study. Interpretive phenomenological design is characterized by the interpretation of how individuals make sense of their own experiences, with the commitment of giving voices and providing context to the lived experiences of participants (Larkin et al., 2006; Smith & Osborn, 2003). Interpretive

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phenomenology is particularly effective in exploring phenomena that require deep insights from individuals who have the relevant experience to understand a particular event (Smith & Osborn, 20003).

The researcher aimed to recruit 15–20 municipal leaders who have direct experience in implementing an emergent technology in their area of their constituency. Data were collected online through the Jitsi teleconference application to facilitate individual semistructured interviews. Data were analyzed using the interpretive phenomenological analysis methodology, which includes steps such as bracketing, coding, determination of themes and superordinate themes, and interpretation of the data (Pietkiewicz & Smith, 2014).

Research Questions

The following research questions were developed to guide this study:

Research Question 1: What are the lived experiences of municipal leaders regarding the implementation of emergent technologies in information systems in their municipality?

Research Question 2: What are the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies?

Conceptual Framework

The theoretical framework that the researcher adopted for this study was the DeLone and McLean (2003) information system (IS) success model, which asserts strategies or models that influence success in information systems, such as the efficiency of operations, customer satisfaction, and competitive advantage. The IS success model outlines six components of IS success: (a) information quality, (b) system quality, (c) service quality, (d) system use/usage intentions, (e) user satisfaction, and (f) net system benefits. In addition to the IS success model, the consideration of municipal economic factors can be influential in understanding net system benefits (Shaffer et al., 2004).

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The IS model asserts factors that contribute to success (DeLone & McLean, 2003). The literature supports the influence of municipal and community economics on net benefits (Shaffer et al., 2004). The theory lays the foundation for the implementation of emergent technologies in information systems as a strategic decision to encourage economic benefits at the municipal level of leadership. The theoretical framework in this study relied on the assumption that the implementation of emergent technology can lead to economic benefits. The theory provides support for the role of emergent technologies in enhancing the effectiveness of information systems. Informed by the IS model as a framework, the study's qualitative nature focused on the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems.

Operational Definitions

Emergent technologies: Emergent technologies are technologies that are still mostly unrealized (Jessup & Valacich, 2008).

Information systems: Information systems are the complementary network of hardware and software that people use to accomplish individuals and organizations (Jessup & Valacich, 2008).

Machine learning: Machine learning is described as algorithms that improve themselves through experience (Mitchell, 1997).

Municipal economic development: Municipal economic development refers to the process of utilizing revenue, creating policy, and implementing procedures that benefit a city's economy (Rogerson, 2020).

Success strategies: Success strategies refer to the plans, policies, objectives, or methods applied to conduct a given task to achieve the desired outcomes and success (Barney, 2014).

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Assumptions, Limitations, and Delimitations

In this study, the researcher assumed that information systems implementation is strategic and deliberate. The researcher assumed that municipal leaders would not only be honest with the responses to the interviews, but knowledgeable to the topic of implementing emergent technologies in information systems. Finally, the researcher assumed that the target sample size of 15–20 participants could be achieved.

In terms of limitations, the use of one municipality as the setting for this study may not be reflective of other municipalities' implementation of emergent technologies in information systems. Another potential limitation of the study was the small sample size, which limits the generalizability of the results. Finally, conducting the interviews virtually could potentially decrease the quality of the interactions of the researcher with the participants because of poor internet connection or occasional disruptions.

The study was delimited to emergent technologies such as machine learning, unmanned aerial systems (UAS) technology, cloud-based computing, and data-based decision-making. The study also delimited data collection to conducting semistructured interviews virtually, which was sufficient in exploring the lived experience of the participants. Finally, the study was delimited by the interpretive phenomenological analysis framework described by Smith and Osborn (2003).

Contribution to Practice or Stakeholder Groups

Municipalities are tasked with taking care of a city's collective needs, including public safety, community planning, and economic development. With a fixed budget comprised of a mixture of sales tax, property tax, federal grants, and other various revenue generated from fees and charges, there is a limited budget and a continual need to maximize dollars collected from the citizens (Armanios et al., 2020). Achieving success requires finding ways to leverage

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technology to find efficiencies. An understanding of the full cost of potential technologies as they become possible tools to be utilized is instrumental in improving efficiency at the municipal level.

The study's overarching contribution was a better understanding of the aspects of implementing emergent technologies, particularly their economic benefits to municipalities. The identification of the successful implementation of emergent technologies in information systems is the study's primary contribution. The researcher conducted a qualitative study to collect data to allow the type of data collection that best suits the desired scope of the study. The findings of this study may aid in developing policies involving the implementation of emergent technologies in information systems, which could potentially lead to economic benefits to municipalities.

Summary

Emergent technologies have the potential to address the economic inefficiencies of some municipalities (García-Navarro et al., 2019). The specific problem that the researcher addressed through this study was that the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems were not known. The purpose of this qualitative interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. Information was collected on municipalities' values, opinions, behaviors, and organizational context in the southern California area.

The primary means of data collection was virtual interviews. The researcher possessed a unique position as a member of a municipal organization's information systems technology department. Data were analyzed using the interpretive phenomenological analysis methodology (Smith & Osborn, 2003).

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The remainder of the study is organized into four additional chapters, bringing the total number of branches to five. Chapter 2 is the literature review, in which the researcher discusses the findings of previous studies related to the selected topic. Chapter 3 includes a presentation of the phenomenological research methodology used to research implementation success. Chapter 4 is the results of the interviews used to create new information regarding the topic. In Chapter 5, the researcher discusses the findings in greater depth and considers their significance in informing future research and practice.

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Chapter 2: Literature Review

The general problem that inspired the current study was the insufficient existing processes and decisions implemented by the public sector, which can have devastating economic effects on local governments (da Silva Nogueira & Jorge, 2017; Parikh & Zhaochen, 2017; Wester, 2021). The reason for these inefficiencies is lack of accurate predictions that result from lack of adequate knowledge to guide the decision-making of leaders (Ahmad et al., 2020; Gombos et al., 2021; Tian & Li, 2019). In particular, the focus of the current literature review is on the opportunities offered by the implementation of emergent technologies by the municipal leaders, and the associated long-term economic benefits of these technologies.

The reason for the urgency of the research on this topic, are the recent reports of municipalities neglecting the requirements to change or update their existing processes and procedures, which ultimately leads to less efficient decision-making and operations (George, 2017; Krishnan et al., 2020; Saurenko et al., 2018). The potential explanation for this is that the public sector organizations (municipalities in particular) are less economically motivated than the for-profit organizations, and are therefore less likely to invest in information systems that could potentially save costs in the long-term (Baghini et al., 2020; Buelens & Van den Broeck, 2007; Reis et al., 2017). Thus, there is a risk of municipal leaders not recognizing the economic benefits of utilizing emergent technologies, simply because that is not the primary goal of the public sector leaders. As the subsequent sections of this chapter will demonstrate, there are several operational and economic benefits that could improve the long-term processes of municipalities.

To write this literature review, several online databases were consulted. The researcher collected data from over 80 online articles from JSTOR, Wiley Online Library, Google Scholar,

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SAGE, and EBSCO databases. In order to optimize the search and obtain the most relevant articles, the researcher used the following key search terms and search term combinations to guide this literature review: *emergent technologies in public sector, machine learning in municipalities, Unmanned Automated Systems (UAS) technology in municipalities, data-based decision-making in local governments, cloud-based computing technology in municipalities, information system success model, machine learning in public sector, Unmanned Automated Systems (UAS) technology in public sector, impact of emergent technologies on operations, success measure of emergent technologies, municipalities and emergent technologiesi* and *economic benefits of emergent technology*. The majority of the sources used by the researcher were published between 2018-2021, with the exception of resources focusing on the theoretical framework. The researcher supported the theoretical framework literature with recent studies to demonstrate its applicability to emergent technologies.

The literature review is structured in the following sections. The first section provides an overview of the theoretical framework chosen to guide the current study, that is the DeLone and McLean's information system (IS) success model. The second section includes an in-depth analysis of literature of the most prominent emergent technologies: machine learning, UAS technology, cloud-based computing technology, and data-based decision-making. The third section is a discussion of the economic benefits and value of implementing emergent technologies in the public sector, and its contributions to economic development. Lastly, the fourth section reviews the existing applications of emergent technologies in public sector today and will identify areas of opportunity for emergent technology utilization. The chapter concludes with a summary of findings and conclusions.

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Theoretical Framework

To expand the current understanding on the information system success and applicability for municipality leaders, DeLone and McLean's IS success model will be consulted. First, the historical context of the theory needs to be understood. DeLone and McLean introduced the model to improve the understanding of different dimensions of information system success. The goal behind this model was to provide a well-defined outcome measure that allowed the researchers to assess information system procedures, policies, and practice.

Initially, the IS success model was developed from Richard Mason's (1978) taxonomy of information systems, which in turn was developed from the Shannon and Weaver's (1949) Information theory. The original theory developed by Shannon and Weaver (1949) proposed that the overall goal of information technology is a successful transition of information. The researchers argued that the successful transition could be affected by three possible levels of error: first, level A referred to the accuracy levels of the transmission (i.e., technical level), second, level B referred to the precision of symbols being transmitted (i.e., semantic level), and third, level C referred to the effectiveness in attaining the desired behavior through the message (i.e., effectiveness level).

This theory then gave rise to a framework designed by Mason (1978). The researcher used the levels of information complications developed by Shannon and Weaver (1949) to measure the output of information system. Thus, Mason referred to level A (technical level) as the "Production," level B (semantic level) was referred to as "Product," whilst level C (effectiveness level) was divided into three sub-levels: how the message was received by the recipient (receipt), the effect that the message has on the received (influence on receipt), and the effect that the message has on the system (influence on system). Mason's taxonomy of

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information systems focused on the output of the information as opposed to the process of transitioning the information, which was the focus of Shannon and Weaver's original framework.

These two frameworks gave rise to the DeLone and McLean's (2003) IS success model, which is the focus of the current study. DeLone and McLean developed six categories that determined the level of IS success. These included the information quality, system quality, intention of use, user satisfaction, individual impact, and organizational impact (net benefits). DeLone and McLean used this taxonomy to measure, categorize, and analyze the success of information systems transition and outcome. The six categories are reviewed in detail below.

Information Quality

According to the model, information quality refers to the quality levels of the information produced by the system. The system should produce information that is accurate, timely, precise, reliable, concise, relevant, and complete (DeLone & McLean, 2003). Past research by Kamble et al. (2020) focused on assessing sustainable performance in agriculture. They used the information quality produced by the agricultural systems to guide operations and decision-making to optimize sustainable performance. Similar findings were obtained by Kim and Sin (2018) in the academic context.

System Quality

This category refers to the information processing system, which is the hardware and software working jointly to offer the highest quality information processing (DeLone & McLean, 2003). The system quality can be measured using the convenience of access, response time, flexibility of system, reliability, ease of use, ease of learning and integration of system (DeLone & McLean, 2003). Research by Chopra et al. (2019) focused on assessing the effectiveness and usefulness of e-learning portal from students' perspective. They discovered that system quality was critical from the user's perspective, in order to ensure high quality information processing.

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Moreover, Palese and Usai (2018) obtained similar conclusions from a study on e-commerce system experiences.

Intention of Use

Next dimension is the intention of use, or the system use. DeLone and McLean (2003) referred to system use as either actual or reported use. Moreover, system use refers to the users who intend on using the system, such as the executives or the company controllers. Over time, this category was further developed by other researchers. Vojvodic and Hitz (2019) studied the actual and reported use of data compliance system by business users, and its contribution to the successful implementation of the system. They proposed four levels of use for its users: obtaining instructions (knowledge), recording data, planning and data control (monitoring). Moreover, Larmuseau et al. (2018) studied the differences between the actual and perceived use of virtual learning environment by students. They discovered that perceived usefulness of the system significantly improved actual use.

User Satisfaction

This is one of the most important categories of measuring system success. Without user satisfaction measure, the system must rely on self-use, which is not an efficient method of measuring success. DeLone and McLean (2003) argued that user satisfaction offers face validity of the system and allows for validation of multiple measurement tools. Past research by Al-Fraihat et al. (2020) focused on measuring user satisfaction of students who used an e-learning system to support their course learning. The researchers constructed multiple levels of user satisfaction, mainly the support system quality, service quality, learner quality, instructor quality, perceived usefulness, information quality and technical system quality. Thus, user satisfaction is a category that can be measured using multiple constructs. Moreover, Bano et al. (2017) studied

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the importance of user satisfaction on system success and found a significant correlation between the two.

Individual Impact

Success of information systems can be assessed using the individual impact. This impact is different to user satisfaction, as the impact on the individual is more ambiguous to define. DeLone and McLean (2003) referred to individual impact as a category that defines the effect the received information has on the user, which could be an increased understanding of the problem, improved individual learning, behavioral change, increased confidence, improved decision-making effectiveness and information recall. Researchers such as Han and Patterson (2017) focused on the individual impact of using information systems when performing in-vehicle operations. They identified several individual impacts on users, such as increased awareness of task situation, and improved controlling of virtual vehicle. Moreover, Walkington and Bernacki (2019) discovered that online intelligent algebra tutoring system impact students positively through increased interest in algebra.

Organizational Impact

The last category from DeLone and McLean's (2003) model is the impact of the information system on the organization. In their model, organizational impact is not clearly defined, similar to the individual impact. These researchers grouped organizational impact into three sub-categories: profit, productivity, and cost/benefit analysis. Thus, these three sub-categories can be used to measure organizational impact from the information system, which can provide an indication of success. Past research by Sun et al. (2019) focused on measuring profit and system performance to assess the success of using mobile education information system in higher education institutions. Using organizational impact as a measure of information system success, the researchers were able to examine the task-technology fit to explain mechanism in

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technology using behavior of users. Moreover, Bellodi et al. (2017) discovered that the organizational impact of using a clinical decision support system meant improved decision-making and more efficient processes.

Applicability of the Model

The purpose of this study was to apply DeLone and McLean's (2003) model of measuring information success with reference to emergent technologies such as machine learning, UAS, cloud-based computing, and data-based decision-making in local governments (municipalities). The findings of this study offer a unique application of the model on the field of work carried out by local governments, but previous research applied the model to a variety of environments that are relevant to the current study.

The model was applied in measuring success of e-government information systems to optimize the e-filling continuance usage. Researchers Veeramootoo et al. (2018) used the data collected from 645 e-filling users of the e-government system based in Mauritius and used the model to measure its effectiveness. The findings indicated that users' continuance usage intention was affected by the system quality, frequency of user and user satisfaction, which had the strongest impact on the success of use. Similar findings were obtained by Nkanata (2019), who carried out a similar study. Thus, the applicability of the model becomes apparent that the online systems can be introduced by local governments to improve their daily operations.

Moreover, the model was applied to measure the success rate of information systems used by universities. Dalle et al. (2020) collected data from 98 systems users (which included students, lecturers, and administration staff) of the information system used by the master's program of civil engineering. The researchers discovered that the quality of the system, quality of information and service quality affected the user satisfaction and intention of use of the system. Moreover, intended use did not influence user satisfaction but it influenced

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organizational impact. Similarly, Yakubu and Dasuki (2018) found similar results in Nigerian universities adopting e-learning systems. Thus, it can be concluded that DeLone and McLean's (2003) model allows to measure information system success by assessing the relationship between different constructs.

Lastly, DeLone and McLean's (2003) model was applied to public health. The study conducted by Ojo (2017) included using the model on measuring the information success of public hospital information systems used in the developing country. This author collected data from 442 health information management system users from Nigeria. The results indicated that the system quality significantly affected the intended use of the system, whilst information quality significantly affected the intended use of the system and user satisfaction levels. Moreover, the intended use of the system significantly influenced the perceived net benefits, which was the new construct created to supplement the model. In contrast, similar findings were obtained by Gaardboe et al. (2017), whose context was healthcare in Denmark. Thus, the findings of this study showed the applicability of the model on healthcare information systems in both developed and developing countries, which shows the validity of the model.

From the research above, it becomes observable why DeLone and McLean's (2003) model was the best fit for the current study. As the researcher focused on the applicability of emergent technologies in municipalities, the model allowed the researcher to assess the level of success of these technologies from the perspective of municipality leaders. The next section provides a robust literature review and a discussion of the emergent technologies and their benefits to the organizations.

Machine Learning

To understand the topic that the current study addressed, it is important to define the concept of emergent technologies. With the emergence of Big Data, more and more industries

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are utilizing the data for analytical and competitive purposes (Kumar & Singh, 2018; Mehta & Pandit, 2018). The use of Big Data helps governments to improve and accelerate their decision-making operations, which in turn improves their efficiency (Ippolito & Lozano, 2020). One of the mechanisms that allow for the processing of the Big Data is machine learning. Ippolito and Lozano measured the predictive capabilities of machine learning to strengthen the decision-making of the fiscal units in the municipality of Sao Paulo. These researchers used machine learning to check its predictive power against detecting crimes in the tax systems. The results indicated that the Random Forest was the most effective learning algorithm that predicted tax crime. Moreover, the result indicated that this algorithm was able to generalize new data. Thus, from the study above it becomes apparent that the researchers believe that Random Forest is the most effective type of machine learning that offers tax crime prediction performance, which in turn can save the costs for the governments in the long-term.

Other research focused on machine learning's predictive powers. In a study by Amrit et al. (2017), the researchers used machine learning models and text mining to determine whether the model would be able to determine meaningful patterns of child abuse in a municipality in the Netherlands. The researchers discovered that the resulting model was able to achieve a high score in identifying cases of possible child abuse. The researchers concluded that decision-making in municipalities would benefit from the deployment of the API. Thus, it is apparent that machine learning offers substantial benefits to the municipalities and the public sector in general, as it can work with a variety of different data and make accurate decisions that can guide decision-making.

Similarly, Nyetanyane and Masinde (2020) focused on targeting the problem of climate change in agriculture in a municipality in South Africa, where rain-fed agriculture makes the

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crops more vulnerable to sustain. To improve the efficiency of the farmers' systems of predicting rain and making critical decisions regarding crop cultivation, the researchers proposed and analyzed a machine learning model to utilize the climate data, vegetation index and indigenous knowledge to produce the most accurate crop and weather predictions. The current study will focus on the topic of economic benefits for municipalities, and this study indicated that money can be saved using machine learning through monitoring and predicting.

Machine learning can also be utilized to monitor land use and land cover change to prevent the destruction of natural habits. The study by Nyamekye et al. (2020) focused on the use of the Random Forest learning algorithm in the Ghanaian New Juaben municipality. The researchers used Random Forest to classify the land cover maps across several years and provided the analysis of dynamics using intensity analysis. These researchers concluded that machine learning can be used for assessing changes in land use and land cover, which can positively contribute to transformative decision-making for the municipality. The economic benefit of that is the continuous access to land that can be utilized effectively to encourage urban planning, housing, and environmental uses.

There is also evidence to suggest that machine learning can be used to predict bankruptcy of local governments, which has some evident economic benefits for the municipality. Antulov-Fantulin et al. (2021) used statistical and machine learning models to predict the bankruptcy of 7795 municipalities in Italy, across the period of 2009 to 2016. The researchers discovered that machine learning was capable of producing out-of-sample predictions with a high true positive rate and low false-positive rate, which is a strong predictive performance. The current study focused specifically on the economic benefits of machine learning and predicting bankruptcy to benefit local governments.

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Machine learning can be used to understand societal challenges and complex socio-economic phenomena. Feldmeyer et al. (2020) focused on how machine learning methods can address insufficient quality and availability of data, which can limit the adaptation and resilience of municipalities. The researchers utilized machine learning to predict four socio-economic indicators in municipalities and compared their predictive power using regression models. The researchers concluded that machine learning could be used to monitor monitoring administrative boundaries, semi-quantitative factors like social cohesion, and interdisciplinary topics, which confirms its universality. Addressing socio-economic challenges using machine learning can help municipalities to improve the quality of life in the region.

Data-driven household consumption models can help to reduce household environmental footprints. Froemelt et al. (2020) assessed the ability of the machine learning model to profile data-driven household consumption and agent-based transport simulation. Their model was able to predict demand levels in 400 different consumption areas in Swiss households and provided a realistic view of variability in household environmental footprints. Thus, data-driven models are able to predict energy consumption and environmental footprint of municipalities, which in turn can dictate effective decision-making to improve energy efficiency in towns.

Public health can be a big expense for towns, municipalities, and cities alike if it is not effectively planned. Bergamini et al. (2020) studies the predictive powers of machine learning models for mortality rates for ischemic heart disease at a municipal level. Their goal was to use machine learning to validate the Heart Health Care Index, which is used to predict the disease risk of the population. The researchers found that creating the Heart Health Care Index through machine learning allowed the researchers to identify the predictive characteristics that would affect the health conditions of those living in the municipality. Thus, machine learning can

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predict individuals at risk of a disease, which—through efficient decision-making and planning—can minimize the risk of the disease.

Machine learning in public health is more relevant nowadays than ever before, due to the outbreak of the COVID-19 pandemic. Carrieri et al. (2021) used a machine learning model to predict communities with a high risk of vaccine hesitancy across 6408 Italian municipalities. The researchers used a Random Forest algorithm and discovered that it was the most effective algorithm to predict the high risk of vaccine hesitancy with a 24% higher accuracy level than the baseline models. Thus, machine learning can guide the decision-making of municipality leaders and policymakers alike to ensure the health of the public is maintained.

Lastly, machine learning can help municipality leaders to improve their governance and anti-corruption policies. Ash et al. (2021) used data from Brazilian municipalities on audit and local budgets that were associated with fiscal corruption. These researchers used the machine learning model to predict the presence of corruption using budget variables as predictors. They found that the model was able to be applied to new and old data alike, and to provide a prediction-based measure of corruption. Thus, municipality leaders can produce targeted policies based on the machine predictions, which are likely to predict twice as many corruptions than the standard audit. Thus, from the findings in this section, it becomes evident that machine learning is versatile and offers high-accuracy predictive opportunities, which are unique and critical in decision-making.

Unmanned Aerial Systems Technology

The current researcher focused on another emergent technology, the UAS technology. UAS is a system that allows unmanned aircrafts or other systems to operate without a pilot and support search and rescue operations, monitor the infrastructure and provide disaster relief (Howard et al., 2018; Zang et al., 2018). UAS technology can also be utilized at the municipality

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level. Howard et al. (2018) measured the applicability of UAS in commercial settings such as the construction field. The researchers discovered that UAS technology can perform dangerous tasks thus improving the safety of the workplace. Moreover, they determined that UAS can be used for risk mitigation and improving health and safety policies in the workplace. Thus, UAS technology can be used in commercial settings and municipality leaders can utilize it across various industries.

The UAS technology creates opportunities to enhance the built and natural environments in municipalities. Nelson and Grubesic (2020) examined the use of UAS and LiDAR systems in maintaining existing solar infrastructure, which can improve the urban sustainability. Their results indicated that when UAS was used to obtain digital orthophotos, the aggregate irradiation estimated improved by 36% as opposed to LiDAR. Thus, it becomes evident that UAS technology improves the accuracy of estimates, which can guide the decision-making of the municipality leaders.

Building from the previous study, other researchers have identified the benefits of using UAS technology in geohazard mapping. Blišťan et al. (2018) focused their study on several sites with landslide hazards in Slovakia and utilized UAS aerial photography as a way of systematic monitoring of these landslides. Their results indicated that UAS aerial photogrammetry had detail and accuracy levels comparable to any other modern technology method such as terrestrial laser scanning, which is another type of emergent technology. Thus, this study provided evidence of using emergent technologies as a way of managing geohazard risks, which is one of the key aspects of municipality leaders' responsibilities.

The UAS technology can be the most time and cost-effective remote sensing technology that could be utilized by municipality leaders. Perc and Cirella (2020) measured the effectiveness

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of using UAS technology in in evaluating the green infrastructure and predicted rainfall in Slovenia. Their results indicated that UAS can be utilized as a complimentary environmental monitoring tool for urban and natural environments, as it offers high spatial resolution imagery. UAS offers an efficient alternative to other expensive traditional aerial platforms, thus offering economic and money-saving benefits for municipality leaders and others alike.

Moreover, one of the benefits of utilizing UAS technology is the opportunities it creates with accessing data on difficulty-to-access areas. Researchers Prodanov et al. (2020) carried out a case study of using emergent technology to survey, detect and analyze any shoreline dynamics of the Bulgarian coast. One of the technologies used was the UAS technology for landform mapping. The researchers found that UAS was able to photograph erosion-prone areas, provide a digital surface model for the whole coast, and identify a set of ground control points. Thus, it becomes apparent that UAS offers opportunities in urban and natural environment planning, which is of critical importance for municipality leaders.

UAS technology is widely used for wildlife surveying and natural environment surveying as indicated by previous studies. McMahon et al. (2021) focused on the use of UAS systems on wildlife surveying. The researchers used UAS with the forward-looking infrared technology to carry out the surveying on species that were challenging to detect. The researchers used both technologies to create a model to detect GPS-collared moose and cows. The findings indicated that moose detection rates increased by 25% during first calving season, and 85% during second calving season (McMahon et al., 2021). Their findings indicated that the accuracy of the detection improved over time. Thus, similarly to previous studies, they concluded that UAS works efficiently in combination with other emergent technology but is also effective on its own. Municipality leaders could utilize UAS alongside other emergent technologies to provide the

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most accurate spatial information on urban and natural infrastructure, that would guide their decision-making for the municipality.

Spatial data offers a lot of opportunities and economic benefits for municipalities and the society alike. The study by Hernina et al. (2021) focused on UAS application in supporting and developing the government's climate change readiness program in Indonesia. As climate change poses a real-life risk, it is of particular importance to the municipality leaders. The researchers used UAS to acquire the location of a Proklim village and to capture images of the houses in the area. The researchers were able to gather very high-resolution images, generate locations, and produce maps of Biopori Hole. All of these contributed to the government's knowledge about the village's natural environment, which guided the climate change readiness program designed to target the most vulnerable areas in the country. Thus, it becomes apparent that UAS is able to target specific niches of spatial data gathering that is not met by the traditional aerial platforms. The data gathered from UAS is of a critical importance to global, national, and local leaders alike; as a result, implementing it in decision-making is extremely important.

Cloud-Based Computing

The third emergent technology is the cloud-based computing. This is a delivery of computing services such as databases, software, analytics, intelligence, storage, and networking over the internet, to offer a faster, more flexible and innovative access to resources for organizations (Aasi et al., 2020). Researchers Aasi et al. (2020) carried out a study to identify the influence of a cloud computing service (i.e., Software as a Service [SaaS]) on IT governance processes, structures, and relational mechanisms within a public sector in a Swedish municipality. The researchers found that utilizing SaaS helped the IT governance structure to improve the roles and responsibilities within the team, which in turn increased the speed of the decision-making. At the same time, the communication between the team improved significantly.

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Thus, if municipality leaders adopted cloud-based computing into its daily operations, they would likely improve the overall efficiency.

Cloud-based computing has the potential to transform the government's operations and make it more ethical as a result. Prabhakaran et al. (2018) studied the development of Municipal Corporation, which was a cloud-based software that allows people to raise complaints about issues taking place within their localities. The researchers discovered that the main issues raised by people included the water supply, garbage management, electricity management, road repairs, and threats to animals. Thus, the cloud-based computing improved the communication between people and the government. Ethicality was increased as a result, as the software provided a platform for auditing the issues and completed actions. Thus, it is tool that can improve communications between people and leaders in the municipalities.

Recent research identified the opportunities created by cloud-based computing technologies in designing the "smart city" projects. Researchers Wieclaw et al. (2017) examined the experience of using cloud-based computing technologies by organizations, firms, and town residents. The technologies that they studied were GIS, BigData, OLAP, GRID and IoT. These researchers concluded that using cloud-based computing technologies allowed for a more efficient analytical data processing, geospatial data processing and sharing, visualization of data, reporting of information, increased security and data structuring and simplifying. Cloud-based computing offers an opportunity for public organizations to increase their efficiency and operations, which is likely to be time- and cost-effective.

Building on the previous findings, the study of Kaur and Maheshwari (2016) is relevant to consider. These researchers examined the role of using internet of things and cloud-based architectures on enhancing the performance, interconnection, and quality of several services

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within the information and communication technologies. The researchers examined the use of IoT on smart city application deployment, with Dubai serving as a case study. The researchers concluded that IoT provided an opportunity to align different systems with the matching solutions, provided interfaces and tools for validation and integration, and coordinated specifications of the common reference models. Thus, IoT as a cloud-based computing technology facilitates a reduction of capital and infrastructure costs due to the increased efficiency of the services provided. Municipality leaders would benefit from this approach in their daily operations.

Other research focused on the role that cloud-based technologies play in the digital transformation of public and private organizations. Nanos et al. (2019) focused their research on identifying the reasons why cloud-based computing is not widely adopted in the public administration, and the initiatives for adopting these solutions in Greece's public sector. These researchers discovered that utilizing cloud-based computing technology in government institutions would allow for an introduction of innovative and cost-effective services. Moreover, the researchers identified the benefits of increased productivity, full utilization of resources, elimination of system failure risk, increased citizen engagement and improved services to citizens. Thus, utilizing cloud-based computing would improve the effectiveness of services offered to citizens and allow for a cost-effective utilization of resources within the public sector.

With the rise of smart cities, one of the biggest challenges remains the sustainability, skill management and development of the workforce. Researchers Iatrellis et al. (2021) focused on how the development of digital skills of the municipalities' workforce through cloud-computing would improve the development of operations within a smart city. These researchers utilized a skill gap diagnosis to develop the most appropriate digital skills for the professionals operating

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within a smart city. They discovered that through implementation of a proposed CMUTE system, the municipality leaders were able to exchange learning pathways, knowledge, and good competence management. Moreover, staff were able to provide tangible resources to the municipality through the system and engage in mentorship programs. Lastly, the cloud-based system allowed the municipality staff and policy makers to develop and implement policies on the national level through appropriate training and access to statistics. Thus, it becomes apparent that cloud-based computing technologies offer a variety of development and resource-sharing facilities that contribute to the overall improved efficiency of operations.

Many developing nations still lack access to cloud-based computing strategy. Researchers Scholtz et al. (2017) focused on the factors that hinder South African public sector from adopting the latest cloud-based computing technologies in their operations. These researchers carried out a primary research on forty public sector organizations in South Africa to understand the employees' and leaders' perceptions of cloud-based computing adaptation in South Africa. The majority of the respondents in their study indicated concern over lack of availability of online resources, or privacy of their data online. The researchers identified that public sector employees considered cloud-based computing implementation as a regulatory requirement that not only improves the overall performance of the organization, it improves the trust, privacy, efficiency and management of data used by the public sector. Thus, from the literature on cloud-based technologies, it becomes evident that it is an emergent technology used primarily in developed nations. Cloud-based technology offers an opportunity to improve the daily operations of public sector and municipalities, and is therefore beneficial for municipality leaders to implement.

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Data-Based Decision-Making

The last type of emergent technology that will be considered by the present research is the data-based technologies that guide decision-making. These technologies are characterized by processes that are data-driven, and where decisions are made based on the insights offered by the data (Jin & Mi, 2019). Researchers Jin and Mi examined the role of data-based decision-making using AIMMS software, and its role on improving productivity of port operations. These researchers constructed a multi-objective integer programming model to measure the processes of container rehandling and yard crane movements. Using the data on the sum of weight differences between stacked containers, researchers identified that the model which they designed using AIMMS solution, helped to optimize the stowage planning using the complex preliminary stowage data. Moreover, the researchers identified that their model was able to address the safety of the ships, enhance the cost efficiency of the ships, and optimize the loading and discharge processes. Thus, this study provides evidence of the opportunities offered by the data-driven models that aid decision-making, which can be implemented by municipality leaders to improve their existing operations.

Applicability of data-based models can be used across a variety of sectors thus it is a practical and efficient solution to be adopted by municipalities. Tomić et al. (2018) carried out a study on agricultural operations in Croatia, and its effectiveness. The rationale for the study was the cost-inefficiency of the existing agricultural production processes. The researchers gathered the official registers' data to undertake a multi-criteria analysis as a tool for optimal solutions scenario. The researchers discovered that this information-based decision-making processed allowed the agricultural agencies (with applicability to other sectors) to increase the effectiveness and transparency of their decisions. Municipal leaders would benefit using data-based decision-making models to increase the transparency of the economic decisions made.

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Another data-based decision-making model was proposed by Li et al. (2018). The researchers focused on developing a multi-objective and multi-layer fuzzy optimization model to help identify and navigate potential risks withing different sea areas for marine transportation industry. The researchers discovered that the model was consistent with the real traffic within the Chengshantou sea, and the results from the model were consistent with the real-life events. Thus, data-based decision-making model allowed researchers to calculate the risks, provide decision-making references, rescue sites locations and layout, and the configuration of rescue forces. Thus, it becomes evident that data-driven decision-making model are versatile and can adopt a variety of types of data.

On the other hand, data-based decision-making can be used to upgrade the lives of citizens through the utilization of appropriate support systems, good strategies and consistent commitment. Researchers Mokoena and Musakwa (2018) carried out a study on utilizing an Oracle-based mobile GIS tool to undertake an audit for an informal settlement in a municipality in South Africa, allocate their housing and administer their needs. They carried out a data-driven spatial analysis using ArcGIS to create a geo-spatial modelling environment. The researchers discovered that the model enabled the researchers to plan to make effective decisions on household development strategies. Thus, data-driven models help to improve planning and implementation processes through utilization of collected data. Municipality leaders are more likely to make the right decision when they use the correct information.

Decision-making based on data from urban communicates can help to improve policy making, standard of life, and local governments' decision-making. Kuvvetli and Firuzan (2019) carried out a study where they examined the use of Six Sigma, a data-based decision-making application in private and manufacturing industries. The researchers presented a case study

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where this data-driven decision-making process was implemented to reduce traffic accidents in urban public transport sector. The researchers used Six Sigma to identify any areas of improvement and determining risk factors. The researchers concluded that Six Sigma was able to achieve an improvement rate of 20%. The results from the study indicate that data-driven decision-making and data-driven quality improvement approaches can significantly contribute to the quality of services offered by the public sector; thus, it is particularly important for municipality leaders to implement it into their existing decision-making approaches.

Data-driven decision-making processes are becoming more prevalent in public sectors across different countries. For instance, Ranerup and Henriksen (2019) carried out a study on social service delivery in public sector in Sweden using automated decision-making processes. These researchers gathered data from interviews with politicians and professionals, which they later used as the analytical framework in decision-making processes. They discovered that the framework allowed the local governments to automate their decision-making processes, improve transparency and accountability of public servants, and increased the trust of the citizens. Thus, it becomes apparent that data-driven decision-making processes are successfully implemented in public sector different countries, thus providing its applicability and validity. As a result, it is recommended that municipality leaders adopted the data-based decision-making approach to increase the highest quality of decisions.

Lastly, it is important to consider the role of data-based decision-making on education as a key responsibility area of any municipality. Mirke and Cakula (2017) carried out a study on school development in a Latvian municipality. The researchers focused on the demographic and geographical migration processes as the data basis for their simulation model to guide decision-making. The researchers discovered that the simulation model was applicable for education

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system decision-making but was able to be adapted to other public sector industries such as museums and libraries. Thus, the results from their study helped to improve the decision-making processes of the municipality's secondary school as well as collect new data or further analysis. It is evident that data-driven decision-making models can often used in public sectors, which is relevant to the topic of the current study. Moreover, previous scholars have identified the validity and applicability of data-driven decision-making, and the associated benefits to the public administration of adopting these models. The next section narrows the literature focus and addresses the economic benefits of the emergent technologies in line with the current study.

Economic Benefit and Value of Emergent Technologies

As the previous section demonstrated the opportunities created by emergent technologies, it is now important to narrow down the focus on the economic benefits and value of implementing emergent technologies in the public sector. This provides evidence for the importance of implementing these technologies at a municipality level.

Researchers such as Kim et al. (2019) demonstrated that machine learning can introduce several economic benefits when it comes to renewable energy generation. These researchers created a machine learning model to predict the amount of generated solar power, using only weather information that was supplied by weather agencies. The researchers discovered that through using Random Forest regression algorithm, the researchers were able to carry out realistic one-day predictions, which significantly improved the prediction performance. This meant that the number of errors decreased significantly, meaning that the energy operations such as wind and power productions were able to operate at a much more cost-effective level due to improved operations planning.

Other studies demonstrated the economic value of implementing machine learning technology on production and manufacturing processes. Researchers Min et al. (2019) focused

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on constructing a digital twin model to realize production control optimization in the petrochemical industry. These scholars discovered that the model was able to respond timely to any changes in the market, thus improving economic benefits of production. Moreover, the researchers argued that through machine learning the factories were able to achieve a more agile production control process that reduced the cost of any inefficient production processes. Their findings demonstrated that machine learning not only provided the economic value to the sector but enhanced sustainable development, which is cost-effective in the long-term.

Research identified the economic value of machine learning on public sector through the use of artificial intelligence. Kuziemski and Misuraca (2020) carried out a case study on the governments of countries that represented diverse socio-economic differences. The researchers carried out a number of interviews with public servants, government contractors, project delivery leads and academics working on policies. The researchers discovered that the combination of emergent technologies such as artificial intelligence, internet of things, distributed ledger systems, and edge computing contributed to improved automated decision-making, maximized the potential of technology, improved overall productivity, and quality of services offered by the public body, which the authors concluded offered long-term cost-saving opportunities. This is particularly relevant to the topic of the current study, as municipal leaders are public servants who are required to ensure that the quality of services offered to the public meet the required standards.

UAS have been demonstrated to provide the economic benefit to shipping industries. Research by Kretschmann et al. (2017) focused on the automated ships technology and carried out a cost-benefit analysis against using a conventional vessel. The results indicated that the autonomous vessels presented a substantial economic benefit for the shipping companies, as the

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value of cost of owning and operating an autonomous vessel was substantially lower than the cost of owning and operating a conventional vessel. Moreover, the freight rate of the autonomous vessel was lower than that of the conventional vessel. These findings demonstrate the potential of emergent technologies to cut down the operational costs, which can create many long-term benefits for the organization.

UAS technology is particularly relevant in the agricultural industry, where inefficient crop nutrient management can be very costly in terms of operations (Hunt & Daughtry, 2017). Hunt and Daughtry assessed the effectiveness of UAS on identifying problems, monitoring yield losses, and planning crop management operations. Their findings indicated that UAS technology provided the most economic benefit to the planning crop management operations. This is in line with previous research, where several studies identified the economic benefits of emergent technology on daily operations. They noted that many farmers in the United States lack efficient UAS technology to help prevent the yield losses. Although not strictly related to the topic of municipalities, the findings of their study reinforced the evidence that UAS technology can benefit different industries economically by improving the cost-effectiveness of the operations.

Education is another sector that has benefited financially from adopting emergent technology in its operations. Al-Badi et al. (2017) carried out a study where they conducted interviews with cloud service providers, cloud service users and experts in cloud-based computing in educational institutions. Their results indicated that the adopted cloud-based computing approaches helped the educational institutions to offer a most-cost effective disaster recovery and business continuity plan due to the low cost of cloud-based testing and development environment (Al-Badi et al., 2017). As a result of cloud's wide accessibility, it becomes apparent that it is one emergent technology that is easy to set up and offer immense

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cost-saving opportunities. This is relevant for municipal leaders, who will be required to have a disaster recovery and business continuity plan to support its daily operations—which, in turn, affects long-term projects.

From these findings, it becomes apparent that emergent technologies offer multiple opportunities, and many of these opportunities offer an economic/cost-saving advantage to organizations and public sector alike, which was the topic of the current study. The next section of this literature review focuses on the existing utilization of these technologies in the public sector today, to assess the prevalence of these technologies and identify a potential gap where public sector does not fully utilize the opportunities created by the emergent technologies.

Current Implementation of the Emergent Technology

As highlighted by previous research, there is evidence to suggest that public sector widely adopts the emergent technologies in its operations. The purpose of this section is to highlight the patterns and trends of the use of these technologies by the public sector and identify areas where emergent technologies are not used.

One of the most common ways that machine learning is utilized in the public sector is to guide decision-making. Veale (2017) focused on the real-world applications and logistics of machine learning in determining the transparency of decisions made by the public bodies. This researcher interviewed 27 public servants and government contractors from across five different countries. The researcher discovered that machine learning helped the public bodies to maintain transparency, better decision-making, and trust of the citizens. These findings indicate that machine learning is a useful tool for the public sector to improve its decision-making process.

Building on from this study, Veale and Brass (2019) carried out a study on the effects of machine learning on improving public services offered by the public sector. These researchers carried out a case study on the government bodies who used administrative data in order to build

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algorithmic models through machine learning, in order to help them improve their day-to-day operations, management and delivery of the services offered to the public. The researchers discovered several shortcomings such as lack of skills, processes, capacities, and practices, which prevent public bodies from fully implementing machine learning in their processes. Once again, it is apparent that machine learning is typically used in public bodies to aid day-to-day operations and decision-making. As demonstrated earlier, machine learning offers predictive capabilities that can substantially improve accuracy of forecasts that guide decision-making. This is something that municipal leaders could consider in their practice, to fully maximize the use of machine learning to improve larger operations.

Moving on from machine learning, other research demonstrated the utilization of UAS in public sector to prevent cyber threats. Researchers Madan et al. (2019) studied the use of UAS in military and civilian operations in undersea, sea-surface, air, and ground environments. These researchers developed a rigorous threat modelling and risk analysis model to protect the security systems. The researchers discovered that many threats can be managed in cost-effective ways through cyber threat modelling. Thus, UAS offers opportunities for expanding the cyber security that exists in organizations. Although military operations are notorious for utilizing UAS for a variety of purposes, there is limited research centering on the utilization of UAS in public sector and municipalities.

Other research expanded on findings from this study. Hildmann and Kovacs (2019) focused on the utilization of UAS in disaster response, civil security, and public safety. These researchers carried out a case study on serious/commercial application of the UAS and developing a model of UAS applications. They identified that the best applications of UAS would be in the prohibiting environments, tight time constraints, or scenarios with high-

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resolution requirements. Thus, it becomes apparent why UAS is not as widely used on a local level by the public bodies. The authors of previous studies, however, identified the opportunities created by using UAS across a variety of industries such as agriculture and urban planning, which is particularly relevant to municipal leaders.

Although machine learning and UAS are not as widely utilized across local public bodies, cloud-based computing technology is more prominent. Researchers Al-Ruithe et al. (2017) carried out a case study using survey, focusing on the major public sector organizations in Kingdom of Saudi Arabia. A number of government ministries took part in the study. The researchers identified that cloud-based technology is present in government bodies in Saudi Arabia, however more work is required to introduce the adaptation of technology in that region. Moreover, the researchers identified that 70% of the country's public bodies do not use cloud-based services. Al-Ruithe et al. identified that higher education institutions in the country were the largest adopters of cloud-based services, followed by ICT, military, and healthcare. Thus, although cloud-based computing technology is more prominent than other technologies, it is still not as widely used across public bodies in the Middle East.

In contrast, researchers Jones et al. (2019) carried out a study on the implementation of cloud-based computing in the British public sector. The researchers carried out a qualitative study to government officials to ask about their perceived rewards and risks from implementing cloud-based services in the UK public sector. These researchers found that the government officials identified improved data management, improved flexibility of work practices, risk of data compromise or loss of data control as the main opportunities and risks. It was clear, however, that the officials did not identify communication or knowledge sharing as key opportunities offered by cloud-based services, which was evident in past research. Thus, one of

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the ways that municipal leaders can utilize cloud-based services is to improve communication between citizens and staff, and to enhance knowledge sharing.

The last emergent technology that was addressed was data-based decision-making in public sector. Cobbe (2019) undertook a study to assess the applicability of automated decision-making within the public sector and legal institutions in the UK. Cobbe carried a case study on legal institutions and their existing decision-making practices, and explored the opportunities offered by the automated decision-making. This researcher identified that automated decision-making is a novelty in the British public sector, thus this emergent technology has had limited application in the public sector. Moreover, Cobbe concluded that there were several restrictions to implementing automated decision-making in the legal institutions as part of the public body, such as data loss, data confidentiality or security risk. Thus, little is known about the opportunities of data-based decision-making in the public sector. Lack of knowledge contributes to lack of initiative within public bodies in implementing this technology. Implementation at a local municipality level, however, could offer a potential to change this situation.

From this literature review, it becomes apparent that although emergent technologies are widely used across private sector, the implementation within the public sector is still limited. Although some progress is being made as technology awareness increases, it is still a novelty compared to the advanced utilization of these technologies in the private sector. This highlights the importance of the current study to further understand the experiences of municipal leaders, and the potential limitations that prevent them from fully utilizing these innovative technologies. The last section of this literature review provides a summary of findings and final conclusions.

Summary

The chapter opened with an introduction to the problem at hand. Previous researchers who have studied this topic have identified that current operational processes adopted by the

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public sector is not optimal, and thus does not offer economic value. Moreover, there appears to be lack of adequate knowledge of public sector leaders on the opportunities of emergent technologies to improve the decision-making and operations processes.

The second section of the chapter provided an overview of the theoretical framework for the chapter, DeLone and McLean's (2003) IS success model. The model emerged as a combination of two older models and addressed several components that could be used to assess the success levels of the implemented technology. Through the analysis of recent literature, it became apparent that the model was ambiguous in some aspect, and some studies have freely interpreted existing, or created new constructs. The model, however, provides a strong theoretical basis for assessing the effectiveness of implementation of emergent technologies in the public sector.

The final section focused on providing an overview of the most commonly used emergent technologies, including machine learning, UAS, cloud-based computing, and data-based decision-making. The key takeaways from this review were that machine learning offered substantial predictive capabilities and was widely used across various sectors. UAS technology was excellent for gathering data in difficult environments and managing risks. These technologies were mainly used in the sustainable sectors. Moreover, cloud-based computing was the most widely used emergent technology and helped to improve the overall operations and decision-making. Lastly, the data-based decision-making was widely used across different private sectors, but not as widely used in public institutions. The next chapter provides an overview of the methodology that the researcher employed to collect the data on the lived experiences of municipal leaders and their experiences of using emergent technologies in practice.

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Chapter 3: Methodology

The purpose of this qualitative interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. This chapter includes an in-depth discussion of the methodology that was utilized to conduct this study. The sections in this chapter are the following: (a) research design; (b) research questions; (c) population and sample; (d) role of the researcher; (e) geographical or virtual location; (f) procedure; (g) instrumentation; (h) data collection; (i) data analysis; and (j) informed consent process and ethical concerns; and (k) trustworthiness of the study. The chapter ends with a summary of the most important aspects of the methodology and the research procedure.

Research Design

The research method that was adopted in this study was qualitative. Qualitative research is an approach that is ideographic in nature, focusing on the essence of the experiences and perceptions of individuals regarding a specific phenomenon (Fossey et al., 2002). Qualitative research is not concerned with making generalizations; rather, the focus is on amplifying the unique experiences and perceptions of each individual with the intent of finding commonalities (Marshall & Rossman, 2014). Qualitative research also relies on descriptive and nonnumerical data in the process of understanding and interpreting the meaning of a phenomenon (Fossey et al., 2002; Marshall & Rossman, 2014). These methodological and theoretical features of qualitative approach justified its selection for the current study, in which the researcher aimed to explore the lived experience of municipal leaders regarding the implementation of emergent technologies in information systems.

Quantitative research is not appropriate because this approach is utilized in studies that have a strong positivist orientation such as the needs to make broad generalizations about

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relationships and outcomes (Guo, 2015). Quantitative research is also exclusively reliant on numerical data and analysis, which is fundamentally opposed to the exploration of the in-depth lived experience of individuals. Because of the mismatch between quantitative research and the study of lived experience, the qualitative research constructivist approach is the more suitable methodology for this study.

Interpretive Phenomenological Design

An interpretive phenomenological research design was used for this study. The interpretive phenomenological design is characterized by the interpretation of how individuals make sense of their own experiences (Smith & Osborn, 2003). According to Larkin et al. (2006), the two main commitments of interpretive phenomenology are to give voice to the participants and to provide context to the concerns and thoughts of these participants. Interpretive phenomenology is particularly effective in exploring phenomena that require deep insights from individuals who have the relevant experience to understand a particular event (Smith & Osborn, 2003).

Other qualitative designs, such as case study and grounded theory, were initially considered for this study. A case study would not have been appropriate because this design is intended for phenomena that are not only embedded in a particular context but also requires multifaceted examination through interviews, questionnaires, or documents (Yazan, 2015). The lived experience of the municipal leaders could not have been optimally examined using the case study approach. Grounded theory was not appropriate for the current study because this design is specifically concerned with understanding the underlying processes involved that result to the existence of a phenomenon (Dunne, 2011). Hence, there was a fundamental lack of alignment between grounded theory and studying the lived experience of municipal leaders, which was the purpose of the current study.

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The selection of the interpretive phenomenological design was appropriate for this study because the purpose of the current research was to obtain an understanding of individuals' lived experience. The interpretive phenomenological design facilitated the collection of rich descriptive data, enabling the researcher to engage in meaning-making interpretations of other people's lived experience. Through the interpretive aspect of the chosen phenomenological variation for the study, the researcher was responsible for generating rich descriptions of the lived experience of the participants.

Research Questions

The research questions of the study were the following:

Research Question 1: What are the lived experiences of municipal leaders regarding the implementation of emergent technologies in information systems in their municipality?

Research Question 2: What are the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies?

Population and Sample

The participants in the current study included municipal leaders in one municipality who have direct experience in implementing an emergent technology in their area of constituency. Municipal leaders were operationalized broadly as any person holding leadership positions who have adequate knowledge about the implementation of emergent technologies in information systems. The location of the participants was set in a single municipality in the United States.

The criteria for selecting participants was based on the following characteristics: (a) having been involved in implementing emergent technologies such as machine learning, UAS, cloud-based computing, or data-based decision-making; (b) having knowledge and competence to participate in virtual interviews through a teleconferencing platform; and (c) holding a

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leadership position for at least 1 year. These criteria were assessed during the recruitment phase by simply asking the potential participants several questions to determine their eligibility.

The process by which participants were selected was through the purposeful sampling technique, which is a nonprobability method of sampling wherein the selection of participants is informed by the evaluation of the potential contribution of each individual in illuminating the research problem (Gentles et al., 2015). This means that purposeful sampling is strategic in nature because participants are not selected randomly or in terms of any order. Instead, participants are selected based on their projected qualification and expertise. For instance, more senior leaders were prioritized over those who have years of leadership experience. If more individuals expressed their interest to be part of the study compared to the target of 15 to 20 municipal leaders, the researcher would have ranked the projected expertise of each to determine who would be part of the sample.

The final sample size was 15 municipal leaders. This sample size was expected to be adequate in reaching data saturation based on the findings of previous research (Francis et al., 2010). Data saturation is the main indicator of the sufficiency of sample size in qualitative studies, providing reasonable assumption that the number of participants in the sample is already sufficient for variety in responses and theme development (Fusch & Ness, 2015). No important distinction in terms of sex or ethnicity was made regarding the composition of the sample.

Role of the Researcher

In qualitative research studies, the role of the researcher is important because of their immersion in various aspects of the research such as through in-depth data collection and the interpretive nature of the data analysis (Mulholland, 2007). The current researcher took a proactive role in being part of every phase of the study, which had the added advantage of

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limiting who can access the data. The quality of the research depends on the abilities and competencies of the researcher.

Because of the potential for biases, it is important for qualitative researchers to have a plan for maintaining objectivity. Through the process of bracketing, the personal opinions and judgments of the researcher were consciously set aside so that the true essence of the lived experience of the participants could emerge inductively from the data (Chan et al., 2013). According to Smith and Osborn (2003), interpretive phenomenological researchers must be careful and mindful of ensuring that the personal views of the participants are accurately reflected in the interpretation of the data, highlighting the important role of the researcher in the phenomenological process.

Geographical or Virtual Location

This study was conducted online, which means that all interaction with the participants were accomplished through virtual teleconference platforms. More specifically, all interactions with the participants were confined to the Jitsi teleconferencing platform, which allows individuals to speak with one another online privately. The setting of the research study was also confined to a single municipality in southern California in the United States.

Procedure

The Internal Review Board (IRB) provided their approval before any data were collected virtually. After IRB approval was secured, the recruitment of the participants was conducted. Participants were recruited by coordinating directly with a municipality in southern California in the United States. The researcher had a unique position as a member of a municipal organization's information systems technology department. The researcher presented the study to any of the leaders of the said municipality and explained the specifics of the research such as the individuals who can participate in the study, what their participation would entail, and the

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purpose of the research. After approval from the department was secured, invitation to participate in the study was posted within the department.

The scheduling of the data collection process was made after the composition of the sample has been identified and finalized. The researcher coordinated with each participant separately to arrange the time of the interview. All participants received information about the informed consent process and the method of the interviews, which were conducted online.

Instrumentation

The instrument that the researcher used to collect data was semistructured interviews. Semistructured interviews are particularly popular in qualitative research due to their combination of flexibility without sacrificing some level of structure or organization (Harvey-Jordan & Long, 2001). More specifically, qualitative researchers who adopt semistructured interviews rely on predetermined, open-ended questions in order to instigate the discussion, with follow-up questions utilized in order to allow for clarity, expansion, and elaboration regarding the ideas that emerged from the initial questions.

A guide was developed to help the researcher become more comfortable, relaxed, and intentional during the interview. The development of the semistructured interview guide was informed by the five steps proposed by Kallio et al. (2016). The first step of this protocol is the identification of all the necessary requirements for conducting semistructured interviews. The second step is the retrieval of previous knowledge from the literature. The third step is the formation of the preliminary questions in the interview guide. The fourth step is the field testing of the guide, which is accomplished by asking the help of three experts in the field of qualitative research to assess the quality of the questions. The final step is the completion and use of the guide for the semistructured interviews.

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Data Collection

The interviews were conducted online through a teleconference application called Jitsi. The participants were provided with the necessary information and instructions about the teleconference platform before the scheduled individual interviews. A short preinterview test run was conducted to ensure that the recording and sound were properly working and to ensure that the participants know how to operate Jitsi. During the preinterview session, the informed consent was reviewed and verbal consent to be part of the study as participants was requested.

The length of the interview was approximately 30–45 minutes. There was one session of virtual interview for every participant; however, the researcher had the option to schedule follow-up interviews if unexpected events occurred during the interview, such as internet interruption. The virtual interview was recorded so that the researcher was able to accurately transcribe the answers of the participants to every question during the analysis phase of the study. After the interview, participants were informed about the member checking process. Participants were urged to check their email for the transcripts and the preliminary coding results so that the validation of the materials could be facilitated.

Data Analysis

After the interview recordings were transcribed, all data were entered into NVivo qualitative software. This software is particularly helpful in the organization and management of the data, which can be difficult to accomplish without the assistance of a qualitative software (Hilal & Alabri, 2013). NVivo was be used as a storage for all of the interview transcripts, making the coding process more convenient and systematic for the researcher.

Data from the interview were analyzed using interpretive phenomenological analysis, which is characterized by the process of interpreting the experiences of the participants by closely engaging with the meaning of the data (Smith & Osborn, 2003). Interpretive

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phenomenological analysis also uses existing psychological constructs and lens in the process of interpreting the experiences of the participants during the data analysis (Pietkiewicz & Smith, 2014). The specific steps that the researcher followed to analyze the data are presented in the following paragraphs.

The first step entails the process of bracketing, wherein the researcher consciously controls personal biases in order to prevent (Smith & Osborn, 2003). Bracketing is important in phenomenological studies because it is critical to establish that the interpretation is rooted from the actual data and not the personal biases of the researcher. This process of bracketing was accomplished in the current study by performing the process of memoing, which was accomplished by diligently recording the impressions, opinions, theories, conclusions, and biases of the researcher (Birks et al., 2008). These memos were helpful during the validation of the codes and the themes.

The second step of the interpretive phenomenological analysis is the coding of the interview transcripts (Smith & Osborn, 2003). The coding of data was performed inductively, which means that the assigned labels to the different sections of the interview transcripts were based on the raw data, not on previously generated set of codes from the literature. The codes captured the most direct interpretation of the essence or meaning of a particular portion of the text as interpreted by the researcher.

The third step is the determination of themes, which entails looking for patterns from the different codes and assigning a name that captures the essence of the theme (Smith & Osborn, 2003). These themes are likely to tap into what are most significant to the participants and to the most essential elements of a particular phenomenon—which, in this study, pertained to the lived experiences regarding the economic benefits of the implementation of emerging technologies in

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information systems. Depending on the codes that were generated, the number of themes could not be predetermined. Each theme needs to be unique and taps into different aspects of the research problem.

The fourth step of the interpretive phenomenological analysis is the determination of superordinate themes. According to Smith and Osborn (2003), superordinate themes are broader categories wherein several themes can be grouped together. Through this process, the goal of the analysis was to establish broader patterns from the data so that the themes can be organized in ways that capture larger ideas within the dataset. Superordinate themes contains a variety of different themes that can still be grouped together because of an underlying similarity from each other (Smith & Osborn, 2003).

The last step of the analysis is the interpretation of the findings, based on the results presented from the themes and the superordinate themes. More specifically, the researcher generated an interpretive description of the lived experience of municipal leaders regarding the perceived economic benefits of the implementation of emerging technologies in information systems. These descriptions were thick and detailed, using both the themes and superordinate themes as the foundation of the research findings. Exemplary quotes from the participants were strategically interspersed with the researcher-generated descriptions to enhance the presentation of the research findings.

Informed Consent Process and Ethical Concerns

The approval of the university IRB was secured before conducting the interviews. Ethics review of the IRB is an important component of research in order to protect the welfare and safety of human participants (Page & Nyeboer, 2017). The IRB approval indicated that the current study passed the benchmark for the accepted standards in research.

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The informed consent of the participants was secured before the start of the data collection. The informed consent process is important to protect the welfare of the participants and to enhance the likelihood of collecting quality data (Crow et al., 2006). The informed consent form was sent through email in order to allow participants the opportunity to review the document before the scheduled interview. Because no face-to-face interactions occurred with the participants, informed consent could have been given verbally during the start of the recorded virtual interview.

Confidentiality is another important component of an ethical research (Wiles et al., 2008). The real names of the participants were not included in the processing of the data; instead, random numbers were used to distinguish participants from each other. These assigned identifiers were used in the file names of the recordings of the interview, the transcripts, the coding data during the analysis, and the discussion of the results. The recordings of the interviews were kept in a password-protected folder in the personal computer of the researcher to protect the identities of the participants. All data will be destroyed 5 years after the dissertation has been approved.

Trustworthiness of the Study

The trustworthiness of a qualitative study is important to establish to ensure the readers that the findings are reputable and have high levels of quality. The trustworthiness of the current study was established using the strategies of credibility, confirmability, dependability, and transferability (Korstjens & Moser, 2018; Pandey & Patnaik, 2014). In this section, each of these strategies is defined and specific examples are provided to detail how the study's trustworthiness can be addressed.

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Credibility

In qualitative research studies, validity is often operationalized by establishing the credibility of the data and the results. Credibility refers to how accurate the data and findings are, particularly when participants are asked to assess the accuracy of the findings in capturing their experiences and perceptions (Korstjens & Moser, 2018). To enhance the credibility of the study, member checking was implemented by allowing the participants to validate the data and vouch for their accuracy (Birt et al., 2016). Member checking was facilitated by asking the participants to assess the accuracy of the interview transcripts and the preliminary results of the coding.

Confirmability

Confirmability is another element that is comparable to the concept of validity. Confirmability refers to how objective the process is regarding the generation of the research findings (Korstjens & Moser, 2018; Pandey & Patnaik, 2014). To establish the confirmability of the study, the strategy that was used is through reflexivity, which entails creating a journal that details the accurate day-to-day events and decisions that have occurred in the collection and analysis of data (Golafshani, 2003).

Dependability

In terms of the qualitative equivalent of reliability, dependability is typically used to establish the stability of the findings (Golafshani, 2003). Dependability refers to the extent to which the same findings can be generated several times if independent researchers repeat the same procedure (Korstjens & Moser, 2018; Pandey & Patnaik, 2014). To enhance the dependability of the study, an inquiry audit was created so that the researcher could document the decisions made during the course of the study so that a clear justification could be presented (Golafshani, 2003).

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Transferability

Transferability is another strategy that is somewhat comparable to the concept of reliability. Transferability pertains to the extent to which the findings have outside relevance and applicability (Pandey & Patnaik, 2014). For the establishment of the transferability of the study, the researcher provided rich and in-depth descriptions of where the study was conducted without revealing the specifics, how the data were collected and analyzed, and the demographic characteristic of the sample.

Summary

The purpose of this qualitative interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. The interpretive phenomenological design is based on the dual commitment of giving participants their voices and providing context to these ideas, concerns, or perceptions (Larkin et al., 2006; Smith & Osborn, 2003). The selection of an interpretive phenomenological design was appropriate because the lived experience of municipal leaders regarding the implementation of emerging technologies led to meaningful insights that could not have been acquired as effectively using other designs.

The participants in this research study included 15 municipal leaders who have direct experience in implementing an emergent technology in their area of their constituency. The sample size was informed by the tenets and assumptions of data saturation, which provide some level of guidelines regarding the appropriate sample size (Francis et al., 2010). The selection of participants was accomplished through a purposeful sampling technique, giving priority to individuals who have shown the most promise in providing highly relevant data (Gentles et al., 2015).

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Data were collected online through a teleconference application called Jitsi in order to facilitate individual semistructured interviews. Data were analyzed using the interpretive phenomenological analysis methodology, which includes various steps such as bracketing, coding, determination of themes and superordinate themes, and the interpretation of the data (Pietkiewicz & Smith, 2014). The next chapter includes the results of the interpretive phenomenological analysis.

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Chapter 4: Findings

Technology can be used to address efficiency problems and improve economic efficiency at the municipal level (Tian & Li, 2019). The implementation of emergent technologies can often meet requirements related to municipal economic development (Armanios et al., 2020). Furthermore, there are typically unexpected outcomes that arise from using emergent technologies (Krishnan et al., 2020). The purpose of this interpretive phenomenological study was to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. Understanding the lived experiences of those involved in implementing these technologies was essential. The research questions for this phenomenological study were:

1. What are the lived experiences of municipal leaders regarding the implementation of emergent technologies in information systems in their municipality?
2. What are the lived experiences of municipal leaders regarding the economic benefits of implementing emergent?

The use of a phenomenological approach allowed for an in-depth understanding of how the need for positive economic outcomes in a municipal environment can impact the implementation of emergent technologies. Detailed in this chapter is a description of participants, a review of data collection, details of data coding, and the qualitative results such as emergent themes, patterns, and outliers.

General Description of Participants

Individual participation in this study was voluntary and at eligible participants' discretion. The sample included persons employed at municipality that held direct experience in implementing an emergent technology in their area of constituency. Municipal leaders were

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operationalized broadly as any person holding leadership positions who had adequate knowledge about the implementation of emergent technologies in information systems. The location of the participants was set in a single municipality in the United States. Twenty-nine individuals qualified to participate. Twenty-one eligible participants inquired about participation in the study, of which 15 completed and returned the informed consent form to participate in the study, representing a 52% response rate. The 15 participants evenly represented all areas of the organization, planning, communication, police, fire, utility billing, environmental services, human resources, graphic information systems, and information systems. Reaching data saturation was required for the greatest understanding within this study.

Participation and responses were anonymous and confidential through the application of random participation identification numbers. Obtaining basic demographic information enhanced the analysis of the data collected. Forty-seven percent of participants were female, and 53% of participants were male. The age distribution of the participants in the study was 7% under the age of 29 years, 47% between the age of 29 and 49 years, and 47% aged 50 years old or over.

Regarding ethnicity, 66% of the participants were White, 20% were Hispanic, 7% were Black, and 7% were Asian. Participants had a wide range of educational backgrounds. The number of participants with some college experience but not bachelor level education was 20%. Those participants that achieved the level of bachelor's degree made up roughly 47%. The number of participants with graduate or higher levels of education made up 12%.

Participants possessed a wide range of years in municipal leadership, ranging from 3 to 36, with a combined total of 222 years of experience as municipal leaders in the space of emergent technology implementation. Fifty-three percent of participants possessed less than 10

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years of experience. Thirteen percent of participants possessed between 11 and 21 years of experience. Those with greater than 22 years of experience made up 33% of all participants.

In this phenomenological qualitative study, the unit of measurement and analysis was the semistructured interview from each participant. Themes and patterns found in the data from each interview contributed to the analysis of the data as a whole and the conclusion of the research question presented.

Sample Size

All 29 eligible participants had the opportunity to participate in the study. All 29 eligible participants received information regarding the study topic, timeframe, and requirements. This practice allowed eligible participants to self-identify as interested in participating in the study. This practice also limited the potential of researcher bias in participant selection while ensuring a willingness from participants to reflect on experiences. A self-selection research sample also aids in limiting bias by capturing input from various eligible participants without limitations (Nicholls, 2019). Of the 29 eligible participants, 15 eligible participants volunteered, which represents 52% of all identified eligible participants. The self-selected participants met the established requirements of the study by having a minimum of 2 years of experience and the requisite knowledge of emergent technology implementation.

Data saturation occurs when no new codes are occurring in the data (Saunders et al., 2018). Repetitive themes within the same coded category signify saturation. The achievement of data saturation was evident following eight interviews with repetitive themes withstanding. The remaining interviews conducted confirmed saturation allowing the potential for new information and giving participants the opportunity to reflect on their experience. Having achieved data saturation with participant representation across the study with varying employment lengths, the sample size was large enough to ensure a depth of data for the research study.

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Data Collection

Data collection commenced after obtaining IRB approvals (see Appendix D). The appointment scheduling software used was SimplyBook.me. The researcher created a website that allowed participants to choose available times while inputting their contact information. Eligible participants were identified at the organization via the organization's website. Emails recruiting participants were sent to those identified via the city's website. Of the 29 individuals identified, 15 responded and set up interview times. Once interview times were set up, instructions and informed consent forms were sent to participants via DocuSign. The documents were sent to the participant to be signed and returned to be signed by the researcher. Included in the information were directions on when and where to access the video conferencing platform that would be used.

The video conferencing platform used is called Jitsi. This platform allowed for video conferencing and had options to utilize either video or phone. This made a consistent platform to conduct interviews. The other software utilized to record the interviews was Camtasia by Techsmith. This software allowed for the video capture of all interviews conducted. These interviews were recorded and are kept private in the possession of the researcher, who will keep them secure and locked for 5 years, after which the data will be destroyed. The time of interviews ranged from 18 to 45 minutes. The data collection time frame and process were sufficient for engaging participants and capturing the data needed for saturation.

Employing a hermeneutic approach to the interview involved a process in which participants explore their experience of the phenomenon through a conversation that develops between the participant and researcher. Utilizing a conversational approach to explore participants' lived experiences and create an open environment conducive to participant reflection, the researcher's semistructured format moved from asking broader questions

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regarding the participant's history to reconstructing the phenomenological experience and finally to reflect on the meaning and impact the time frame had on the participant (Lauterbach, 2018). Refer to Appendix B for the interview questions with demographic and contextual questions asked during the interview.

Codebook Creation

The researcher used NVivo qualitative transcription software and transcribed the video conference interviews to analyze later the information collected (Nicholls, 2019). The researcher listened to the interviews twice before reviewing for coding purposes. This process provided the researcher with an opportunity to listen for true meaning before structured analysis. Upon the third review of the interview responses, the researcher reviewed the data for qualitative data coding (Melnikovas, 2018). Reviewing the interviews following collection allowed the researcher to identify word and phrase repetition within the content based on the participants' responses (Melnikovas, 2018). Identifying themes from interviews with repeated words and phrases also reduces potential bias. Reviewing each interview for word and phrase repetition enabled the researcher to identify frequently used content to analyze across interviews (Melnikovas, 2018).

Following the classification of codes within each interview, the researcher assembled the individual codes to cross-examine meta themes within the data. The researcher assembled common themes and patterns in Microsoft Excel, which allowed data synthesis based on the actual lived experiences of employees (Mihalache, 2019). Ensuring transparency in reporting with minimal manipulation and interpretation provides a basis for potential application to other contexts and is an indicator of objectivity (Elo et al., 2014). To further confirm objectivity and reduction of potential researcher bias, the researcher also employed member-checking of the coding data to increase the credibility of the study (Amankwaa, 2016). After coding each

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interview, the researcher shared the individual analysis with the respondent to confirm understanding and evaluation.

While initially postulating a codebook (Appendix E) based on the semistructured questions presented to participants, the researcher based the final dataset of codes on a ground-up, inductive coding method that employed codes directly derived from the data. The researcher initially used the *in vivo* coding method to summarize passages into single words or extracted phrases. This inductive coding method allowed the initial coding round to stay as close to participants' intent and meaning as possible. Before advancing in the coding process, the researcher performed member checking by sending participants' their data summarizations. After the initial extrapolation of data and confirmation of clarity by participants, the researcher grouped codes into categories based on overall themes by employing thematic analysis coding that synthesized patterns across the data.

Qualitative Results

Outlined in Table A1 are the emerging themes from participant responses to the structured interview questions. Beside each emerging theme is the percentage of interviews in which the theme was present. There were three themes that arose from this iterative, qualitative analysis: (a) implementation of emergent technology, (b) effects of emergent tech use, and (c) economic considerations with emergent tech. Each theme encompassed several subthemes and codes.

Theme 1

The first theme, implementation of emergent technology, was composed of three subthemes: experience with emergent technology, considerations for implementation, and concerns about the implementation process. This first theme relates to participants' descriptions of their own experience with implementing emergent technologies and the factors that drive

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implementation. Participants shared their considerations for determining an emergent technology to implement and the concerns that they have regarding implementation.

Theme 2

The second theme, effects of emergent tech use, was composed of two subthemes: positive gains and lessons learned. These subthemes demonstrated the impact of using emergent technologies. Participants shared the improvements they noticed following implementation and the value realized. They reported on the lessons that they had learned during the implementation process.

Theme 3

The third and final theme, economic considerations with emergent tech, included information about the benefits and outcomes related to implementing emergent technology. There were three subthemes that composed this theme: benefits, funding, and unexpected outcomes. Participants reported on the immediate and long-term benefits of using emergent technology. They also discuss unexpected economic impacts and value derived from the implementation of emergent technology. Lastly, participants discussed their experiences with funding.

Implementation of Emergent Technology

One theme that arose from this analysis was the implementation of emergent technology. This theme revealed participants' experiences with implementing emergent technologies and the factors that they considered. The subthemes and examples of quotes that motivated these subthemes are provided in the following sections.

Experience with Emergent Technology

All participants shared their own experiences with emergent technology. First, participants identified they types of emergent technologies they implemented. There were six

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participants who used cloud-based computing, four participants who used data-based decision-making, and three participants who used UAS technology.

The participants with experience with cloud-based computing reported on these experiences. For example, Participant 13 commented on the ease of using this technology, stating, "Well, it's a very straightforward process. As long as you do research for a typical municipality area to utilize many third-party enterprise applications that are typically hosted at the facility. So, the road to a cloud-based was kind of a natural extension and evolution of that same concept." Participant 6 detailed the importance of selecting a good company for your technology provider: "Again, part of that is choosing specifically the company that I'm going with because had such a good reputation. They're known for their support and everything." Participant 8 described their unique experience as entering their position during this decision-making process:

> So, for me, coming on with very little experience, because I, I knew how to enter into a box and change it to build and do things, I needed to also ask my input systems or … to help out. So, coming on to an agency with … people completely, it's very nice because I have a little bit more control over creative inputs, creative parts of the job and I'm really just getting to see the nuts and bolts being a part of the board meetings. I'm getting to see why certain software is brought up and why certain decisions were made based on budgetary reasons or just based on the capabilities at the time. So, one of the things that we're doing is bringing the website up. It will be a few of the other things we have are now cloud based. So, I was involved in kind of the creative part of it, kind of the middleman, and they need help. And then I really just kind of sitting back

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and getting to witness all the other fun stuff come together.

In addition to experiences with cloud-based computing, participants also depicted their experiences with data-based decision-making. For example, Participant 11 shared, “I think one of the rewarding things about the decision-making that's based on the data that we have stored is the ability for managers and decision-makers to look at what has actually happened and make decisions based on factual data rather than in the past.” Participant 1 also denoted, “You have to get user buy-in kind of from a top-down level and across the municipality. I feel like most departments are kind of off on their own little sector doing their own thing. So, it's hard to get that buy-in and that trickles down from department heads out to the front line staff.”

Participants who implemented unmanned aerial systems technology also described their experiences. For example, Participant 14 shared how this technology was selected, describing, “The way the idea originates is someone in the organization learns of the text of the technology first and then usually it's on an individual basis. They go out and they learn how it works. And then at some point, it moves from the individual to the organization.” This participant went on to identify the benefits of this technology: “You have a drone and that can save a huge amount of resources when you're talking about deploying fire engines and ambulances. So, I don't mean to go on too much that police wrong. Yeah, but the drones are just a wonderful specific example of how a small, simple, almost a hobby type of technology as it moves from the individual into the organization, then you get your technology professionals involved, just the incredible range of things you can do with that.” Participant 3 noted the complexity of this technology: “Dealing with the technology, with the aspect and operating the drone and digital management, there's a lot of major tiny components both in the foreground, meaning fun and then in the background, meaning the management side of operating a drone.” Lastly, Participant 5 shared their feelings

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about implementing this technology, indicating, “But, you know, over time, I don't know, like it's that it's gotten to the point where it is. It feels really good to have it. But for a while there, it was tough. And then, you know, probably in 5 years will wish that we had done something different or will wish that we had something that was more adaptable.”

Considerations for Implementation

All participants voiced the considerations they made when implementing emergent technology. One major type of consideration was origin of need. For example, Participant 1 said, “That work is just not running at an efficient level. There's no real workflow that is flowing. It's just kind of very static.” Participant 10 commented, “I think, as we look at where technology is providing for things like this online portal, when you have platforms that are open to the public that they are interacting with, you've opened up a whole other level of ways in which you can further enhance the system.” Participant 13 detailed how they origin of need connected to the technology: “The typical need is for more flexibility, scalability, resiliency, redundancy, the ability to have disaster recovery plans and regional areas because of the typical drivers for cloud-based infrastructure and applications.” Contrastingly, Participant 14 believed that it was less about need and more about opportunity, explaining, “The use of technology is not need-based, but is opportunity-based, in other words, the city of Escondido? Well, I think a lot of organizations, don't sit around thinking, oh, what do we need? Because when you think about it, they're already doing their stuff in the way that they've done it for hundreds of years.”

In addition to sharing their origin of need, participants also commented on the decision-making process for adopting new technology. For example, Participant 2 provided a detailed example:

My manager reached out to me to investigate new technology that basically

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> streamlines how any type of city roads are implemented, the system, how to represent a very unique, specific way, and how to represent different activities of roads. For example, certain segments painted curbs designated for a certain amount of time you can park. There is no parking, say, along the same road. It could be split up a different way and just stay well over this section from this section, the U-turn, and so on. So, it's this technology that this person who's going to create more investment of time and setting all that up to implement a system. So, I from other research and data that get this new technology for ultimately a new person, we need to hire a new person or redistribute responsibilities to handle that.

Participant 3 also said, "the process of bringing something new that relates to technology is really understanding what is the next thing? […] For example, you know, if I just buy a phone, obviously I need a lot more to it for it to work, which is, you know, OK, you got to activate it. You got to make sure you got a good plan. Right. You got to make sure you got data." Additionally, Participant 7 commented, "So you have to know what you're trying to achieve first. So, what's your end goal? That's kind of where you start. And it seems like that's where you would finish." Lastly, Participant 1 expressed, "I say that it has to be data-driven, you have to look at what you're doing now and what you're potentially going to bring in, how that's going to change the process, really confer with your team to see if this is the right choice."

Concerns About the Implementation Process

All participants reported concerns they had regarding implementation of emergent technologies. They shared their concerns at various stages of the implementation process: before, during, and after. All participants commented on the concerns they had before they implemented

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a new technology. For example, Participant 1 worried, “You know, this could blow up in our faces. What if this isn't the best solution? You know, the data may support that it is, but there's always a chance there because there's that human error to any side of like a software implementation were how are the users going to be affected by this?” Participant 2 said, “Right. The concern immediately about any new emerging technology is the learning curve and the minute the cost and who's actually going to maintain it.” Participant 4 described a “resistance to change. No one, um, especially in my industry, people don't like change. They don't like new things. Very seldom are they welcome, you know. So, if I understand the question correctly, you're talking about like barriers to implementation.” Lastly, Participant 8 denoted, “I mean, integration is something that's very important. And then also the long-term aspect is going to work for us now, or is this something that, you know, was just going to be shorter term?”

There were 13 participants who expressed concerns they had during the implementation process. For example, Participant 4 shared, “I think from a you know, from a departmental perspective, that was a little bit irksome because, you know, it's like, you know, that you're going to have to do this and you know that you're going to have to handle these sorts of things that are going to come up from other departments as you're rolling this out […] I'm already paying information systems, a lot of money. And we probably threw in for this program, too. So those are kind of some questions that come up during the during the process.” Participant 7 commented, “The amount, the amount of support or how you're going to structure your support, and the service levels that you'll be offered. Those are considerations as well. You always want to have to rely on a vendor.” Participant 8 also stated, “I mean, another thing after limitation is does it actually work? Obviously. Did our projections translate?”

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Lastly, 11 participants denoted the concerns they had after the implementation was completed. For example, Participant 1 mentioned, “Did I just waste all this time and money for nothing? I think there’s always a period when you go live with something or you implement something that you kind of hold your breath. Everyone wants to criticize you.” Participant 10 also shared, “S,o if I think about the work that I've done just with the city and with this project that implemented you know, the new city works and the online portal and the plan review piece, I think one of the things that caught me a little bit off guard was its hindsight is always 20/20, but it was the idea that when we implement everything, we were really, really focused on trying to train the staff.” Participant 1 stated, “So, one of the big things would be ongoing, the ongoing training and support level. So, one piece that people sometimes forget when they're implementing a solution is that the people who are there implementing it, both on the site and on the department side, may not be there long term. So, you need to make sure you plan for continuity of knowledge.”

Effects of Emergent Tech Use

Another theme that arose from this analysis was effects of emergent tech use, which was composed of participants detailing the influences of technology on various outcomes. This theme was composed of two subthemes: positive gains and lessons learned. Examples of quotes that motivated these subthemes are provided in the following section.

Positive Gains

All participants disclosed some positive effects of implementing emergent technology. These gains were classified as noticeable improvements and value realized. There were 14 participants who identified noticeable improvements following technology implementation. For example, Participant 12 commented, “Efficiency, I mean, technology is what it is now. That technology is really what it's all that's what technology is meant for right.” Similarly, Participant

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13 shared, “I think the need for infrastructure in virtual servers, the flexibility to migrate, relocate back up, and replicate these servers is key for third-party apps. The elimination of server maintenance and hosting is really the big, big improvements, not having to worry about that and spend your own staff resources on that.” Efficiency and ease of use were common improvements that participants noted. Participant 5 also reported, “The ability to access information quickly and easily and, you know, communicate really easily between inspectors for inspectors to, you know, be able to. Yeah, fine historical inspection information really easily.”

In addition to having noticeable improvements, participants also shared the value realized with technology implementation. There were 11 participants who contributed information related to this type of positive gain. For example, Participant 15 shared a specific example that applied to a hospital setting: “The value is realized by the hospital being better prepared and knowing what patients coming in, you know, their age, preexisting conditions, anything that was done in intake by the paramedic is transmitted to the hospital. And also the ambulance knows the wait time.” Participant 5 stated, “I guess it is like a little easier to charge people.” Participant 6 conveyed, “It's going to cut down on time and effort. […] So already I see that it's going to put a little bit more burden on the state. I shouldn't say burden a little more responsibility on staff so that it's not so centralized with me.” Lastly, Participant 8 reported, “So there's whole just the way that we participate in public meetings and the executive orders and assembly bills and all the things that are being added on to that to make sure that the public has a right to privacy at all times.”

Lessons Learned

All participants discussed the lessons that they had learned during the technology implementation process. These lessons related to implementation practices and economic

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benefits of implementing emergent technology. There were 13 participants who commented on the lessons they learned with implementation. For example, Participant 10 stated,

> I think the lesson learned was sometimes when I wasn't hearing issues are concerned, I, I thought, no news is good news. And I think drilling into a few things earlier on would have been good. So I kind of relied almost too heavily on just the weekly meetings to check-in. And now if I did it again, it would be to the weekly meetings. Yes. But then also just to really keep coming back to and probing for potential issues.

Participant 12 commented on the importance of staying ahead of problems: "So it's really important to work with all the technologies to stay on top of that, on top of the technology, especially let technology when it's constantly changing so frequently that we don't keep up with all just about a long time. And I catch up even more." Participant 13 shared a specific lesson learned for the type of technology they used: "Modern hosted apps are here to stay. So, investing in that migrating legacy apps to a more platform, more flexible model, I think is the key takeaway from them as far as their own infrastructure." Participant 4 also noted the importance of flexibility during the implementation process, indicating, "I would say just being flexible in that and then using either reformative or a summative approach based on the team, you know, that you're working with and within the constraints of their understanding and expertise also."

In addition to these lessons about how to better implement new technologies in the future, participants also mentioned lessons they learned in terms of economic benefits of implementing emergent technologies. There were 14 participants who shared lessons learned in this context. For example, Participant 3 denoted, "The lesson that I've learned, again, is communicating effectively and intelligently with the research done." Similarly, Participant 5 stated, "So you

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have to have, like, a lot of patience and yeah, be ready to put the time into it because it takes a lot of time from the staff to communicate, you know, what they do so that it can be, you know, made more efficient. You have to kind of walk through the whole process and do flow charts and stuff like that. And it's kind of a lot of work." Participant 7 also reported on the importance of questioning the technology prior to implementation: "I think that one is number one is make sure you ask more questions and make sure you ask more questions than you ever think you need to ask them. And not just for management, but from your and not just for management, but from your end-users to all the way from end-users." Similarly, Participant 8 shared the critical need for feedback, citing, "I always take feedback. I'm always wanting to make sure that information out there is going to make sense to the people that wants to."

Economic Considerations with Emergent Tech

The third and final theme was economic considerations with emergent tech, which contained participants' reports of the economic outcomes and challenges that arise from implementing emergent technology as well as the funding required. This theme was composed of three subthemes: benefits, funding, and unexpected outcomes. All subthemes and examples of quotes that motivated these subthemes are presented in the following sections.

Benefits

All participants provided descriptions of different economic benefits of implementing emergent technology. Participants categorized these benefits as immediate and long-term benefits. All participants described immediate benefits they gained after implementing technology. For example, Participant 12 said, "One thing with like making things more efficient, like, for example, are forms used to be filled by paper. Right. That was one of my biggest things, is, you know, we have even if you Google for us, companies might not be that secure." Participant 14 shared, "An immediate benefit of a number of years ago was when we moved to

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the system of digitizing, digitizing, and handling all of our records electronically. We found it no longer necessary to rent an offsite warehouse to store records. And so that was an immediate short term. You know, I think we realized the economic benefit from that within just a few months." Participant 3 stated, "The immediate benefits are more like…We deal with a lot of editing, a lot of video editing because we produce in-house videos, most of it our essays and so. Having a computer that works, either that's going to handle a high-definition clip or a video requires a lot of data and requires a very strong computer."

Additionally, participants shared the long-term benefits they noticed after implementing emergent technology. There were 13 participants who identified a long-term benefit of this practice. For example, Participant 6 identified a city-wide benefit, stating, "I see it as the transparency for the public as well as hopefully paperless for the city." Similarly, Participant 1 described another city-wide benefit:

> I mean, there's a lot I think that that's the whole goal of technology, at least in my mind, is like creating these efficiencies and economic benefit. You want to be doing the most for the little the least amount of money, right. I think having our city-wide applications breaking outside of this siloed technology is having something that is mostly department or city-wide is the most helpful in recognizing those long-term benefits because everyone gets on the same page. There's not a stoppage from communication.

Participant 11 also noted a long-term economic benefit, indicating, "I think I think long term if you're talking about full-time personnel, were able to save full-time personnel then because we have the pension program, then that will help our long-term benefits if we don't have to add new people, or we can even scale back on some existing people and we don't we wouldn't lay people

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off." Participant 5 noted, "I think just being able to access information easily, you know, in a geographic format, it just helps people, you know, city staff to be able to do their jobs faster and more efficiently. So, that's a benefit."

Unexpected Outcomes

Another economic consideration that could not be planned for prior to initial implementation—but was important to factor in future implementations—was unexpected outcomes. There were two types of unexpected outcomes participants described: unexpected economic impacts and unexpected economic value. Most participants (n = 13) indicated which unexpected economic values they observed. For example, Participant 10 reported, "I guess that might be unexpected is the volume increase. But to be fair, I think a big part of that also came from the shutdown. Right. It was forced upon us, but still unexpected. We can expect that there are definitely some things that have been good, some changes that were forced on us that have been good." Participant 11 stated,

> I think we were just we were a bit surprised at how quickly things turned around for them. I mean, we knew we knew that that working in the field was going to be of value to them. But I don't think we realized quite just how much it was. And so we're working to bring that model to other areas of the city. And I think once we're able to do that, once we overcome some of the initial resistance, then we're going to see a lot of benefits over there, too. And we'll have a better idea this time around of how much benefit they'll get out of it.

Participant 12 described some positive, but unexpected, attention: "You know, putting yourself in that spotlight was kind of like, oh my God, we didn't expect you know, we didn't expect this. We got a lot of attention as he works on the stuff that we've implemented. And I think that helps

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us add value to what we do."

Another type of unexpected outcome was unexpected economic impacts. There were 11 participants who contributed information related to the unexpected economic impacts of implementing an emergent technology. For example, Participant 5 indicated that there were unexpected costs, citing, "You need that done. That's going to cost you 2,500 bucks, you know, to get that extra ability to write that you know to generate a letter or something like that." Similarly, Participant 6 shared, "So I was just surprised how much it went up. I just got the invoice for this next year. And so that's something that I wonder what it's going to look like long term, like if it's already in the budget and they're going to ignore it, or are we going to keep spending." Participant 15 also reported, "I would say the unexpected is that the software does not run effectively on the PC standard. So, in order to run the software, new computers had to be ordered that were like high-performance machines that are actually like use for A.I." This participant continued, "They're like, um, there's a certain level of the Dell workstation, but they're high processor memory-intensive application. It also impacted the bandwidth so that traffic couldn't travel on certain Vlaams without impacting other traffic. And so, while the software was very featured, rich, and the customers loved it, it incurred costs later because the equipment couldn't handle it."

Funding

The final subtheme within the economic considerations with emergent technology theme was funding. This subtheme included participants' reports of the methods they use to obtain funding and the concerns they have with funding. There were 13 participants who shared the method they use to obtain funding. For example, Participant 12 indicated, "Our division, in general, is usually funded by general funds from the city's budget in both agencies." Participant

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13 identified several funding mechanisms: “Approaches typically look for existing funding sources first. If new funding is required, you can be creative and look at cost-sharing with other departments. Or you could even create a proposal outlining the benefits to the city manager and city council, the additional funding that obviously must come from somewhere. So, you just have to find the best place for that.” Similarly, Participant 3 mentioned several funding sources: “So in my department, there's different ways that we can get funding. And that could come directly from our what we call their general funding, a bucket of money that is just our department could be grants or three could be reserves, which we normally don't touch. That in other is what we call government tax taxpayers credits.” Participant 5 indicated a single funding source, stating, “Rebels were funded by the ratepayer's so, so ratepayer's, I think, you know, they kind of would hope or expect that that their money is going to a good place and to an efficiently run organization.”

In addition to funding methods, participants also shared the concerns they had regarding funding. For example, Participant 10 expressed the importance of monitoring costs, describing, “You know, the only thing has been maybe being watchful of the hours consulting hours. Right. Because that'll, you know, that's, that goes into your budget. So, you want to be aware of how the time is being spent. But yeah, that is an area of the project I've not really been involved.” Participant 11 commented on the lack of increasing funds:

> In in our municipality and probably most of the others we have were funded out of the general fund budget and so our budgets are constrained by the and in our case, it's mostly the sales tax of our municipality. And because of the fallout from the Great Recession of 2008, ever since then, we pretty much have been operating under the assumption that our budgets can't grow or can only grow

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minimally and we can't add new personnel.

Similarly, Participant 13 mentioned concerns about having a constrained budget "since this palmitate in annual budgeting. Too many concerns about that. We didn't have unlimited budgets, always a constrained budget. So, we have, again, pick and choose and prioritize what's most important. Being able to migrate to cloud-based computing." In contrast, Participant 14 reported on technology not being prioritized: "I would say that the biggest concern would be and a lack of appreciation by the decision-makers for the value which technology can add to the organization."

Outliers

There were no datasets directly related to the research question that varied greatly from the rest of the data. The most divergent response from responses of other participants was to the interview item that asked participants to "Describe concerns, if any, about funding allocation and approaches to obtain funding." The concerns were dependent on the department. Depending on the department, the funding sources and ability to acquire funding for emergent technology implementation varied. The participants expressed these sentiments and would sometimes validate this understanding across departments. One of the participants was very efficient in the amount of time taken for the interview. There was no less volume or depth in answers, but during his interview, it appeared as though he would hear the question, take 30 seconds or so to digest the question, and respond with his answer. It is a point that warrants discussion as an outlier.

Summary

The researcher interviewed 15 participants of a municipality during October 2021 regarding their lived experiences in emergent technology implementation for local government considering the economic value and impact. During the semistructured, conversational,

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hermeneutic phenomenological method interviews, three major themes emerged. The importance of direct, frequent, and transparent communication was significant, relating to both events of the time frame and how the simultaneous events affected participants. Chapter 5 contains the research findings and connects the findings to the literature review of the research. In Chapter 5, the researcher also provides his reflections on the research study as well as recommendations for further research.

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Chapter 5: Concluding the Study

The researcher developed this phenomenological study to investigate municipal leaders' lived experiences regarding the economic benefits of implementing emergent technologies. The findings revealed that these leaders faced several challenges during implementation. The interviewed employees of the municipality shared their concerns and pertinent emotions based on their lived experiences. This chapter includes a summary of the study, a consideration of its ethical dimensions, an overview of the population, sampling method, limitations, findings, reflection, recommendations, suggestions for future research, and a conclusion to the study.

Summary of the Study

The analysis of the interviews with municipal leaders in one municipality who have direct experience in implementing an emergent technology in their area of constituency revealed several themes associated with the overarching research questions of this study. The first theme, the implementation of emergent technology, included participants' reports of the experiences they had with implementing emerging technology. There were three subthemes that composed this theme: experience with emergent technology, considerations for implementation, and concerns about implementation process. Participants shared the types of technologies that they had implemented and the considerations for implementation of these types of technologies. They also reported on their decision-making process and the origin of need to informed technology selection. Lastly, participants voiced their concerns about every change of the implementation process.

The second theme, effects of emergent tech use, included participants' portrayals of the outcomes that resulted from implementing emergent technology. There were two subthemes under this theme: positive gains and lessons learned. Participants identified the noticeable improvements that they had observed following technology implementation. They also reported

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on the value realized from using these technologies. Lastly, participants discussed the lessons that they learned during the implementation process and the economic outcomes related to emergent technology implementation.

The third and final theme, economic considerations with emergent tech, covers participants' identification of the types of economic effects and costs they witnessed with implementing emergent technology. Participants described the economic benefits of implementing technology, both immediate and long-term. Additionally, participants shared the unexpected outcomes that arose. Lastly, participants reported on the funding required for this implementation and the concerns that they experienced regarding funding.

Ethical Dimensions

Ensuring strict ethical standards and transparency throughout the study were critical elements. Direct communication regarding the study's intent, potential risks, and avenues for reporting concerns were essential components of the introductory letter to participants and contained within the informed consent form that interested participants received. Establishing and maintaining participants' confidentiality and anonymity contributed to a relationship of trust between the researcher and participants that resulted in more openness with interview responses.

A signed informed consent form (Appendix D), which included the IRB standards and requirements adhered to throughout the process, was required from each participant before their interview began. The interview data remained anonymous and protected identifiers related to the company and participants during reporting by utilizing random unique identifiers that only the researcher can access to for recordkeeping purposes. The researcher bracketed his potential bias and ensured that reporting only reflected the participants' opinions and responses; this was achieved by employing member-checking of coded data. After coding each interview, the researcher shared the individual analysis with the respondent to confirm his understanding and

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evaluation, which aided in transparency between the parties and ensured accuracy during data review and synthesis.

Overview of the Population and Sampling Method

Participants were selected using a purposeful sampling technique (Gentles et al., 2015). The sample size was 15 municipal leaders. This sample size was expected to be adequate in reaching data saturation based on the findings of previous research (Francis et al., 2010). The self-selected individuals were diverse in terms of range of tenure at the organization and personal ages, and the sample represented all areas of the organization.

Limitations

The first limitation of this study is that the findings may not be generalizable to the broader population. The researcher aimed to further the understanding the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. As data were collected from a specific sample population, however, the results may not be generalizable to municipal leaders in other settings.

Another limitation is the potential threat of subjectivity that is common in qualitative research. Due to the qualitative nature of the study, the data were dependent upon participants' experiences and interpretations of their experiences. Subjectivity and interpretation of lived experiences must be based solely on participants' accounts to ensure reliability and validity. As the researcher analyzed and interpreted these reports, however, there was a potential for bias. There were several methods employed to increase the trustworthiness of the data. Member checking was used to increase the likelihood that experiences were interpreted accurately. Another aspect of this research that improves the trustworthiness of the interpretation is that several participants responses were coded under each subtheme. The similarity of responses across participants reinforces the quality of the research instrument and the accuracy of the

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interpretation of these responses. Even with these efforts, however, it is possible that the researcher's subjectivity impacted the analysis.

Findings

The current researcher explored the lived experiences of municipal leaders in one municipality who have direct experience in implementing an emergent technology in their area of constituency. The findings of this study align with the existing literature and extend findings of previous studies. In the following sections, these findings will be discussed in reference to the research questions that they address.

Research Question 1

The first research question asked: What are the lived experiences of municipal leaders regarding the implementation of emergent technologies in information systems in their municipality? This question was addressed by several themes and subthemes that arose from the qualitative analysis. First, participants shared their experiences with implementing emergent technology. From these discussions, participants expressed several areas of concern, including uncertainty about the outcomes related to implementation, communication, and training. These categories are described in the following sections.

Uncertainty

Fear of the unknown was also a predominant theme during the interviews. Exacerbated by infrequent, transparent communication, the concern surrounding the uncertainty of both concurrent crises was especially challenging. Leaders and decision-makers within the practice experienced increased demands in leading the organization and lacked clarity of data, which caused additional challenges in information distribution. Employees' esteem and safety needs are impacted when employees feel a lack of confidence in the information provided or a deficit in the information given, are according to Maslow's hierarchy schematic (Howick & Rees, 2017).

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A situational cycle of increased stressors created a need for additional communication; when that need was not fully fulfilled, feelings of fear, worry, and concern escalated, which compounded experience stressors.

Communication

With the nature of implementing technology, communicating the type of changes and understanding the scope of potential changes throughout the entirety of the implementation process were important needs for leaders. Most leaders, however, had a positive association with the fulfillment of this need and therefore did not feel a discrepancy in this area of their need hierarchy. Because of leaders' desire to manage expectations, maximize stakeholder engagement, and ultimately fulfill their self-actualizing need to help others, leaders prioritized communication and demonstrated a higher expression of satisfaction.

Additionally, communication needs to promote motivation for stakeholders are associated with better outcomes of commitment to the implementation of solution and to maximize outcomes and adoption of the solution. Having a positive association and need fulfillment of some foundation level needs within Maslow's needs hierarchy created a sense of stability in uncertain times, which generated stronger motivation and dedication towards successful implementation outcomes.

Training

Furthermore, leaders had developed strong feelings of the need to account for training. This resulted from two major reasons: (a) feelings of security in some of the basic safety needs and (b) the increased communication by and between the stakeholders. Training is critically important throughout all levels of technology adoption, for both the users of the technology and those members of the organization tasked with technical servicing. Leaders' trust in the actions,

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decisions, and motivations of the vendors and technology professionals tasked with implementations helped to reduce concern for need deficits.

Research Question 2

The second research question asked: What are the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies? This question was primarily addressed by the third theme that arose from this qualitative analysis: economic considerations with emergent technology. This theme included participants' portrayals of the immediate and long-term benefits of using emergent technology. They also discuss unexpected economic impacts and the value derived from the implementation of emergent technology. Lastly, participants discuss their experiences with funding.

Efficiency

One of the major benefits that was raised by several participants was the efficiency that implementing an emerging technology can afford. Previous researchers have indicated the importance and potential for increased efficiency with the implementation of technology. The need to do more with less and solve efficiency problems through technology is imperative to improving economic efficiency at the municipal level (Tian & Li, 2019). The implementation of emergent technologies can often meet requirements related to municipal economic development (Armanios et al., 2020). These technologies' performance can offer unique outcomes beyond those initially perceived (Krishnan et al., 2020). The current study participants reported that increased efficiency was an "origin of need" that motivated the implementation of emergent technology. Additionally, participants reported efficiency as both an immediate and long-term benefit of implementing an emergent technology.

This finding that efficiency was a frequently reported benefit of implementing emergent technology also aligns with the theoretical framework driving this study. The framework

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developed by DeLone and McLean (D&M), the IS success model, asserts strategies or models that influence success in information systems, such as the efficiency of operations, customer satisfaction, and competitive advantage. The IS success model outlines six components of IS success: information quality, system quality, service quality, system use/usage intentions, user satisfaction, and net system benefits. In addition to the IS success model, the consideration of municipal economic factors can be influential in understanding net system benefits (Shaffer et al., 2004). The participants in this study cited efficiency as being one of the benefits.

Costs

In contrast to the benefits of implementing emergent technologies, another major finding from this study was the costs that were associated with this practice. Under the theme of economic considerations with emergent technology, participants commented on the sources of funding they received and the concerns they had about funding. Previous scholars have pointed to the practices within municipalities that can drain economies. These studies revealed that municipalities have been neglecting the requirements to change or update their existing processes and procedures, which ultimately leads to less efficient decision-making and operations (George, 2017; Krishnan et al., 2020; Saurenko et al., 2018). This neglect could be explained by the fact that municipalities are less economically motivated than the for-profit organizations and therefore are less likely to invest in information systems that could potentially save costs in the long-term (Baghini et al., 2020; Buelens & Van den Broeck, 2007; Reis et al., 2017).

Thus, there is a risk of municipal leaders not recognizing the economic benefits of utilizing emergent technologies—simply because that is not the primary goal of the public sector leaders. The current study findings confirmed the lack of prioritization that is given to technology in municipalities. Participants shared the sources of funding that they had utilized for

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implementing new technologies. Most participants shared one source and commented on the constrained funding they had. This finding demonstrates that while benefits are gleaned from implementation of technology, these benefits are not communicated effectively with funding sources.

Reflection

The following is a collection of reflections of the study realized by the researcher after the completion of the study. Biases, assumptions, education, and beliefs before the study are discussed, as well as the causal fallacies potentially contributing to this.

Biases

The researcher has worked in technology for roughly 15 years, and of those 8 years have been in local government. This has contributed to his perspective; however, he does not believe that he had any biases that pertained to this field of study. The nature of the researcher's job and work within a particular department may have contributed to his thoughts regarding the changes that technology could bring.

Assumptions

The researcher assumed that everyone was aware of the technologies and the intricate technologies that were brought to bear. It was also assumed that leaders in the industry leaned heavily on thorough understandings of the technologies utilized.

Education

In technology, it is important to understand features and how to use technologies that are implemented. It is the researcher's belief that considering the knowledge base of the end user is important and working to obtain full understandings of the technology offered is important. The training component of implementation is important to the feelings of security of the leaders and may be helpful in insuring successful adoption by stakeholders. Education as a tool for the

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process of implementing emergent technologies is believed to be an important component for success as well as an efficient aid in decision-making necessary to gain success.

Beliefs Before the Study

Before the study, the researcher believed that the main influence on success was on the education of those that utilize the technology and their attitudes that influence adoption and potential success. The belief that the lack of education was the primary reason that emergent technology projects were successful or unsuccessful. This was more of a notion than a belief, but this notion is indicative of the experience that the researcher has had working in proximity to technology implementation.

Unexpected or Surprising Changes

Understanding that the most influential reason for adoption was often knowledge of a nearby municipality utilizing the technology. Understanding that sometimes the speed at which technology changes can sometimes influence obsolescence faster than implementation can be done by a large organization.

Causal Fallacies

Some casual determinism may be at fault for making the unsubstantiated assumption that because technologies are adopted and implemented by leaders, their influence stems from the understanding and nature of the technologies, and not the realization of working examples at other cities nearby.

Recommendations

The researcher has developed several recommendations motivated by the findings of the current study. First, this study demonstrated the multiple benefits that arise from implementing emergent technologies. These participants shared some of the immediate benefits of implementing technologies, such as improved performance, localization of work, and increased

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efficiency. Additionally, participants shared that funding for their municipalities was limited and technology was not prioritized. One potential reason for this lack of prioritization is the misunderstanding or ignorance to the benefits of technology. To combat this problem and increase funding for technology implementation, it is critical that municipality leaders with lived experience implementing technology and recognizing gains communicate these gains with funding sources in order to increase funding in this area.

Another recommendation that arose from this study comes from the participants' descriptions of the lessons they learned during the implementation process. All participants discussed the lessons that they had learned during the technology implementation process. These lessons related to implementation practices and economic benefits of implementing emergent technology. One key lesson that several participants cited was to ensure there are open lines of communication between different employees interacting with new technologies. Participants shared that certain types of communication (e.g., weekly meetings) were insufficient to stay ahead of problems that can arise during implementation. Participants also commented on the utility of remaining flexible during implementation. There were many unexpected outcomes, both positive and negative, that were not anticipated prior to the implementation process. Flexibility helped with addressing the negative outcomes.

Suggestions for Future Research

One suggestion for future research conducting in this area is to expand the study population. The scope of the current study was limited to among a small participant pool using a qualitative methodology. This type of an approach reduces the findings' generalizability to the broader target population and instead allowed for generalization only to highly similar contexts. In order to address this limitation, future researchers could expand this study to a larger participant pool. The current study was limited to a single municipality in the United States.

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Therefore, to expand the population and increase the generalizability of the findings, the study could be conducted in multiple cities across the country to determine whether there are any geographic differences in lived experiences.

Another suggestion for future research is to use a quantitative methodology to build upon the existing findings in a larger sample. For example, a survey or another type of quantitative methodology could be informed by the findings of the current study. This design would allow for data to be collected from a larger population who could be more widely surveyed. Furthermore, using a quantitative methodology enables the researcher to assess the strength and direction of associations in the datasets. Both the increased size and the potential for assessing directionality of relationships would provide a new contribution to this research topic.

Concluding the Study

In addition to the future research directions this study inspires, the findings of this study revealed several recommendations for implementing emergent technologies. The researcher aimed to address the gaps of the existing literature which have not explored lived experiences of municipality leaders with implementing emergent technology. The current study was conducted to address this this gap, which can help inform the implementation process in other municipalities. These study findings suggested that there are several benefits of implementing technology that are unrealized in current organizations. This study also revealed a lack of funding to support the implementation of technology that could be partially due to a misunderstanding of the benefits that can be gained. Given the small sample used in this study, the researcher recommends that a larger quantitative, or qualitative research study be conducted based on the current findings in order to expand the generalizability of the findings.

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

References

Aasi, P., Nikic, J., Li, M., & Rusu, L. (2020). The influence of cloud computing on IT governance in a Swedish municipality. *Lecture Notes in Business Information Processing, 402*, 623–639. https://doi.org/10.1007/978-3-030-63396-7_42

Ahmad, F., Shahid, M. K., & Syed, A. S. (2020). Role of knowledge management in strategically suitable decision-making telecommunication sector. *Pakistan Business Review, 22*(1), 1–12. https://pbr.iobm.edu.pk/

Al-Badi, A., Tarhini, A., & Al-Kaaf, W. (2017). Financial incentives for adopting cloud computing in higher educational institutions. *Asian Social Science, 13*(4), 162–174. https://doi.org/10.5539/ass.v13n4p162

Al-Fraihat, D., Joy, M., & Sinclair, J. (2020). Evaluating e-learning systems success: An empirical study. *Computers in Human Behavior, 102*, 67–86. https://doi.org/10.1016/j.chb.2019.08.004

Al-Ruithe, M., Benkhelifa, E., & Hameed, K. (2017). Current state of cloud computing adoption: An empirical study in major public sector organizations of Saudi Arabia (KSA). *Procedia Computer Science, 110*, 378–385. https://www.journals.elsevier.com/procedia-computer-science

Amankwaa, L. (2016). Creating protocols for trustworthiness in qualitative research. *Journal of Cultural Diversity, 23*(3), 121–27. https://tuckerpub.com/jcd.html

Amrit, C., Paauw, T., Aly, R., & Lavric, M. (2017). Identifying child abuse through text mining and machine learning. *Expert Systems with Applications, 88*, 402–418. https://doi.org/10.1016/j.eswa.2017.06.035

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Antulov-Fantulin, N., Lagravinese, R., & Resce, G. (2021). Predicting bankruptcy of local government: A machine learning approach. *Journal of Economic Behavior & Organization*, *183*, 681–699. https://doi.org/10.1016/j.jebo.2021.01.014

Armanios, D. E., Lanahan, L., & Yu, D. (2020). Varieties of local government experimentation: U.S. state-led technology-based economic development policies, 2000–2015. *Academy of Management Discoveries*, *6*(2), 266–299. https://doi-org.proxy1.calsouthern.edu/10.5465/amd.2018.0014

Ash, E., Galletta, S., & Giommoni, T. (2021). A machine learning approach to analyze and support anti-corruption policy. *CESifo*, *9015*, 1–15. http://dx.doi.org/10.2139/ssrn.3589545

Baghini, M. S., Nejad, M. M., & Baghini, S. S. (2020). The effect of health information technology on time and cost saving in remote areas of Iran. *Indian Journal of Forensic Medicine & Toxicology*, *14*(2), 1–19. https://doi.org/10.37506/ijfmt.v14i2.3407

Bano, M., Zowghi, D., & da Rimini, F. (2017). User satisfaction and system success: An empirical exploration of user involvement in software development. *Empirical Software Engineering*, *22*(5), 2339–2372. https://doi.org/10.1007/s10664-016-9465-1

Barney, J. B. (2014). *Gaining and sustaining competitive advantage* (4th ed.). Pearson.

Bellodi, E., Vagnoni, E., Bonvento, B., & Lamma, E. (2017). Economic and organizational impact of a clinical decision support system on laboratory test ordering. *BMC Medical Informatics and Decision Making*, *17*(1), 1–9. https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-017-0574-6

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Bergamini, M., Iora, P. H., Rocha, T. A. H., Tchuisseu, Y. P., Dutra, A. D. C., Scheidt, J. F. H. C., Nihei, O. K., Carvalho, M. D. B., Staton, C. A., Vissoci, J. R. N., & de Andrade, L. (2020). Mapping risk of ischemic heart disease using machine learning in a Brazilian state. *Plos One*, *15*(12), 1–13. https://doi.org/10.1371/journal.pone.0243558

Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of Research in Nursing*, *13*(1), 68–75. https://doi.org/10.1177/1744987107081254

Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research*, *26*(13), 1802–1811. https://doi.org/10.1177/1049732316654870

Blišťan, P., Kovanič, Ľ., Patera, M., Frąckiewicz, P., & Gil, M. (2018). Monitoring of selected geohazards by using unmanned aerial systems (UAS). *GIS Forum*, 1–7. https://depot.ceon.pl/handle/123456789/17036

Buelens, M., & Van den Broeck, H. (2007). An analysis of differences in work motivation between public and private sector organizations. *Public Administration Review*, *67*(1), 65–74. https://www.jstor.org/stable/4624541

Carrieri, V., Lagravinese, R., & Resce, G. (2021). Predicting vaccine hesitancy from area-level indicators: A machine learning approach. *Health Economics*, *30*(1), 3248–56. https://doi.org/10.1002/hec.4430

Chan, Z. C., Fung, Y. L., & Chien, W. T. (2013). Bracketing in phenomenology: Only undertaken in the data collection and analysis process. *Qualitative Report*, *18*(30), 1–9. https://doi.org/10.46743/2160-3715/2013.1486

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Chopra, G., Madan, P., Jaisingh, P., & Bhaskar, P. (2019). Effectiveness of e-learning portal from students' perspective. *Interactive Technology and Smart Education, 16*(2), 94–116. https://doi.org/10.1108/ITSE-05-2018-0027

Cobbe, J. (2019). Administrative law and the machines of government: Judicial review of automated public-sector decision-making. *Legal Studies, 39*(4), 636–655. https://doi.org/10.1017/lst.2019.9

Crow, G., Wiles, R., Heath, S., & Charles, V. (2006). Research ethics and data quality: The implications of informed consent. *International Journal of Social Research Methodology, 9*(2), 83–95. https://doi.org/10.1080/13645570600595231

Dalle, J., Hastui, D., Mahmud, M., Prasetia, I., & Baharuddin, B. (2020). DeLone and McLean model evaluation of information system success: A case study of master program of civil engineering Universitas Lambung Mangkurat. *International Journal of Advanced Science and Technology, 29*(4), 1909–1919. https://www.scimagojr.com/journalsearch.php?q=21100829147&tip=sid

da Silva Nogueira, S. P., & Jorge, S. M. F. (2017). The perceived usefulness of financial information for decision making in Portuguese municipalities. *Journal of Applied Accounting Research, 18*(1), 116–136. https://doi.org/10.1108/JAAR-05-2014-0052

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9–30. https://doi.org.10.1080/07421222.2003.11045748

Dunne, C. (2011). The place of the literature review in grounded theory research. *International Journal of Social Research Methodology, 14*(2), 111–124. https://doi.org/10.1080/13645579.2010.494930

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open, 4*(1). https://doi.org/10.1177/2158244014522633

Eskridge, M. (2019). Privacy and security data governance: Surveillance mechanisms and resilience risks of smart city technologies. *Contemporary Readings in Law & Social Justice, 11*(2), 63–69. https://doi-org.proxy1.calsouthern.edu/10.22381/crlsj11220199

Feldmeyer, D., Meisch, C., Sauter, H., & Birkmann, J. (2020). Using OpenStreetMap data and machine learning to generate socio-economic indicators. *ISPRS International Journal of Geo-Information*, *9*(9), 498–511. https://doi.org/10.3390/ijgi9090498

Fossey, E., Harvey, C., McDermott, F., & Davidson, L. (2002). Understanding and evaluating qualitative research. *Australian & New Zealand Journal of Psychiatry*, *36*(6), 717–732. https://journals.sagepub.com/home/anp

Francis, J. J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M. P., & Grimshaw, J. M. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology and Health*, *25*(10), 1229–1245. https://doi.org/10.1080/08870440903194015

Froemelt, A., Buffat, R., & Hellweg, S. (2020). Machine learning based modeling of households: A regionalized bottom- up approach to investigate consumption- induced environmental impacts. *Journal of Industrial Ecology*, *24*(3), 639–652. https://doi.org/10.1111/jiec.12969

Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *Qualitative Report*, *20*(9), 1408. https://nsuworks.nova.edu/tqr/

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Gaardboe, R., Nyvang, T., & Sandalgaard, N. (2017). Business intelligence success applied to healthcare information systems. *Procedia Computer Science, 121,* 483–490. https://doi.org/10.1016/j.procs.2017.11.065

García-Navarro, J., Ramírez, F. J., & Ruíz-Ortega, M. J. (2019). Using action research to implement an operating efficiency initiative in a local government. *Systemic Practice & Action Research, 32*(1), 39–62. https://doi-org.proxy1.calsouthern.edu/10.1007/s11213-018-9451-1

Gentles, S. J., Charles, C., Ploeg, J., & McKibbon, K. A. (2015). Sampling in qualitative research: Insights from an overview of the methods literature. *Qualitative Report, 20*(11), 1772–1789. https://doi.org/10.1016/j.procs.2017.11.065

George, B. (2017). Does strategic planning 'work' in public organizations? Insights from Flemish municipalities. *Public Money & Management, 37*(7), 527–530. https://doi.org/10.1080/09540962.2017.1372116

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *Qualitative Report, 8*(4), 597–607. https://nsuworks.nova.edu/tqr/

Gombos, K., Herczeg, R., Erőss, B., Kovács, S. Z., Uzzoli, A., & Nagy, T. (2021). Translating scientific knowledge to government decision makers has crucial importance in the management of the COVID-19 pandemic. *Population Health Management, 24*(1), 35–45. https://doi.org/10.1089/pop.2020.0159

Guo, S. (2015). Shaping social work science: What should quantitative researchers do? *Research on Social Work Practice, 25*(3), 370–381. https://doi.org/10.1177/1049731514527517

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Han, X., & Patterson, P. (2017). The effect of information availability in a user interface (UI) on in-vehicle task performance: A pilot study. *International Journal of Industrial Ergonomics*, *61*, 131–141. https://doi.org/10.1016/j.ergon.2017.05.015

Harvey-Jordan, S., & Long, S. (2001). The process and the pitfalls of semi-structured interviews. *Community Practitioner*, *74*(6), 219. https://www.communitypractitioner.co.uk/

Hernina, R., Rosyidy, M. K., Ashilah, Q. P., Bassayev, M. H., Huda, D. N., Pratama, A. A., & Putra, T. A. (2021). Unmanned aerial vehicle (UAV) application for supporting climate change readiness program in Depok municipality, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *683*(1), 1–12. https://doi.org/10.1088/1755-1315/683/1/012106

Hilal, A. H., & Alabri, S. S. (2013). Using NVivo for data analysis in qualitative research. *International Interdisciplinary Journal of Education*, *2*(2), 181–186. http://www.injer.org/injer

Hildmann, H., & Kovacs, E. (2019). Using unmanned aerial vehicles (UAVs) as mobile sensing platforms (MSPs) for disaster response, civil security and public safety. *Drones*, *3*(3), 59–71. https://doi.org/10.3390/drones3030059

Howard, J., Murashov, V., & Branche, C. M. (2018). Unmanned aerial vehicles in construction and worker safety. *American Journal of Industrial Medicine*, *61*(1), 3–10. https://doi.org/10.1002/ajim.22782

Howick, J., & Rees, S. (2017). Overthrowing barriers to empathy in healthcare: Empathy in the age of the Internet. *Journal of the Royal Society of Medicine*, *110*(9), 352–57. https://doi.org/10.1177/0141076817714443

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Hunt, E. R., Jr., & Daughtry, C. S. (2017). What good are unmanned aircraft systems for agricultural remote sensing and precision agriculture? *International Journal of Remote Sensing*, *39*(15–16), 5345–5376. https://doi.org/10.1080/01431161.2017.1410300

Iatrellis, O., Panagiotakopoulos, T., Gerogiannis, V. C., Fitsilis, P., & Kameas, A. (2021). Cloud computing and semantic web technologies for ubiquitous management of smart cities-related competences. *Education and Information Technologies*, *26*(2), 2143–2164. https://doi.org/10.1007/s10639-020-10351-9

Ippolito, A., & Lozano, A. C. G. (2020). Tax crime prediction with machine learning: A case study in the municipality of São Paulo. *ICEIS, 1*, 452–459. https://research.com/conference/iceis-2022-international-conference-on-enterprise-information-systems

Jessup, L. M., & Valacich, J. S. (2008). *Information systems today: Managing in the digital world*. Pearson/Prentice Hall.

Jin, J., & Mi, W. (2019). An AIMMS-based decision-making model for optimizing the intelligent stowage of export containers in a single bay. *Discrete & Continuous Dynamical Systems*, *12*(4–5), 1101–1115. https://doi.org/10.3934/dcdss.2019076

Jones, S., Irani, Z., Sivarajah, U., & Love, P. E. (2019). Risks and rewards of cloud computing in the UK public sector: A reflection on three organisational case studies. *Information Systems Frontiers*, *21*(2), 359–382. https://doi.org/10.1007/s10796-017-9756-0

Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi- structured interview guide. *Journal of Advanced Nursing*, *72*(12), 2954–2965. https://doi.org/10.1111/jan.13031

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Kamble, S. S., Gunasekaran, A., & Gawankar, S. A. (2020). Achieving sustainable performance in a data-driven agriculture supply chain: A review for research and applications. *International Journal of Production Economics, 219*, 179–194. https://doi.org/10.1016/j.ijpe.2019.05.022

Kaur, M. J., & Maheshwari, P. (2016). Building smart cities applications using IoT and cloud-based architectures. In *Proceedings of the 2016 International Conference on Industrial Informatics and Computer Systems* (pp. 1–5).

Kim, K. S., & Sin, S. C. J. (2018). Evaluating social media information: Impact of academic background, purpose of use, and perceived importance of information quality. In *Proceedings of the Association for Information Science and Technology* (pp. 845–846).

Kim, S. G., Jung, J. Y., & Sim, M. K. (2019). A two-step approach to solar power generation prediction based on weather data using machine learning. *Sustainability*, *11*(5), 1501–1512. https://doi.org/10.3390/su11051501

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), 120–124. https://doi.org/10.1080/13814788.2017.1375092

Kretschmann, L., Burmeister, H. C., & Jahn, C. (2017). Analyzing the economic benefit of unmanned autonomous ships: An exploratory cost-comparison between an autonomous and a conventional bulk carrier. *Research in Transportation Business & Management*, *25*, 76–86. https://doi.org/10.1016/j.rtbm.2017.06.002

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Krishnan, B., Arumugam, S., & Maddulety, K. (2020). Critical success factors for the digitalization of smart cities. *International Journal of Technology Management & Sustainable Development, 19*(1), 69–86. https://doi-org.proxy1.calsouthern.edu/10.1386/tmsd_00016_1

Kumar, S., & Singh, M. (2018). Big data analytics for healthcare industry: Impact, applications, and tools. *Big Data Mining and Analytics, 2*(1), 48–57. https://ieeexplore.ieee.org/xpl

Kuvvetli, Ü., & Firuzan, A. R. (2019). Applying Six Sigma in urban public transportation to reduce traffic accidents involving municipality buses. *Total Quality Management & Business Excellence, 30*(1–2), 82–107. https://doi.org/10.1080/14783363.2017.1297198

Kuziemski, M., & Misuraca, G. (2020). AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings. *Telecommunications Policy, 44*(6), 1–12. https://doi.org/10.1016/j.telpol.2020.101976

Larkin, M., Watts, S., & Clifton, E. (2006). Giving voice and making sense in interpretative phenomenological analysis. *Qualitative Research in Psychology, 3*(2), 102–120. https://www.tandfonline.com/toc/uqrp20/current

Larmuseau, C., Evens, M., Elen, J., Van Den Noortgate, W., Desmet, P., & Depaepe, F. (2018). The relationship between acceptance, actual Use of a virtual learning environment and performance: An ecological approach. *Journal of Computers in Education, 5*(1), 95–111. https://doi.org/10.1007/s40692-018-0098-9

Lauterbach, A. A. (2018). Hermeneutic phenomenological interviewing: going beyond semi-structured formats to help participants revisit experience. *Qualitative Report, 23*(11), 2883–2898. https://doi.org/10.46743/2160-3715/2018.3464

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Li, L., Lu, W., Niu, J., Liu, J., & Liu, D. (2018). AIS data-based decision model for navigation risk in sea areas. *Journal of Navigation*, *71*(3), 664–673. https://doi.org/10.1017/S0373463317000807

Madan, B. B., Banik, M., & Bein, D. (2019). Securing unmanned autonomous systems from cyber threats. *Journal of Defense Modeling and Simulation*, *16*(2), 119–136. https://doi.org/10.1177/1548512916628335

Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research*. SAGE.

Mason, R. O. (1978). Measuring information output: A communication systems approach. *Information & Management*, *1*(4), 219–234. https://www.journals.elsevier.com/information-and-management

McGregor, G. (2020). The city that sees all. *Fortune*, *181*(3), 78–80. https://www.fortunejournals.com/

McMahon, M. C., Ditmer, M. A., Isaac, E. J., Moore, S. A., & Forester, J. D. (2021). Evaluating unmanned aerial systems for the detection and monitoring of moose in northeastern Minnesota. *Wildlife Society Bulletin 1*(13), 1–15. https://doi.org/10.1002/wsb.1167

Mehta, N., & Pandit, A. (2018). Concurrence of big data analytics and healthcare: A systematic review. *International Journal of Medical Informatics*, *114*, 57–65. https://doi.org/10.1016/j.ijmedinf.2018.03.013

Melnikovas, A. (2018). Towards an explicit research methodology: Adapting research onion model for futures studies. *Journal of Future Studies*, *23*(2), 29–44. https://doi.org/10.6531/JFS.201812_23(2).0003

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Mihalache, G. (2019). Heuristic inquiry: Differentiated from descriptive phenomenology and aligned with transpersonal research methods. *Humanistic Psychologist, 47*(2), 136–157. https://doi.org/10.1037/hum0000125

Min, Q., Lu, Y., Liu, Z., Su, C., & Wang, B. (2019). Machine learning based digital twin framework for production optimization in petrochemical industry. *International Journal of Information Management, 49*, 502–519. https://doi.org/10.1016/j.ijinfomgt.2019.05.020

Mirke, E., & Cakula, S. (2017). Simulation modeling for school development in Ādaži municipality. *Rural Environment. Education. Personality., 12*(13), 1–7. https://agris.fao.org/agris-search/search.do?recordID=LV2017000302

Mitchell, T. M. (1997). *Machine learning*. McGraw-Hill.

Mokoena, B. T., & Musakwa, W. (2018). Mobile GIS occupancy audit of Ulana informal settlement in Ekurhuleni municipality, South Africa. *Geo-Spatial Information Science, 21*(4), 322–330. https://doi.org/10.1080/10095020.2018.1519349

Mulholland, J. (2007). Understanding the self as instrument. In *Contemporary qualitative research* (pp. 45–57). Springer.

Nanos, I., Manthou, V., & Androutsou, E. (2019). Cloud computing adoption decision in E-government. *Operational Research in the Digital Era–ICT Challenges*, 125–145. https://ideas.repec.org/h/spr/prbchp/978-3-319-95666-4_9.html

Nelson, J. R., & Grubesic, T. H. (2020). The use of LiDAR versus unmanned aerial systems (UAS) to assess rooftop solar energy potential. *Sustainable Cities and Society*, *61*, 1–11. https://doi.org/10.1016/j.scs.2020.102353

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Nica, E., Konency, V., Poliak, M., & Kliestik, T. (2020). Big data management of smart sustainable cities: Networked digital technologies and automated algorithmic decision-making processes. *Management Research & Practice, 12*(2), 48–57. http://mrp.ase.ro/

Nicholls, C. D. (2019). Innovating the craft of phenomenological research methods through mindfulness. *Methodological Innovations*, *12*(2). https://doi.org/10.1177/2059799119840977

Nkanata, M. G. (2019, September). Applying DeLone and McLean information systems success model in the evaluation of e-government initiatives: A literature review. *Proceedings of 20th Annual IS Conference*, *18*, 287–291.

Nyamekye, C., Kwofie, S., Ghansah, B., Agyapong, E., & Boamah, L. A. (2020). Assessing urban growth in Ghana using machine learning and intensity analysis: A case study of the New Juaben municipality. *Land Use Policy*, *99*, 1–13. https://doi.org/10.1016/j.landusepol.2020.105057

Nyetanyane, J., & Masinde, M. (2020, March). Integration of indigenous knowledge, climate data, satellite imagery and machine learning to optimize cropping decisions by small-scale farmers: A case study of uMgungundlovu district municipality, South Africa. *International Conference on Innovations and Interdisciplinary Solutions for Underserved Areas*, 3–19. https://doi.org/10.1007/978-3-030-51051-0_1

Ojo, A. I. (2017). Validation of the DeLone and McLean information systems success model. *Healthcare Informatics Research*, *23*(1), 60–68. https://doi.org/10.4258/hir.2017.23.1.60

Page, S. A., & Nyeboer, J. (2017). Improving the process of research ethics review. *Research Integrity and Peer Review*, *2*(1), 1–7. https://doi.org/10.1186/s41073-017-0038-7

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Palese, B., & Usai, A. (2018). The relative importance of service quality dimensions in e-commerce experiences. *International Journal of Information Management, 40,* 132–140. https://doi.org/10.1016/j.ijinfomgt.2018.02.001

Pandey, S. C., & Patnaik, S. (2014). Establishing reliability and validity in qualitative inquiry: A critical examination. *Jharkhand Journal of Development and Management Studies*, *12*(1), 5743–5753. https://www.xiss.ac.in/JJDMS/

Parikh, S. D., & Zhaochen, H. E. (2017). Failing cities and the red queen phenomenon. *Boston College Law Review*, 58(2), 599–638. https://lawdigitalcommons.bc.edu/bclr

Perc, M. N., & Cirella, G. T. (2020). Evaluating green infrastructure via unmanned aerial systems and optical imagery indices. In *Sustainable human–nature relations* (pp. 171–184). Springer.

Pietkiewicz, I., & Smith, J. A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal*, *20*(1), 7–14. https://doi.org/10.14691/CPPJ.20.1.7

Prabhakaran, V. M., Priyadharshini, S., Gayathri, R., & Kathiravan, T. (2018). Transformative and innovative e-municipality for the next generation using cloud. *International Research Journal of Engineering and Technology, 5*(2), 1–8. https://www.irjet.net/

Prodanov, B. K., Kotsev, I. S., Lambev, T. H., & Dimitrov, L. I. (2020). 3D high-resolution mapping and identification of coastal landforms using unmanned aerial vehicles, case study: Shabla Municipality coastal sector, Bulgaria. *Eighth International Conference on Remote Sensing and Geoinformation of the Environment, 11524*, 1–12.

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Ranerup, A., & Henriksen, H. Z. (2019). Value positions viewed through the lens of automated decision-making: The case of social services. *Government Information Quarterly*, *36*(4), 1–13. https://doi.org/10.1016/j.giq.2019.05.004

Reis, Z. S. N., Maia, T. A., Marcolino, M. S., Becerra-Posada, F., Novillo-Ortiz, D., & Ribeiro, A. L. P. (2017). Is there evidence of cost benefits of electronic medical records, standards, or interoperability in hospital information systems? Overview of systematic reviews. *JMIR Medical Informatics*, *5*(3), 1–17. https://doi.org/10.2196/medinform.7400

Rogerson, C. M. (2020). Using municipal tourism assets for leveraging local economic development in South Africa. *Bulletin of Geography, Socio-Economic Series*, *48*(1), 47–63. https://doi-org.proxy1.calsouthern.edu/10.2478/bog-2020-0013

Rotolo, D., Hicks, D., & Martin, B. (2015). What is an emerging technology? *SSRN Electronic Journal*, *44*(10), 1827–43. https://doi.org/10.2139/ssrn.2564094

Rotuna, C., Gheorghita, A., Zamfiroiu, A., & Smada Anagrama, D. (2019). Smart city ecosystem using blockchain technology. *Informatica Economica, 23*(4), 41–50. https://doi-org.proxy1.calsouthern.edu/10.12948/issn14531305/23.4.2019.04

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893–1907. https://doi.org/10.1007/s11135-017-0574-8

Saurenko, T., Anisimov, V., Anisimov, E., & Levina, A. (2018). Comparing investment projects of innovative developing strategies of municipalities, based on a set of indicators. *MATEC Web of Conferences*, *170*, 1–13. https://www.matec-conferences.org/

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Scholtz, B., Govender, J., & Gomez, J. M. (2017). Technical and environmental factors affecting cloud computing adoption in the South African public sector. In *CONF-IRM 2016 Proceedings* (pp. 16–25). https://aisel.aisnet.org/confirm2016/16

Scott, J. (2018). Eye in the sky: Local governments begin researching drones as a way to improve service, save money. *Central Penn Business Journal, 34*(21), 6. https://www.cpbj.com/welcome-ad/?retUrl=/

Shaffer, R., Marcouillier, D., & Deller, S. (2004). *Community economics: Linking theory and practice*. Blackwell.

Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*. University of Illinois Press.

Silverman, D. (Ed.). (2016). *Qualitative research*. SAGE.

Smith, J. A., & Osborn, M. (2003). Interpretative phenomenological analysis. In J. A. Smith (Ed.), *Qualitative psychology: A practical guide to research methods.* SAGE.

Sun, S., Xiong, C., & Chang, V. (2019). Acceptance of information and communication technologies in education: An investigation into university students' intentions to use mobile educational apps. *International Journal of Enterprise Information Systems, 15*(1), 24–44. https://doi.org/10.4018/IJEIS.2019010102

Sytsma, V. A., & Laming, E. (2019). Exploring barriers to researching the economics of municipal policing. *Canadian Journal of Criminology & Criminal Justice, 61*(1), 15–40. https://doi-org.proxy1.calsouthern.edu/10.3138/cjccj.2017-0056.r

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Tian, G., & Li, J. (2019). How does infrastructure construction affect economic development along the "belt and road": By promoting growth or improving distribution? *Emerging Markets Finance & Trade, 55*(14), 3332–3348. https://doi-org.proxy1.calsouthern.edu/10.1080/1540496X.2019.1607725

Tomić, H., Mastelić Ivić, S., & Roić, M. (2018). Land consolidation suitability ranking of cadastral municipalities: information-based decision-making using multi-criteria analyses of official registers' data. *ISPRS International Journal of Geo-Information*, *7*(3), 87–98. https://doi.org/10.3390/ijgi7030087

Van Raan, A. F. J. (2020). Urban scaling, geography, centrality: Relation with local government structures. *PLoS ONE, 15*(9), 1–23. https://doi-org.proxy1.calsouthern.edu/10.1371/journal.pone.0238418

Veale, M. (2017). *Logics and practices of transparency and opacity in real-world applications of public sector machine learning.* University College London.

Veale, M., & Brass, I. (2019). *Administration by algorithm? Public management meets public sector machine learning.* Oxford University Press.

Veeramootoo, N., Nunkoo, R., & Dwivedi, Y. K. (2018). What determines success of an e-government service? Validation of an integrative model of e-filing continuance usage. *Government Information Quarterly*, *35*(2), 161–174. https://doi.org/10.1016/j.giq.2018.03.004

Vojvodic, M., & Hitz, C. (2019). Governance team leadership and business user participation: Organizational practices for innovative customer engagement in data compliance project. *Central European Business Review*, *8*(2), 15. https://doi.org/10.18267/j.cebr.214

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

Walkington, C., & Bernacki, M. L. (2019). Personalizing algebra to students' individual interests in an intelligent tutoring system: Moderators of impact. *International Journal of Artificial Intelligence in Education*, *29*(1), 58–88. https://doi.org/10.1007/s40593-018-0168-1

Wester, M. (2021). Robust municipal decision making? A pilot study of applying robust decision making in three Swedish municipalities. *Journal of Environmental Planning and Management*, *65*(4), 745–58. https://doi.org/10.1080/09640568.2021.1914560

Wieclaw, L., Pasichnyk, V., Kunanets, N., Duda, O., Matsiuk, O., & Falat, P. (2017). *Cloud computing technologies in "smart city" projects.* 2017 9th IEEE International Conference on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications.

Wiles, R., Crow, G., Heath, S., & Charles, V. (2008). The management of confidentiality and anonymity in social research. *International Journal of Social Research Methodology*, *11*(5), 417–428. https://doi.org/10.1080/13645570701622231

Yakubu, N., & Dasuki, S. (2018). Factors affecting the adoption of e-learning technologies among higher education students in Nigeria: A structural equation modelling approach. *Information Development*, *35*(1), 026666691876590. https://doi.org/10.1177/0266666918765907

Yazan, B. (2015). Three approaches to case study methods in education: Yin, Merriam, and Stake. *Qualitative Report*, *20*(2), 134–152. https://nsuworks.nova.edu/tqr/

Zang, D., Wei, Z., Bao, M., Cheng, J., Zhang, D., Tang, K., & Li, X. (2018). Deep learning–based traffic sign recognition for unmanned autonomous vehicles. *Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering*, *232*(5), 497–505.

DocuSign Envelope ID: E0D367AA-7DD9-4313-883E-27DA012B01AB

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Appendix A: Tables

Table A1.

Final Codebook

Theme	Subtheme	Percentage of Participants Contributing	Example Quotes
Implementation of Emergent Technology	Concerns about the implementation process	100%	"You know, this could blow up in our faces. What if this isn't the best solution? You know, the data may support that it is, but there's always a chance there because there's that human error to any side of like a software implementation were how are the users going to be affected by this?"
	Experience with emergent technology	100%	"OK, so definitely it was the software had already been selected by the time I joined. So it wasn't there was no opportunity to evaluate options that had already been decided. So that in some ways made it a bit easier and the software was broad enough to be used across multiple departments and platforms."
	Considerations for implementation	100%	"I say that it has to be data-driven, you have to look at what you're doing now and what you're potentially going to bring in, how that's going to change

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			the process, really confer with your team to see if this is the right choice. And sometimes even if the team is not in agreement, you have to look at the cold, hard facts of this is where we're going, but this is what we can do and we need to get there some kind of way."
Effects of Emergent Tech Use	Value realized	80%	"Well, it's intangible, but the value of understanding what's happening in your workforce so that that not only has the economic benefit, but I think also the personal benefit because you're a more effective manager if you can see what's happening on the ground that your folks are doing, and then you can make decisions based on that. So you don't have, for instance, too many people dedicated to a certain task or too few people dedicated to a certain task. If you can balance it just right, then you're going to have a happier workforce and probably better morale overall."
	Noticeable improvements	93%	"Efficiency, I mean, technology is what it's

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			now that technology is really what it's all that's what technology is meant for right. To build more efficient workflows, to expose the data that you're collecting and so that you can make decisions based on what you collected."
	Lessons learned	100%	"Dreaming big is great, but at the end of the day, realistic. And that's probably the toughest part. Like we don't have any user studies. We don't have time to, you know, hold workshops or all the technology that we implement. Yeah. So having a realistic expectation of what's to come out, it's probably more conservative is probably better than spending too much and having more lost. And documentation is more valuable than anything possible because it's not useful that sits in one person's brain. And yeah, those are the two of my two big takeaways from implementing things."
Economic Considerations with Emergent Tech	Unexpected outcomes	93%	"Yeah, you think you're right, because like I said, coming out to other cities and other cities, we're seeing like a 20

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		percent adoption rate. Yeah, right. And so we're definitely exceeding that 20 percent or so. And that actually happened fairly quickly. So, yeah, I guess that might be unexpected is the volume increase. But to be fair, I think a big part of that also came from the shutdown. Right. It was forced upon us, but still unexpected. We can expect that there are definitely some things that have been good, some changes that were forced on us that have been good."
Benefits	100%	"Well, I think one of the things that still are still to be seen is the other piece of the implementation we did. Which is which was the electronic plan with you? Oh, yeah. At the moment, so many of our plans are still paper-based. And I think long term, as more and more are done electronically, certainly our applicants see a huge benefit because they don't have to pay for the cost of preparing multiple sets of plans, which can be really expensive. So for them, it's obviously

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	Funding	100%	beneficial. But even internally for us, the efficiency of doing that electronic client review is still something that we have not yet seen as much of a benefit as I think I've seen. Sure." "And again, I because it was all kind of stalled before I joined. Yeah. You know, the only thing has been maybe being watchful of the hours consulting hours. Right. Because that'll, you know, that's, that goes into your budget. So you want to be aware of how the time is being spent. But yeah, that is an area of the project I've not really been involved."

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Appendix B: Instruments

Interview Questions

Demographic Questions

1. What is your Gender?
2. What is your Ethnicity?
3. What is your age?
4. What is your highest level of education?
5. How Long have you worked in municipal leadership?

Research Questions

1. What are your lived experiences regarding the implementation of emergent technologies in information systems at your municipality?
    1. This study focuses on four primary segments of emergent technology. Those segments include machine learning, unmanned aerial systems technology, cloud-based computing, and data-based decision-making. Which of these have you had experience with implementing?
    2. What was that like?
    3. Describe the process of decision-making to adopt the specified technology?
    4. Describe the origin of the need?
    5. Describe your concerns before the process?
    6. Describe your concerns during the process?
    7. Describe your concerns after the process?
    8. What were your thoughts?
    9. Describe some of the noticeable improvements.
    10. Tell me about lessons that you learned.

2. What are your lived experiences regarding the economic benefits of implementing emergent technologies?

a. Describe concerns if any about funding allocation?
b. Describe the methods of approach to obtain funding?
c. Tell me about immediate economic benefits realized?
d. Describe long-term economic benefits realized if any.
e. Describe value realized.
f. Describe unexpected economic value adds.
g. Tell me about unexpected economic impacts.
h. Describe lessons that you learned from the process?

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Appendix C: Consent Form

Consent Form

You are being asked to take part in a research study being conducted by Raymond W. Seraile, III under the supervision Dr. Stephanie Hoon. The title of the study is:

LIVED EXPERIENCE OF MUNICIPAL LEADERS REGARDING THE ECONOMIC BENEFITS OF EMERGENT TECHNOLOGIES

Before agreeing to participate in the study, the investigator must explain: (a) the purpose of the study; (b) the study's procedures and duration; (c) any potential and foreseeable risks; (d) any potential discomforts and benefits of participating or the research; (e) whether any steps/activities incurred during participating are experimental; and (e) how confidentiality and privacy will be maintained.

The purpose of this effort is to explore the lived experiences of municipal leaders regarding the economic benefits of implementing emergent technologies in information systems. Your responses will supplement written records through virtual interviews, in-depth description of the lived experience of key people with relevant experience in implementing emergent technologies in municipal information systems projects.

The interview will take approximately 30–45 minutes. During the interview, you will be asked questions about your lived experience as a municipal leader regarding the implementation of emergent technologies in information systems and questions regarding the economic benefits of implementing emergent technologies in information systems.

Your responses will be transcribed and transformed into data for the research study. The results will be analyzed using the interpretive phenomenological analysis methodology, which includes various steps such as bracketing, coding, determination of themes and superordinate themes, and the interpretation of the data (Pietkiewicz & Smith, 2014).

All collected data will remain anonymous. No one will be able to identify participants; nor will anyone be able to determine information about an individual participant. All collected data will be stored in a secure and locked location for five years after which the data will be destroyed.

There are no known risks if you decide to participate in this research study, nor are there any costs for participating in the study. The information participants provide will help the investigator understand how municipal leaders' values, opinions, and behaviors through the experience of implementing emergent technologies for economic benefit. The information collected may not benefit you directly, but what is learned from this study should provide general benefits to emergent technology policy makers.

Further, if you would like to learn about the results of this study, you may request a summary of results from the investigator at Raymond.Seraile@my.calsouthern.edu .

Your participation in this interview is voluntary. Even if you decide to participate, you may withdraw without penalty, or request confidentiality, at any point during the interview. You may

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also choose not to answer specific questions or discuss certain subjects during the interview or to ask to exclude portions of the interview from the study.

The Institutional Review Board (IRB) has reviewed my request to conduct this project and enlist up to 20 participants. If you have any concerns about your rights in this study, please contact _____ of the _____ IRB at _____ or email _____.

Statement of Consent

I agree to participate in the study and to the use of my feedback/data as described above. Further, I agree to print a copy of this consent form, for my records, as I deem appropriate.

Participants Signature _____Date_____

Witness Date _____Date_____

Participant Bill of Rights

As a participant, you have the following rights. These rights included, and are not limited to, the following:

- the right to be informed of the purpose and nature of the study;
- the right to understand the procedures and processes involved with being a participant;
- the right to understand the potential risks of participating;
- the right to understand how participation may benefit stakeholders;
- the right to be informed regarding the voluntary nature of participation;
- the right to have information struck/removed from data collection;
- the right to withdraw from participation without prejudice;
- the right to print a copy of the signed/dated (or electronically signed) consent form;
- the right to freely participate without the intervention of force, fraud, bribery, extortion, deceit, fear, or undue influence;
- the right to consult with the IRB regarding any concerns.

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Appendix D: IRB Approvals

CALIFORNIA SOUTHERN UNIVERSITY
3330 HARBOR BLVD, COSTA MESA, CA 92626
PHONE: 714.480.0800 | TOLL FREE: 800.477.2254 | WEB: WWW.CALSOUTHERN.EDU

Institutional Review Board Decision

Applicant's Name: Raymond W. Seraile, III

Date of Submission: 09/17/2021

Date of Review: 09/29/2021

Determination of Review:

☑ **Approved [Study meets requirements. Study meets criteria in 45 CFR 46 where applicable.]: You can collect data.** Please see IRB Approval below.

☐ **Deferred: You cannot collect data.** The review has some questions about procedures, some procedures need to be changed, and/or several changes are needed to forms. Please answer the reviewer's questions and submit a revised application and supplemental forms. If you are a student, please submit through your dissertation chair.

Resubmission Instructions:

Please indicate changes completed or ask any questions in the "Response to Reviewer Comments".
Please revise the original information in each section of the application as required.

Please also revise the check boxes as needed, and include updated materials with your next submission.
Please do not submit a partial application.

Approval from Chair, Institutional Review Board

The signature of the Chair of the Institutional Review Board, when affixed below, indicates that the activity identified in the enclosed application has been approved with the conditions and restrictions noted here.

Restrictions and Conditions:

Brett A. Gordon, Ph.D., FSA Scot — Chair, Institutional Review Board

09/29/2021 — Date

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Appendix E: Initial Codebook

Name	Files	References
concerns about funding allocation	15	15
concerns after process	11	11
concerns before implementation	15	15
concerns during process	13	14
decision-making process to adopt tech	14	14
economic benefits of implementing emergent technologies	15	15
experience with emergent tech	10	10
experience with cloud-based	5	5
experiences with data-based decision-making	3	3
unmanned aerial systems tech	2	2
immediate economic benefits realized	15	15
implementation of emergent tech	15	15
Lessons learned	15	30
economic benefits	14	14
implementation	13	14
long-term economic benefits	13	13
methods to obtain funding	13	13
noticeable improvements	14	14
origin of need	15	15
thoughts about process	9	9
type of emergent technology	12	12
cloud-based computing	6	6
data-based decision-making	4	4
unmanned aerial systems tech	1	1
unexpected economic impacts	11	11
unexpected economic value	13	13
value realized	12	12

- Showcased the ability to keep abreast with trends and changes, fostering new ideas and nurturing clear direction.
- Resolved escalated problems throughout the project duration and supervised members and staff to achieve common goals.

OTHER PROFESSIONAL EXPERIENCE

US Naval Nuclear Submarine Yeoman: Petty Officer Second Class

EDUCATIONAL BACKGROUND

Doctor of Business Administration February 2022
California Southern University *Costa Mesa, CA*

Master's Degree in Business: Executive Leadership May 2018
Liberty University *Lynchburg, VA*

Bachelor of Science in Media Arts (Web Development) January 2013
Associate of Applied Science Graphic Design November 2011
Platt College *San Diego, CA*

Associate of Science in Management December 2004
Hawaii Pacific University *Honolulu, HI*

PROFESSIONAL AFFILIATION

National Black MBA Association October 2020 – Present
The National Economic Association October 2020 – Present
American Economics Association October 2020 – Present
National Association of Government Web Professionals at Illinois January 2016 – Present

CERTIFICATIONS

DOT FAA Remote Pilot Certification: Department of Transportation, Federal Aviation Administration December 2016

TECHNICAL SKILLS

Adobe Creative Cloud (Photoshop, Illustrator), HTML, CSS, JavaScript, .net programming, Php programming, SQL, Python, AutoCad