Strategic Planning by State Chief Information Officers

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ABSTRACT

State Chief Information Officers (CIOs) have a vital role in information technology (IT) organizations; this role leads and sponsors information system (IS) programs, ensures operations, and provides technologies and digital capabilities for their organizations. Previous studies (Eiras, 2010; Haffke et al., 2016; Mitchell, 2015; Muller, 2011; Roberts et al., 2014) have discussed CIOs' effectiveness in organizational management, the skillset and credentials for the role and responsibilities involved in leading the IT organization. Compliance with Presidential Executive Orders 13571 and 13576 requires the federal government to undertake appropriate steps to streamline and improve digital services and to deliver an efficient, effective, and accountable federal government. At the state government, the CIO position is established in each of the 50 U.S. and is tasked with overseeing and managing the state information technology (IT) and information system (IS). Investigating CIOs' involvement in dealing with IT initiatives in their organizations can identify practices leading to successful implementations (Porfírio et al., 2021). This research sought to contribute to the body of knowledge and aimed to highlight the State CIOs' involvement in IT strategic planning.

KEYWORDS

State Chief Information Officers, Information Technology Strategic Planning, Remote Collaboration.

Introduction

Chief Information Officers (CIOs) exist in many industries including commercial, private, and government industries as well as various research and academic institutes; they strive for their organization's success by meeting their goals and objectives. Their primary focus revolves around ensuring that the organization and its employees have access to the necessary technological tools to accomplish their work, as well as the appropriate training to be able to use those tools effectively and efficiently. Thus, strategic leadership and management practitioners involved in commercial, private, nonprofit, and government should focus efforts in developing CIOs for their leadership positions, as well as supporting CIOs in developing others to use the available technological tools. Strategic leadership and management researchers should focus attention on identifying the unique challenges faced by these CIOs.

CIOs from non-government entities may have different perspectives in their information technology (IT) organization then CIOs from government as there are various levels of compliance, regulations, policies and processes that each organization would need to incorporate and adhere with. State Chief Information Officers (CIOs), as a subset of the CIOs in the private sector and in other levels of the governmental sector, have a vital role in IT organizations; they lead and sponsor information system (IS) programs, ensure operations, and provide technologies and capabilities for their organizations. Previous studies (Eiras, 2010; Haffke et al., 2016; Mitchell, 2015; Muller, 2011; Roberts et al., 2014) have discussed CIOs' effectiveness in organizational management, and CIOs' skillsets and credentials for roles and responsibilities involved in leading an organization. However, previous studies have focused on the CIO role in the private sector and federal government.

Compliance with Presidential Executive Orders 13571 and 13576 requires federal government agencies to undertake appropriate steps to streamline and improve digital services, and deliver an efficient, effective, and

accountable federal government. At the state government level, the CIO position is established in each of the 50 U.S. states and tasked with providing oversight and managing state IT and IS. Investigating CIOs' involvement in dealing with IT initiatives in their organizations can identify practices leading to successful implementations (Porfirio et al., 2021). This research adds to the understanding of how the State CIO's involvement in IT strategic planning led to the execution of strategies and actions enabling remote collaboration, and it provides a contribution to the literature and suggestions for future research.

Problem

More research is needed concerning IT strategic planning, given that work to date has shown a high failure rate in such initiatives (Brown & Brown, 2019). State CIOs need to understand the importance of IT strategic planning to meet the organization's business and technology needs. Despite over 50 years of research and practice, the track record for industry IT projects remains very poor, with a failure rate of over 70% (Li, 2020). Many industry reports emphasize the importance of drive and the strategic need for IT investments.

This research was motivated by the first author's experience in the field of information technology and the support he provided to the U.S. government's Chief Information Officer (CIO) office. The term *CIO* was first used in the early 1980s and later associated with the main responsibilities of planning, operating, and managing an organization's IT resources, IT investment, and IT management as a corporate executive leader (Ostrowski & Helfert, 2011). The Clinger-Cohen Act of 1996 mandated the position of CIO; this individual would take the steps necessary to implement and manage IT and processes through policies and strategic plans to meet organizational business and mission needs (Government Accountability Office, 2001).

Scant research literature pertaining to State CIOs is available (De Tuya et al., 2020). Some reports from the U.S. Government Accountability Office (GAO) cover topics on U.S. federal government CIOs, and reports from the National Association of State Chief Information Officers (NASCIO) covering topics on U.S. state government CIOs are also available. However, current literature includes limited information about State CIOs (McCarthy et al., 2021). A gap exists in the literature pertaining to State CIOs' involvement, and the implications of IT strategic planning and remote collaboration during the height of the COVID-19 pandemic.

Purpose and Research Questions

The purpose of this research with a complete version appearing in Na (2024), was to investigate State CIOs' involvement in IT strategic planning for enabling remote collaboration during the COVID-19 pandemic. A CIO is appointed in each of the 50 U.S. states as a senior executive to lead and manage IT initiatives, serving as change agents and decision makers. A CIO needs various characteristics and attributes as a strategist, effective communicator, and visionary as well as technological savvy (Whitehurst, 2015). New IT initiatives by state governments present opportunities to modernize IT. IT strategic planning has generated much research in recent years from both academic and strategic leadership and management practitioner perspectives, as the COVID-19 global pandemic impacted the pace of new remote collaboration technologies within organizations of all types and sizes, across many industry sectors (McCarthy et al., 2021).

This research sought to contribute to the body of knowledge that addresses the ways in which State CIOs are involved in IT strategic planning. It highlighted State CIO involvement in IT strategic planning that enabled remote collaboration during the height of the COVID-19 pandemic. Such information could assist strategic leadership and management practitioners with the development of needed strategic planning skills and crisis leadership and strategic leadership and management researchers with future studies focusing on strategic planning skillsets training development and crisis leadership development investigation and relationships. Furthermore, the research findings could also contribute to studies of State CIOs, for which scant research is available (De Tuya et al., 2020).

The main research question and sub-questions for this research were as follows:
1. In what ways were State CIOs involved in IT strategic planning to enable remote collaboration for their organization's remote workforce at the height of COVID-19 pandemic?
    1a. Identify and categorize State CIOs' involvement in IT strategic planning to enable remote collaboration.
    1b. Analyze State CIOs' involvement in IT strategic planning to enable remote collaboration.

Literature Review

The purpose of the literature review was to provide some background and information on current issues. A concept map was generated to depict the relationships between the subject areas researched. (See Figure 1). The literature review showed the current depth of the subject area of interest and provided some ideas for the research methods.

Remote Collaboration

Within an IT organization that operates and maintains information systems (ISs), the CIO has the ultimate responsibility for ensuring the operation of all IT systems and satisfying internal customers with any new IT requirements that may become new IS.

Due to the COVID-19 pandemic, many government organizations had to shift the work environment to ensure that staff could work from remote locations. IT departments were the responsible entities to ensure the internal customers' IT needs were met. The State CIOs led transformational initiative of enabling remote collaboration with new remote work environments through their leadership and their responsibilities as a system owner and an authorizing owner (AO). Strategic planning by State CIOs resulted in new forms of remote collaboration by the workforce. Seamless transition from past and current IT systems to this remote collaboration was and remains a challenge for both end users and IT departments to implement.

Video conferencing and collaborative team tools allowed end users to conduct meetings, take notes, brainstorm, and continue to engage actively online in a manner similar to typical in-person office meetings (NASCIO, 2021). This new work environment paradigm enabled IT organizations to continue to push for IT initiatives to meet internal customer needs, for which CIOs were ultimately responsible to lead and manage. Brown (2019) decried the lack of academic research, given the growth in practice.

State CIO

All 50 states have their own state law that establishes a State CIO. Within the State CIO office, the State CIO generally engages with many stakeholders including the Chief Technology Officer, Chief Data Officer, and Chief Information Security Officer as well as the Chief Executive Officer and Chief Operating Officer. Haffke et al. (2016) suggested that the C-suite has become more interested in taking on the CIO's work, given the lack of value provided by CIO from previous IT investments.

The State CIO has the authority to manage and govern IT and IS, and to ensure technology and security management of accessibility, connectivity, interoperability, resiliency, and business continuity to meet and align with business goals. Thus, State CIOs' qualifications and credentials are key to hiring and retaining individuals with technical and business acumen. For example, according to the state of Oklahoma's statute of CIO, job qualifications include a bachelor's degree in STEM; 10 or more years of professional experience in managing and supporting IT operations, IS, networks, telecommunications, budgets, and contract processes; ability to handle strategic direction, organizational management, and complex problems; and ability to resolve issues and conflicts, and manage teams (Chief Information Officer, 2014).

The CIO's role has changed from providing oversight of current IT and IS for the organization and a management role to helping the business to implement its vision for new digital technologies. Multifaceted expectations exist for the CIO executive level position. These include trust, openness, intelligence, confidence, fairness, transformational, interpersonal relationship, technical and business skills, and innovation (Ghawe & Brohman, 2016). Further, the CIO's role has changed and evolved throughout the years as digital technologies continue to change the technology landscape. The CIO role has evolved from simply building modern technology to creating an adaptive and collaborative culture as one of the desired behaviors for leading an organization and playing a huge role in leading opportunities (McKinsey & Company, 2018).

A CIO's inability to adapt to changes and evolve into the new role may cause them to receive blame for failed initiatives (Gonzalez & Ashworth, 2021). The CIO's role has changed from that of internal manager of IT and IS functions to that of executive responsible for business alignment and technology investment for an organization's competitive advantage, and from dealing with supply to demand-focused work (Ostrowski & Helfert, 2011). It becomes ever more complex with modern technologies and dealing with both customer engagement and product delivery for an organization (Ghawe & Brohman, 2016). Due to the complexity of State CIOs roles and responsibilities, organizational changes, and changes due to both new technology and

business impacts, this literature review could not identify findings or case studies of such challenges due to the scarcity in this subject matter.

In the 2018 NASCIO State CIO survey, top characteristics and attributes of a State CIO were identified as communication, relationship building, and strategic thinking (Finley, 2021). Other important State CIO roles included motivator, diplomatic, change manager, negotiator, facilitator, technologist, and educator (Grass, 2018). These characteristics and attributes overlapped with job search results on State CIO. The next generation of new State CIOs should have the following abilities: improving customer experience, gaining buy-in, demonstrating brokering and relationship building, serving in a transformational role in data and analytics, and displaying risk management, transparency, and vision (Malone, 2019; Regan, 2019; Wood, 2016, 2022). The literature review conducted have shown that State CIOs skillsets and leadership development are important to address the challenges of both technical and business sides of leading their IT organizations. Job board searches were conducted to review State CIO positions that may also include characteristics and attributes. For example, state of Oregon Assistant State CIO, state of California CIO, state of Nebraska Deputy CIO, and state of Washington CIO position descriptions included characteristics and attributes of strategist, effective communicator, strong business acumen, problem solver, critical thinking, collaborative, technology knowledgeable, management role and cultural (Indeed, n.d.).

IT Strategic Planning

IT strategic planning provides a solution to strategic, operations, and tactical mindset within traditional bureaucratic organizations, and collaborative forecasting and creation of short-term and long-term goals to encourage the organization's goals and objectives (Mayer & Martin, 2021). Typically, an IT strategic plan is an output of an IT strategic planning process. IT strategic planning should be an ongoing exercise as technologies continue to evolve, and strategy serves as a placemat for technological directions and analysis of IT investment opportunity (Titthasiri, 2000). A technology strategic plan is critical for an IT organization to lay out its vision and goals as well as priorities in technologies to evaluate, acquire, and implement. Identifying emerging technology trends and forecasting their potential implementation represents a part of technology strategic plan. Developing an IT strategic plan is an important process to prepare an IT organization for upcoming work and to create an opportunity to review the IT organization's mission and vision, and future work as aligned with the internal customer and stakeholders (Pistentis, 2023). The IT strategic planning process is conducted to identify and establish technology priorities that align with the organization's goals and objectives. It serves as a roadmap by which leaders and management teams define targets to accomplish. An annual strategic discussion among IT organization executives and the management team to identify scenarios, give new guidance on direction, and lead new IT initiatives is important (Kane, 2019).

According to research by De Tuya et al. (2020), responses from over 60 participants in the state of New York revealed shortfalls by their IT leaders. These included lack of critical thinking; lack of technical experience; lack of strategic planning and vision; lack of execution and operational behaviors; inept resource and timeline management; lack of IT and IS knowledge and understanding; lack of openness to transparency, collaboration, and communication; distrust; and lack of clear objectives and goals. According to a report from NASCIO (2019), critical success factors for a State CIO listed by priority ranking were: relationship with state officials and internal customers, security, governance, communication, mission focus, innovation, conflict management, portfolio/program management, and data-driven decision making. An IT strategic plan is a valuable resource by which to reinforce the value of IT and show commitment to the organization's success in achieving key goals through modern technologies (Pistentis, 2023).

National Association of State Chief Information Officers (NASCIO)

The National Association of State Chief Information Officers (NASCIO) is a nonprofit organization that supports networks and resources for State CIOs. This organization was founded in 1969 and serves to represent State CIOs and IT executives and managers. NASCIO's mission is to assist U.S. state-level governments with excellence in leadership, business, technology, and management and support with business and technology innovation, and IT service delivery. They host two conferences a year that are open to both state-level senior government executives and representatives from companies and organizations. NASCIO brings together State CIOs, IT executives and managers, state members, and representatives from federal, local, and tribal private and public sectors to support discussions regarding challenges with which State CIOs

struggle. Through collaboration and information sharing the organization promotes best practices and innovations with conferences, networking, research, and publications. Since 2010, a survey report of State CIOs has been published annually by NASCIO. A total of 11 publicly available reports were used in this research, and these included the latest topics identified as priorities by State CIOs high priority items that need to be addressed, and any topics pivotal to their organizations' mission and vision. In addition, 20 critical success factors for State CIOs were identified in NASCIO's 2021 annual survey report. Top factors noted in this report include relationship building, clear goals and objectives, value proposition from technology to business, and generating innovation and vision when leading new IT initiatives for success (NASCIO, 2021).

Multiple reports are available which share the status of new IT initiatives at the state level in the United States. An August 2021 report from the Virginia IT Agency (VITA) summarized new IT initiatives implemented under the Virginia State CIO from July 2019 to April 2021. The purpose of VITA's new IT initiatives was to respond to the COVID-19 global pandemic; the State CIO led the effort to help the remote workforce by migrating workplace tools to a virtual environment (NASCIO, 2021). The goals of this initiative included setting up an agile environment, capturing business opportunities, improving service delivery, improving workforce effectiveness, enhancing the internal customer experience, and enabling data-driven decision making. With an established digital strategy and the State CIO's priorities, this new IT initiative was successful by instantiation of a virtual environment and tools that enabled the workforce to work remotely and seamlessly to conduct business as usual. One of various annual digital state survey reports from government technology (GovTech) noted that implementing new digital technologies such as cloud computing, artificial intelligence, and citizen-centric service enabled a remote workforce environment that allowed the workforce to operate and continue business as usual, and increased efficiency and performance (Stone, 2020).

Methods

This research utilized the grounded theory research method (e.g., Charmaz & Thornberg, 2020; Glaser & Strauss, 1968). To do so, a comprehensive literature search on topic of State CIOs' involvement in IT strategic planning was conducted, as listed below:

1. Conduct a comprehensive literature search on the topic of State CIOs, IT strategic planning, and remote collaboration for the data collection.

2. Conduct the grounded theory analysis from the data collection with triangulation.

3. Apply computer-assisted qualitative data analysis software (CAQDAS) to validate the grounded theory analysis of State CIOs, IT strategic planning, and remote collaboration.

Based on the results, a Construct Course of Action (COA) for State CIOs involvement in IT strategic planning was constructed to assist both State CIOs and strategic leadership and management practitioners.

Search Process

The literature search process was limited to the years December 2019 to December 2023 and included only texts in English. Engineering Village (Compendex and Inspec), IEEE Xplore, and ProQuest were selected for the relevant literature search.

For the purpose of the literature review, key words were used along with Boolean to better locate records. The following searches were executed and adjusted as needed to better find records for the literature review: State CIO AND Remote Collaboration; State CIO AND IT Strategic Planning; IT Strategic Planning AND Remote Collaboration; and State CIO, IT Strategic Planning, AND Remote Collaboration.

After reviewing reference materials on search strategy, the key words listed above were revisited to undertake a different search procedure. For the ProQuest database search, previous search was reworded as follows: (*remote collaboration* OR *remote work* OR *telework* OR *virtual collaboration* OR *online collaboration*) AND (*state chief information officer* OR *state CIO* OR *government chief information officer* OR *CIO*) AND (*IT strategic planning* or *strategic information system planning*) since 2020. This revised search led to nine results that were reviewed and selected as the literature review data sample.

The following sections present the results of the literature review. Discussions include the following: (a) remote collaboration, (b) State CIO, (c) IT strategic planning and (d) the National Association of State Chief Information Officers (NASCIO).

Role of the Researcher

In this research, the primary researcher has a professional career in the fields of systems engineering, information technology, and project management. Throughout the researcher's professional career, clients have included various U.S. federal government agencies' CIOs and C-suite officers including, but not limited to CTOs, CISOs, and CDOs. Current work performed has included executive management consulting, cross-collaboration with various agencies' C-suite officers, and open communication support with state and local governments. There were also opportunities to work with CIOs from private sector companies. At present, many countries and companies around the world have CIOs leading organizations within both public and private sectors.

Philosophy and Worldview

In qualitative research, the researcher's worldview is important to clarify. This study utilized constructivism and pragmatism.

The constructivism worldview assumes that the researcher intended to examine the views of a research idea being studied from many perspectives (Kivinen & Riestela, 2003). This would allow the researcher to construct the meaning of the research idea being studied through historical data and to interpret the meanings of personal and societal experiences.

Another worldview addressed in this study was pragmatism, which is important when focusing on a research problem or question using various research techniques and methods to address a practical problem (Kivinen & Riestela, 2003). For this qualitative research, the researcher was not bounded to specific theories but rather used rigorous methods to identify valid results for applicability. This research sought practical value and applied relevancy from the research questions.

Document Search Procedures

The research method involved locating records pertinent to this research topic. Database sources including ProQuest, Engineering Village (Compendex and Inspec databases), and the NASCIO website online database were utilized to search for published articles and related sources. After all relevant search results were located and examined, records were reviewed to remove any duplicates and exclude any records that did not meet the study criteria. Only full text articles were considered for the research, and any records that did not meet study criteria were removed. Study criteria identified for this research included literature search findings solely scoped to State CIO, State CIOs' involvement in IT strategic planning, and state-wide IT strategic planning by State CIOs.

Diverse types of documents served as sources for document analysis. Document sources included letters, memoranda, official records, general announcements, reports, and scholarly or peer-reviewed documents found in a database (Tellis, 1997). All types of documents had potential value when examined to understand and discover the meaning and insights relevant to the research problem. These documents provided historical and background information that could assist the researcher to understand the context and specific topic of interest (Bowen, 2009).

Document Analysis

Document analysis involved an 8-step process that included the following: gather data, develop category scheme, create version control, assess document authenticity, examine document biases, review document background information, question document status, and examine document content (Document Analysis, 2016). There are two ways to examine document content: content analysis and thematic analysis. Content analysis enables the researcher to identify meaning and relevant passages; thematic analysis provides the researcher with patterns or themes from document data (Document Analysis, 2016).

Constant comparison is a critical part of the grounded theory method (Turner, 2022). There were many themes and categories to compare from multiple data sources. The four steps of constant comparison include (a) comparing data applicable to each category, (b) integrating categories, (c) delimiting theory, and (d)

generating theory (Turner, 2022). This needed to be a constant and continuous process to generate theory as part of the grounded theory approach.

The sources of data were identified using peer-reviewed databases and documents from the National Association of State CIOs (NASCIO) website online database. An iterative research process of document collection and document analysis was used to identify new insights and to address the research problem (Busetto et al., 2020).

Triangulation

In qualitative research, triangulation increases research data reliability. Its purpose is to find multiple sources of data evidence (Tellis, 1997). Triangulation in qualitative research allows cross-checking of evidence collected from multiple sources and enhances understanding of the research problem from a larger perspective (Bhandari, 2022). This study used data triangulation of document analysis with the researcher as an instrument in concepts pertaining to State CIOs, IT strategic planning, and remote collaboration. Systematic procedures and purposeful sampling of data collected were an important part of data triangulation.

Use of Grounded Theory

For synthesizing findings from the literature review, grounded theory analysis was conducted Charmaz & Thornberg, 2020; Chun Tie et al., 2019). The grounded theory method includes simultaneous phases of (a) data collection and analysis, (b) an inductive approach to analysis, (c) allowing the theory to emerge from the data, (d) use of the constant comparison method for theoretical sampling to reach theoretical saturation, and (e) generation of the new theory (Barnett-Page & Thomas, 2009). The grounded theory was selected for this research due to the scarcity of literature available for this research subject matter area and the complexity of strategic planning, and State CIOs involvements and management. With this approach, a theoretical saturation was realized by using an iterative process to sample and then analyze those data. The aim of grounded theory is to produce or construct a process inherent to a subject area of inquiry and generate a theory grounded in the original data that will lay a foundation for a framework to describe the relationship between methods and processes (Chun Tie et al., 2019). Grounded theory is a systematic approach to conducting research, collecting data, and conducting analysis. In grounded theory studies, the researcher's or researchers' focus starts at the beginning of the research process, and they construct and interact with the data throughout the research process (Charmaz & Thornberg, 2020). It involves multiple sources and references to review, examine, and analyze from experience and guidance. The researcher uses the data to identify the categories and subcategories capturing and describing those data. These categories and themes can be developed into a hierarchical structure for visual representation, and that structure provides the resulting theoretical model. This research method required creativity, objectivity, experience, and critical thinking. This methodology provides an approach to examining a research problem from qualitative data and addressing practical, challenging subject topics.

After the literature review using the grounded theory method, categories and themes were developed. Next, computer-assisted qualitative data analysis (CAQDAS) software (an NVivo product developed by QSR International) was used to validate the categories and themes developed (Dalkin et al., 2020; SAGE Publications, 2020). The software can be applied with text data and provides visualization and analytical representations. Using the synthesized results from the grounded theory methodology and the analysis via the CAQDAS software tool, the researcher attempted to address the research questions by enumeration of the terms *State CIO* and *IT strategic planning*, and categorization of hierarchical grouping of State CIO and IT strategic planning.

Scope, Population, and Samples

The scope of the sample included database searches for journal articles, trade journals, magazines, and dissertations including IEEE Xplore, ProQuest, and Engineering Village (Compendex and Inspec databases). The time period of the publications included from December 2019 to December 2023. The sample was collected to help preparation for document analysis, and all types of documents were considered for sample size. The National Association of State Chief Information Officers (NASCIO) serves as a community that provides resources to State CIOs. Within the resource center, there were numerous reports and surveys from State CIOs inputs and their involvement in annual events (https://www.nascio.org/resource-center/). The information available from this site was examined as well.

Trustworthiness

This section addressed the qualitative research trustworthiness attributes including credibility, transferability, confirmability, and dependability. The qualitative research process included continuous data analysis and simultaneous refining and tuning (Korstjens & Moser, 2018).

Credibility defines the confidence of truth in research findings and represents correct interpretation of the original data in the findings (Korstjens & Moser, 2018). The sources of the original data used in this research were scholarly databases and nonprofit organizations' reports that are widely accepted and endorsed by state governments.

Transferability means that the results from qualitative research could be transferred to other means of use. This research could be transferred to other researchers who seek to use the original data found from literature research and resources from NASCIO to conduct different research topic of interest. In addition, the findings may be transferable to federal agencies, nonprofit organizations, and for-profit businesses.

Dependability defines how the research findings could be stable over time and involves evaluations of the research findings, interpretations, recommendations from qualitative research (Korstjens & Moser, 2018). This research is dependable based on findings derived from the literature review, the grounded theory method, and findings from CAQDAS software on NASCIO reports on State CIOs.

Confirmability applies to how other researchers could review the research findings, interpretations, and recommendations and determine that the procedures and results are sound (Korstjens & Moser, 2018). This research provided thorough descriptions of the data sources and procedures, which can be replicated.

Responsible Conduct of Research

The researchers followed all of the training requirements for Responsible Conduct of Research (RCR) and the University Institutional Review Board requirements.

Results

Description of Sample

All 50 states' State CIO websites were identified and researched for IT Strategic Planning. From searches conducted, relevant reports were identified as part of the sample data to review along with initial peer reviewed results from the various databases. A text search query was conducted to determine an occurrence of word frequency results. After a systematic review of database searches, and exclusion of non-related and non-applicable, and duplicative sources, a total of 134 document sources including eight peer reviewed literature sources, 110 State CIOs government reports, and 16 reports from NASCIO, StateScoop and GovTech media sources dated from December 2019 to December 2023 were identified as sample data for the document analysis.

Description of Analyses Completed

Tables were prepared to describe the analyses completed for each research question. These appear below.

State CIOs involvement in IT strategic planning to enable remote collaboration for their organization's remote workforce in the height of COVID-19 pandemic (1)

With the advent of COVID-19 and quick response on shifting the workforce to remote collaboration technology to allow them to work from alternate locations, State CIOs activities were captured in 2020 annual reports and 2021 IT strategic plans. Furthermore, annual reports from 2021, 2022, and 2023 included State CIO office project activities conducted to support remote collaboration technologies. Additionally, IT strategic plan from 2022 and 2023 elaborated the future plan to ensure remote work locations and collaboration to conduct businesses and operations. Results appear in Table 1. All literature sources from State CIO websites and other sources of data collected showed the State CIOs involvement to enable remote collaboration in the height of COVID-19 pandemic through the changes made in IT strategic planning.

Table 1. *State CIOs Involvement in IT Strategic Planning Summary*

State CIOs Involvement in IT Strategic Planning	Document Sources	References
Importance of State CIO's involvement in IT strategic planning.	• CIOs need to be engaged with strategic innovations and improvement opportunities. • Strategic planning, processes, and procedures are utilized to develop IT and business alignment. • CIOs need to work together with applicable stakeholders to establish strategic directions of IT in an organization. • IT strategic planning is an on-going process to identify organizational needs and potential opportunities to prioritize key business and IT activities.	• Success factors of long-term CIOs, 2022 • CIO's role in building IT enabled organizational ambidexterity, 2022 • Technology Managers Challenges to Align IT Strategies with Business Strategies, 2021 • Strategies for Adoption of Innovative Information Technology for Business Performance Improvement, 2022
State CIO's involvement in IT strategic planning.	• IT investment allowed the State CIOs to prioritize strategic technology planning to support remote workforce. • Statewide IT strategic plan was developed to implement cloud environment to enable remote collaboration and support virtual environments for the workforce. • State CIO has a key responsibility to develop, implement and manage Statewide IT strategic plan and supporting activities including IT investment management, IT governance, IT strategic planning IT service management and IT operations. • Effective IT investment management, IT governance, IT strategic planning enabled State CIOs to align IT investments to business goals and objectives, monitor and track IT projects, and improve internal customer satisfaction.	• 2020 Arizona IT Strategic Plan • 2022 Connecticut IT Strategic Plan • 2020 Minnesota IT Strategic Plan • 2022 Montana IT Strategic Plan • 2021 Oregon IT Strategic Framework • 2022 Virginia IT Strategic Plan
State CIO's involvement in COVID-19 pandemic response.	• COVID-19 pandemic accelerated broadband infrastructure and cloud computing technology to support telework and access to state government services. • New IT hardware including computers, laptops, tablets, hotspots, softphones, mobile devices, and printers were purchased to support the new remote workforce. • Due to the COVID-19, IT support was in dire need to support suddenly a virtual workforce. • The State CIOs were forced to act to support the workforce needs and the pandemic has lifted the value of IT and criticality of services delivery. • COVID-19 response activities enabled the State CIOs to transform IT investments, IT governance with flexibility and respond quickly to changes needed.	• 2020 NASCIO COVID-19 Planning for State CIO • 2021 NASCIO State CIO Survey • 2022 NASCIO State CIO Survey • 2020 GovTech Digital State • 2022 GovTech Digital State Survey
State CIO's involvement in enabling remote collaboration.	• State CIOs reported to support new remote work policy, IT investments in new IT infrastructure and resources for remote workforce as well as remote training and remote hiring. • IT investments were shifted to face the challenges faced with COVID-19 to implement cloud for virtual collaboration and expand broadband infrastructure. • New online training is offered to the remote workforce to ensure organizational effectiveness and the performance does not hinder.	• 2022 New York IT Strategic Plan • 2021 Maine Annual Report • 2021 Washington IT Strategic Plan • 2021 Texas IT Strategic Plan

Identify and categorize State CIOs involvement in IT strategic planning to enable remote collaboration (1a)
The remote collaboration technology such as Microsoft 365 (M365), Google Workspace, Amazon Web Services (AWS) Workspaces, Zoom, Cisco Webex, and Microsoft Teams have been available to the workforce before the COVID-19 pandemic, and these technologies were expanded to a larger scale of users due to an increased demand due to the COVID-19 pandemic and transitioning of workforce into working remotely. Other IT hardware such as computers, laptops, tablets, mobile devices, and printers were identified to be purchased and distributed to the workforce for them to work at a remote location. The State CIOs had to respond quickly and make a critical strategic decision on shifting the workforce to work remotely and ensuring proper IT support was provided. Common themes categorized from the document analysis results are identified in Table 2 below to support the empirical evidence from all sources indicated that State CIOs have been involved in the following activities to enable remote collaboration.

Table 2 Document Analysis Results Categorized into Common Themes

Common Themes	**Document Sources**	**References**
State CIO's involvement with COVID-19 pandemic Response.	• "COVID-19 pandemic forced the state workforce to start working remotely." • "Responded quickly to provide additional bandwidth, acquired additional VPN licenses, implemented Microsoft Teams Transition to supporting remote work."	• 2022 California Annual Report • 2022 Virginia IT Strategic Plan
State CIO's involvement with Critical Decision Making.	• "Lead efforts to prioritize investments, and enable strategies that ensure accountability, alignment and the achievement of the plan's goals." • "State CIO meet to discuss IT strategy and review the established roadmap for technology investment opportunities that support/enhance the agency mission, while ensuring there is enterprise strategic alignment."	• 2020 California IT strategic plan • 2021 Oregon IT Governance Guide
State CIO's involvement with IT service delivery and IT operations support.	• "Purchased and deployed tablets for remote work during and post COVID-19." • "Purchased 490 laptops of which 201 were issued or loaned out to provide agencies resources to support state employees teleworking."	• 2022 Connecticut Annual Report • 2021 Nex Mexico IT Strategic Plan
State CIO's involvement with new technology training.	• "By offering remote training, CDT expanded its audience to the entire state." • "Training modules addressing issues facing employees in the new remote work environment have been implemented and continue to raise awareness to protect the expanded attack surface."	• 2022 California Annual Report

Analyze State CIOs involvement in IT strategic planning to enable remote collaboration (1b)
There were numerous records and reports available from State CIO IT Strategic Planning websites to analyze State CIOs involvement in IT Strategic Planning to enable remote collaboration. With the quick and sudden responses required due to the state emergency on COVID-19 pandemic and the reporting of new cases on a daily basis, State CIOs had the executive authority to make strategic IT decisions that changed the IT landscape for its workforce. Table 3 summarizes the analysis of common themes and categories.

Table 3 *Analysis of Common Themes and Subthemes Identified and Categorized*

Common Themes	Subthemes	Analysis	Document Sources	References
State CIO's involvement with COVID-19 pandemic Response.		State CIOs were involved with COVID-19 pandemic response to provide IT support to their workforce shifted to work remotely.	• "COVID-19 pandemic forced the state workforce to start working remotely." • "Responded quickly to provide additional bandwidth, acquired additional VPN licenses, implemented Microsoft Teams Transition to supporting remote work."	• 2022 California Annual Report • 2022 Virginia IT Strategic Plan
	State CIOs involvement in providing guidance as a response to COVID-19 pandemic.	State CIOs were involved to support a change in work location guidance to shift the workforce from onsite to remote location.	• "Formal remote work policy along with associated technology changes implemented for the agency based on a hybrid model." • "Establishing hoteling and alternative workspaces within facilities to accommodate the remote and hybrid schedules of many state employees."	• 2022 Kansas IT Plan • 2022 Ohio Annual Report
	State CIOs involvement in response to COVID-19 pandemic to the workforce with changes to policies and standards.	State CIOs were involved to provide COVID-19 pandemic response by implement changes to policies and standards for remote workforce to continue to operate business as usual.	• "The state's International Teleworking and Remote Access standard establishes that state-issued phones, computers, tablets, etc. should not be taken out of the country without an exemption approved by the agency." • "Adapted and modernized all HR processes, including new hire onboarding, to be fully remote."	• 2022 Georgia Annual Report • 2023 Oklahoma IT Strategic Plan

Common Themes	Subthemes	Analysis	Document Sources	References
State CIO's involvement with Critical Decision Making.		State CIOs were involved to make critical strategic decision through IT strategic planning along with IT investment management, IT governance and IT service management activities to ensure the workforce have access to remote collaboration technology.	• "Lead efforts to prioritize investments, and enable strategies that ensure accountability, alignment and the achievement of the plan's goals." • "State CIO meet to discuss IT strategy and review the established roadmap for technology investment opportunities that support/enhance the agency mission, while ensuring there is enterprise strategic alignment."	• 2020 California IT strategic plan • 2021 Oregon IT Governance Guide
	State CIOs involvement in critical decision making to adjust and shift IT resources to focus to support the workforce with remote collaboration.	State CIOs were involved to make critical decision in IT strategic planning to adjust and shift planned IT resources to support the workforce to perform remotely through IT service management.	• "The mass shift to remote work, the use of video conferencing in place of in person meetings, and the adoption of digital signing in lieu of physically handling documents are just some of the changes that have permanently altered the way." • "Shifting a large percentage of the State's workforce to teleworking by rapidly scaling up the technology that State employees need to remain productive from their home offices."	• 2022 Washington IT Projects Status Report • 2021 Ohio Annual Report
	State CIOs involvement in critical decision making to adopt changes to IT governance to support the workforce access to remote collaboration technology.	State CIOs were involved to make critical decision in IT strategic planning to implement changes to IT governance process for the workforce provided with remote collaboration technology.	• "Implemented enterprise IT governance to optimize IT investments." • "Enhanced enterprise IT alignment and ensure agency interests are represented within the IT governance process and duplicative activities are minimized."	• 2022 North Carolina Annual report • 2020 Ohio IT Strategic Plan

Common Themes	Subthemes	Analysis	Document Sources	References
State CIO's involvement with IT service delivery and IT operations support.		State CIOs were involved through IT strategic planning to ensure changes in IT service delivery and IT operations support the responses to COVID-19 pandemic.	• "Purchased and deployed tablets for remote work during and post COVID-19." • "Purchased 490 laptops of which 201 were issued or loaned out to provide agencies resources to support state employees teleworking."	• 2022 Connecticut Annual Report • 2021 Nex Mexico IT Strategic Plan
	State CIOs involvement in IT service delivery support to the workforce equipped with remote collaboration.	State CIOs were involved to provide support in IT service delivery to the workforce with logistics of IT resources including hardware and software for remote collaboration.	• "The state has made progress in efforts to update its overall IT planning strategy, including an IT governance process that closely involves all agency IT directors and staff." • "Moved all users from desktops to laptops to improve teleworking capabilities."	• 2022 GovTech Digital State Survey • 2021 Kansas IT Plan
	State CIOs involvement in IT operations support the workforce to perform remotely.	State CIOs were involved to provide support in IT operations support to the workforce with remote call centers and helpdesk support.	• "Collaboration and improved customer experience also drove the creation of an AI-powered conversation chatbot to serve the state's veterans when they seek assistance from government officials." • "A statewide, AI-driven digital assistant, was launched to offer a clearer path to various agency services."	• 2022 GovTech Digital State Survey

Common Themes	Subthemes	Analysis	Document Sources	References
State CIO's involvement with new technology training.		State CIOs were also involved to provide the new remote workforce with online training to ensure remote collaboration technology is used effectively.	• "By offering remote training, CDT expanded its audience to the entire state." • "Training modules addressing issues facing employees in the new remote work environment have been implemented and continue to raise awareness to protect the expanded attack surface."	• 2022 California Annual Report
	State CIOs involvement in providing support to new remote training.	State CIOs were involved to provide new remote training for the workforce.	• "Provided virtual meeting capabilities/training for staff and many other pandemic technology needs." • "Microsoft Enterprise Skills Initiative provides self-paced and virtual instructor-led courses. Google similarly offers learning tracks and vouchers for certifications in Google Cloud Platform (GCP)."	• 2020 Illinois Annual Report • 2023 Oklahoma IT Strategic Plan
	State CIOs involvement in providing the new remote workforce with remote technology training.	State CIOs were involved to provide training for new remote technologies.	• "Broader distribution of guidance and educational materials for remote workers. State websites with detailed instructions on computer configuration and use are a necessity." • "Training modules addressing issues facing employees in the new remote work environment have been implemented."	• 2020 NASCIO COVID 19 Planning • 2020 Georgia Annual Report

After coding was completed using systematically conducted document analysis and categorically coded data based on the research questions, they were compared for analysis and validation. The word frequency query conducted by the researcher using NVivo software generated a word cloud based on data collected and this query minimized the research bias when comparing results for comparison. Figure 3 is a generated Word Cloud from NVivo software with the highest frequency of words closer to the center of the diagram.

Next, a Word Frequency Tree Map query was conducted by the researcher to present the list of most occurring words located by the data collected using the NVivo software. The most frequent words were: (a) states, (b) remote, (c) agencies, and (d) services. The second most frequent words were: (a) works, (b) plans, (c) technology, and (d) strategic.

Lastly, a Text Search query was conducted to show the relationship between a key word and its relating words based on the data collected by the NVivo software. Figure 4 was generated by the NVivo software as an output of coding branches based on word frequency and text search to address the research questions.

Within the State CIO office, IT strategic planning had been identified and in practice for strategic IT decisions to be made on an annual basis to lay out the statewide IT vision and roadmap to align business and IT goals. The responses to the COVID-19 pandemic required State CIOs to manage through a decision-making process in IT strategic planning. These changes allowed the workforce to work from alternate locations, use remote collaboration technology, receive, and set up IT hardware to enable a remote work environment. Online training had to be offered to train them with new technology systems.

Conclusions and Recommendations

Connection of the Findings with Previous Research
Due to the existence of a gap identified due to the scarcity of literature, there is a lack of connection between this research findings and the previous research. Nevertheless, the findings from studies of CIOs in Federal agencies and in business organizations were similar to those found in the present study of State CIOs on the premise of advocating and enabling remote collaboration during COVID-19. A memorandum from the United States Office of Personnel Management (OPM) published on April 20, 2020, provides guidance on federal agencies to encourage remote work to continue operational needs. Federal CIOs were directed to meet this requirement for their workforce transitioning to remote work and utilize remote collaboration during the COVID-19. According to the United States Office of Personnel Management (OPM) report on the status of telework in fiscal years 2020 and 2021, roughly over 45% of federal employees teleworked, and this trend has increased each previous year due to IT modernization and investment put into place (United States Office of Personnel Management, 2020, 2021). Due to COVID-19, Federal CIOs made decisions, and assisted in transition of the workforce to remote work and utilized remote collaboration. According to the 2020 Federal CIO Survey, COVID-19 accelerated federal IT modernization and investment to accommodate and shift to remote work (Professional Services Council, 2021). A report from International Data Corporation (IDC) published in 2020 stated that over 2000 organizations and companies globally transitioned their workforce and operations to remote operations and allowed real-time collaboration (International Data Corporation, 2020).

Implications for Practice
As noted earlier, the position of the State CIO was established in 1996 along with the Federal agency's CIOs. Since then, CIO level positions have led and managed IT organizations. The State CIOs continue to lead and manage ever-growing IT initiatives as a system owner and authorizing owner (AO) to meet their organizational business needs and adapt to technological advancement. As State CIOs websites share efforts in IT strategic planning, State CIOs must continue to practice the discipline of IT strategic planning and various enabling factors to lead and manage their IT organizations effectively.

Based on the research findings and discussion of the results of analyses, COAs are identified for consideration for future State CIOs and for strategic leadership and management practitioners assisting in CIO development. COAs were identified to prepare for and to use when the next high-risk event or crisis such as natural disaster, war, pandemic, and or other such emergency may occur in the future. State CIOs could consider the COAs listed below to better prepare in advance and make quick critical strategic decisions to deliver much needed technologies for their workforce resulting in positive impacts for the organization. strategic leadership and

management practitioners could use the listing to develop future CIOs in business and industry, as well as with local, state, and federal agencies to address workforce development to handle potential future crises.

Although the following recommendations are targeted to State CIOs, these may be applicable for government agencies at all levels, as well as for-profit and nonprofit organizations.

- State CIO should consider IT Strategic Planning as a continuous process, not a one-time shelfware that captures a snapshot of the IT organization's project status and initiative needs.
  - o Instead of conducting this activity periodically to deliver an IT Strategic Plan, such IT Strategic Planning should be undertaken as a continuous process to review, assess, and update the Plan regularly.
- State CIOs should coordinate and collaborate regularly to share information and knowledge regarding the emerging technological outlook as connected with IT Strategic Planning, and they should embrace and adopt public-private partnerships (PPPs) to align investment and works accordingly.
  - o Institutionalizing IT Strategic Planning with all levels of stakeholders' involvement, assuring knowledge management and information sharing, and engaging with PPPs could better prepare for emerging technology outlook and the next highly risked event or crisis.
- State CIO should consider having an overarching enterprise IT architecture to represent how IT Strategic Planning fits with the organization's vision, mission statement, IT roadmap, IT strategy, ITIM, ITAM, ITSM, and other applicable references.
  - o The discipline of enterprise IT architecture is critical to State CIOs to map all current operational IS, as well as IT systems and applications within the organization's system security boundary. Continuous review and assessment of "as-is" or current architecture and preparations and planning for "to-be" or future architecture would further aid in mapping different components of IT Strategic Planning with State CIO's future vision and strategy.
- State CIO should consider defining measurable and meaningful metrics to evaluate successes, achievements, and return on investment (ROI) from IT Strategic Planning.
  - o Quantitative measures and meaningful metrics for State CIOs to consider may include the following within the scope of IT Strategic Planning on an annual basis:
    - ▪ Number of IT acquisitions planned versus actual.
      - To determine the variance between planned versus actual on IT acquisitions made.
    - ▪ Duration of each IT acquisition from planning to post-award.
      - To determine the variance between planned versus actual duration on IT acquisitions awarded.
    - ▪ IT budget planned versus actual.
      - To determine the variance between planned versus actual on the annual IT budget.
    - ▪ Total cost of ownership (TCO) on IT infrastructure (e.g., cloud, on-prem).
      - To determine the TCO on IT infrastructure and IT landscape that State CIO is managing and planning for future vision and strategy.
    - ▪ % of IT budget for innovation, prototyping, internal research & development (IR&D).
      - To determine % of the IT budget being spent for innovation and prepare for future emerging technological outlooks.
    - ▪ Number of IT projects by categories: initiated, completed, on hold, stopped.
      - To determine the progress of IT projects.
    - ▪ Number of IT requirements received (new or existing internal customer support) by internal customer-based.
      - To determine the types of IT requirements based on different internal customers to justify future IT budget requests.
- State CIO should provide process training on IT Strategic Planning to all relevant stakeholders to ensure institutionalization and a thorough understanding of the requirements.
  - o Institutionalization of IT Strategic Planning will take time and effort to prepare and train all levels of stakeholders. Such training needs to reflect the latest contents and developments. The frequency of

training taken by the workforce, end-of-training exam scores, and training surveys could be captured for future training content and delivery improvement opportunities.

Limitations of the Research

A limitation of this research was that both the preliminary database search results and the final search results revealed a scant number of literature reviews and studies on the topic of interest. The scarcity of literature may have impacted the quality of this document analysis research. The types of sources found may have been a limitation to the research when non journal articles or dissertations were located from literature review searches. The data collection approach may have decreased generalizable findings, as the data that need to be collected and reviewed included CIO related documents from other industries and various governments. Thus, qualitative research for future studies on this topic should consider how to generalize involvement by other types of CIOs and IT strategic planning.

One limitation to the research was that minimal peer-reviewed literature sources were available about this subject matter, and the synthesis of the findings came from only publicly available documentation from State CIO websites. This study did not collect data through a measure of surveys or interviews of State CIOs.

Suggestions for Future Research

The present work represents an extension of previous work undertaken by the authors (Na & et al., 2024). Future research is recommended for strategic leadership and management researchers interested in the subject matter of the State CIOs. Future researchers could use the findings to conduct the Delphi Method with a selected number of State CIOs. In further rounds of the Delphi Method, all 50 State CIOs could receive an online survey request. The Delphi Method is a rational approach to research real-world practice by focusing on structured communication analysis of individuals who could provide subject matter expertise to meet the goal of a consensus (Brady, 2015). This research method is applicable when there is an existence of a group of experts available for participation. The Delphi Method has been applied in IT management related research as a means to improve the efficiency and effectiveness of technology and business management within private, public and government, and to bring a group of experts geographically dispersed together as a structured and organized panel group to communicate for suggestions and recommendations for improvement opportunities (Skinner et al., 2015).

A study similar to the present study could be undertaken with Federal agency CIOs or with CIOs from private and public sectors. That study or another study could possibly investigate and compare CIOs at the Federal, State, and Local levels. A future research scope may consider conducting a case study of multiple states or a state-by-state comparison on the various levels of engagements and processes in which CIOs were involved in order to enable and deliver remote collaboration technologies for their remote workforce.

Another research approach could involve in-person or online interviews with several State CIOs. Such a study could potentially use the results of the present study and interview selected State CIOs to determine their agreement with the study results. A future study may also consider interviewing potential participants from PPPs involved and engaged with various levels of government officials on providing and promoting remote collaboration technologies.

Identifications and analysis of the State CIOs' various involvements in their organizations and the development of such studies would contribute to the literature and body of knowledge. The development of new government level policies and standards to reflect new technologies implemented, focused on implications for State CIO involvement with policy stakeholders such as attorneys and lawyers could be identified and analyzed as future a research effort. Strategic leadership and management researchers and practitioners could further investigate State CIOs leadership, IT organization's effective management, IT organization's workforce development, IT training and organizational learning. Quantitative measures of State CIOs' involvements in these other areas could be planned for future research. Measuring and evaluating involvements and relationships between State CIOs and State level organizations' C-level suite officers could offer consideration for future studies.

Conclusions

The research findings contribute to reducing the gap in the literature and body of knowledge that COAs are for consideration for future State CIOs. Furthermore, additional contributions to a gap in the literature in this subject matter are essential for future researchers, the State CIOs, and their stakeholders. State CIOs could further explore how to integrate these COAs into future IT strategic planning processes or how to implement these action items to enable existing IT strategic planning. As a leader, manager, and practitioner of the position of State CIO, successful planning, execution, management, and operation are all vital to achieving vision, goals, and objectives. Future research related to this topic could strengthen the commitment to public service from current and future state-level employees and a desire to achieve capabilities and deliveries of IT services within the organizational business and technological needs.

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