5-25-2024

Challenges Faced by Information Technology Project Managers When Adopting Network Automation

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This is to certify that the doctoral study by

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Walden University
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Abstract

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Joshua Kerley

MS, University of Arizona Global Campus 2022

MS, Embry Riddle Aeronautical University, 2020

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Automating network services is vital for small and medium-sized enterprises (SMEs) to remain viable and competitive, but implementation has challenges. Without evidence-based strategies to help IT project managers curb those challenges, the transition to automating network services could be hindered. Grounded in Lewin's change model, the purpose of this qualitative pragmatic inquiry was to explore the methods used by IT project managers in network engineering to curb the challenges they face when automating network services. Semi-structured interviews were conducted with a purposive sample of 10 IT project managers from non-governmental SMEs in Florida, US. The data were thematically analyzed, and four themes emerged. One theme highlighted the skills and knowledge managers require to successfully lead the transition process. The second theme described the approaches needed by managers to manage the members of the team involved in the transition process. The third theme highlighted the hurdles faced during the transition, and the final theme described the solutions to the highlighted challenges. A key recommendation for IT project managers is to prioritize continuous learning and skill development to enable them to lead their teams through complex projects effectively. The implications for positive social change include the potential for SMEs to remain viable and contribute to the local economy by enhancing business processes through network automation.

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Dedication

I dedicate this work to my family and close friends. From the earliest stages of my work, you encouraged and supported me. Your steadfast support and belief in my capabilities have been a constant source of inspiration, propelling me in this scholarly pursuit. Your presence has been a reassuring constant, and I am grateful for the strength you provided on this arduous academic journey.

I also dedicate this work to myself. Despite the challenges, I remained steadfast in my pursuit, overcoming obstacles and achieving success. This dedication reflects my unwavering faith in myself, a belief that propelled me to this moment of academic triumph.

Acknowledgments

I am sincerely grateful to acknowledge and appreciate Dr. Dana Haywood as my committee chair. Thank you all so much from the bottom of my heart because I would not have been able to accomplish this study. As committee chair, you saw my potential and capability to attain such a significant academic level. Your continued encouragement and suggestions throughout the doctoral study process kept me focused and hopeful.

Many thanks to Dr. Jodine Burchell, the second committee member. I appreciate your willingness to be part of my committee, as you serve as the second committee member, and I would like to thank you so much for your invaluable contribution that helped to shape the development of the whole doctoral study. Thank you so much.

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Section 1: Foundation of the Study

Automation of network systems and operations is a norm in modern-day organizations. This is due to both technological growth and internal expansion of organizations. The advancement of technology has led to more sophisticated tools and algorithms that streamline network management tasks, reducing manual intervention and improving efficiency. Additionally, as organizations expand internally, the complexity of their networks increases, necessitating automated solutions to handle the growing demands and maintain optimal performance (AL Jarrah et al., 2022). Because information technology (IT) project managers are crucial in coordinating agile software projects (Shastri et al., 2021), exploring their challenges when adopting network automation is essential. I undertook this study to understand these challenges better.

Background of the Problem

Network automation encompasses multifaceted systems fundamental in maneuvering and administering complex operations. These operations affect the learning curve, particularly of a new software suite. Implementing software to automate networks, security, and management places responsibilities on network systems and IT project managers. The progressive exploitation of network functionality presents challenges for these project managers (Yungaicela-Naula et al., 2022). The challenges the managers face are sometimes a result of inadequate professional analysis of the required processes and insufficient knowledge of project management methodology (Vujović et al., 2020). AL Jarrah et al. (2022) argued that IT project managers should comprehend the project management processes that include conception, planning, execution, performance, and

project close before initiating a project. Integrated project management processes, with project risk management, improve the probability of effective project operation by IT project managers.

According to Shastri et al. (2021), project managers play a significant role in agile software projects, particularly during the transition into agile operation systems. Agile software projects refer to the approach of software development that emphasizes flexibility, adaptability, collaboration, and customer feedback (Shastri et al., 2021; Vogel-Heuser et al., 2022). Project managers engage in network automation by facilitating, mentoring, negotiating, coordinating, and protecting IT processes through various management techniques, which can be classified as burdensome, moderate, and soft (Shastri et al., 2021). The method in which software automatically configures, necessities, manages, and tests network systems' importance is intensifying in the IT industry, hence becoming more challenging to accomplish (Vogel-Heuser et al., 2022). The current literature supports that identified project managers are pertinent in matters of network automation and that they face challenges in so doing (Shastri et al., 2021; Vogel-Heuser et al., 2022; Yungaicela-Naula et al., 2022). However, there needs to be more practice literature that addresses the specific challenges faced.

Problem Statement

According to Shastri et al. (2021), project managers play a significant role in agile software projects, especially during the transition into agile operation systems. However, research has shown that IT teams ignore approximately 74% of security threat alerts because of the large volume of the threats they receive (Yungaicela-Naula et al., 2022).

Nevertheless, security automation can decrease the average cost of a breach by 95% (Yungaicela-Naula et al., 2022). The general IT problem is that IT project managers in network engineering need strategies to manage issues while enforcing the automation of networks in their organizations. The specific IT problem is that IT project managers in network engineering need techniques to curb the challenges they face when automating network services.

Purpose Statement

In this qualitative pragmatic inquiry study, I explored the strategies used by IT project managers in network engineering of nongovernmental organizations in the U.S. state of Florida to curb the challenges they face when automating network services. Data collection involved interviews and the collection of documents. The study's target population comprised IT personnel, managers, engineers, and administrators. The study may enable the owners of small and medium enterprises to take advantage of the benefits of IT by adopting network automation, which may enhance business performance and improve the economy and the well-being of society.

Nature of the Study

Qualitative research offers a profound understanding of real-world problems through contextual data (Tenny et al., 2022). I used the qualitative method because of my desire to explore and obtain profound insights into challenges faced by IT project managers. Quantitative research is a type of research that involves statistics and measurements to investigate social phenomena (Watson, 2015). I opted against using the quantitative research method because I explored challenges that are wide-ranging and

difficult to quantify as they may differ from individual to individual. Finally, mixed-methods research incorporates the use of elements of both quantitative and qualitative research methods (Schoonenboom & Johnson, 2017). I decided against using this design because my study did not involve numerical data, an element of the quantitative research method.

Duram (2022) defined a pragmatic inquiry as a research design in which a researcher identifies a problem, focuses on a given decision-maker within a real-world situation, and examines it within a broad context to understand and solve the problem. I used this research design because it provided a means of eliciting in-depth information on challenges facing IT project managers through interviews and document collection. A case study design is limited to a particular context, institution, or situation (Hancock et al., 2021). Therefore, I did not use this type of design to obtain insights from diverse settings. In using a phenomenological design, a researcher explores lived experiences from the perspective of an individual(s) in a given context (Watson, 2015). I did not use the phenomenological design research design because I did not want to restrict my study to individuals' perspectives; instead, I tried to look at my research problem from a broader perspective. The ethnography research design involves a researcher immersing themself in a given research population and using several data collection techniques to examine a social phenomenon (Watson, 2015). I did not use this research design because my data collection did not involve immersing myself in my prospective population to answer the research questions. Therefore, the pragmatic inquiry design is suited for this

study because it enabled me to engage with multiple experiences of the challenges faced by IT project managers, thus orienting the inquiry towards problem-solving.

Research Question(s)

What strategies are used by IT project managers in network engineering to curb the challenges they face when automating network services?

Interview Questions

1. Please let me know your managerial experience to get us started.
2. Please share your roles as the manager in the transition into agile operation systems.
3. Please share with me the technical capabilities and skills you need to successfully manage the transition into agile systems of operation.
4. Please share the approaches and techniques to engage with the people you lead to ensure a successful transition into agile operation systems.
5. Based on your managerial experiences in implementing network automation projects, what key project management processes do you consider essential?
6. What are your experiences regarding challenges faced by managers in network automation?
7. Can you recall any challenges you faced during the initial stages of introducing the need to adopt agile systems?
8. Can you recall challenges you faced, if any, during the implementation of the network automation project?

9. After successfully implementing the network automation project, what challenges could hinder the long-term embedding of the change in your organization?
10. What approaches do you use to address the challenges you mentioned?

Conceptual Framework

I selected Lewin's change model to help ground the conceptual framework for this study. Lewin (1951) outlined three key concepts—driving forces, restraining forces, and equilibrium—that are fundamental principles for change. First, driving forces are significant because they motivate and push in the direction that inspires change (see also Wojciechowski et al., 2016). Second, Wojciechowski et al. argued that change is facilitated when individuals are pushed and directed in the anticipated direction, which can cause a shift in the equilibrium towards positive change. Contrarily, restraining forces counter the driving forces and hinder change by pushing individuals in an unintended direction. As a result, they affect equilibrium by opposing change (Lewin, 1951; Wojciechowski et al., 2016). Finally, equilibrium is a state of being that maintains the equality of driving and restraining forces, with no change occurring. However, it is affected by changes between driving and restraining forces.

Cummings et al. (2016) further illustrated that Lewin's change model has three steps: unfreezing, change, and refreezing. The unfreezing process involves the discovery and adoption of an appropriate method for individuals to dismiss old patterns that were in some way counterproductive to overcome strains of individual resistance and group conformity (Cummings et al., 2016). According to Correia and Rosenkranz (2019), individuals should accept the realism of what was, what is, and what will be as time

passes. The temporal passage indicates that what is the case is not always the same. Unfreezing can be achieved through intensifying driving forces that direct behavior in a different direction from the situation and lowering restraining forces that negatively impact movement from the current equilibrium; a combination of the two methods can also instigate unfreezing (Cummings et al., 2016).

The change model offers insight into business expansion in competitive business contexts by expounding on the capacity of organizations to regulate their approaches and structures (Hussain et al., 2018). Hussain et al. (2018) stated that Lewin's change model, encompassing unfreezing, changing, and refreezing stages, inspires the execution of leadership initiatives for change in complex organizations. When organizational leaders thoroughly research and plan using the three phases of Lewin's change model, they may achieve successful change because there is movement from the current state to the desired and unknown state (Hussain et al., 2018). However, change is often opposed because individuals, including organizational leaders, feel uncertain about the future, which might concern their value, competency, and coping abilities unless they are assured against the status quo (Cummings et al., 2016). In addition, countless factors influence organizational leaders' willingness to embrace change, such as technology, project capabilities, leadership culture, and change readiness (Alolabi et al., 2021).

The change model was an appropriate conceptual framework for this study. I explored similar facets of change addressed by Lewin's (1951) model. The model's explanation of the steps involved in the change process, including freezing, change, and unfreezing, informed my perspective in assessing obstacles encountered while adopting

network automation. Moreover, by using the change model, I could elicit foundational information for identifying the strategies required by IT project managers to embrace change and overcome network automation challenges (see Alolabi et al., 2021).

Lewin (1951) outlined three significant phases of the change process: freezing, change, and thawing. I used this model to illustrate the steps involved in my research. When faced with specific data or an idea for a study, researchers experience freezing. Researchers attempt to solve the current problem in the Change phase, allowing them to advance to the next phase. The final phase, unfreezing, occurs when the issue has been resolved and the researchers attempt to present their findings. I focused on the obstacles encountered by leaders while adopting network automation and moving away from previously utilized manual network systems.

Definition of Terms

Agile operation systems. A digital business model that incorporates methodologies, practices, and principles and is applied to operational processes promoting flexibility, adaptability, and responsiveness of organization (Shastri et al., 2021). Agile operations systems originated from software development and extended to operations management and other domains (Shastri et al., 2021).

Network automation. A network configuration allows it to manage itself (Arzo et al., 2021).

Project manager. A professional is tasked with performing various roles to ensure the completion of projects amongst certain constraints for the given project, which include budget, time, and quality (Gasemagha & Kowang, 2021). They are also expected

to meet the essential standards and necessities of the project's objectives and stakeholders' expectations (Gasemagha & Kowang, 2021).

Assumptions, Limitations, and Delimitations

Researchers should address their study's assumptions, limitations, and delimitations because these components are significant to the research, guaranteeing credibility and prospects for extended study (Theofanidis & Fountouki, 2018). These facets affect a research study's credibility by influencing the study's foundation, design, and interpretation. Identifying and discussing these facets demonstrates transparency, integrity, and critical thinking (Theofanidis & Fountouki, 2018). Therefore, researchers can enhance the credibility of their work by acknowledging and providing adequate justifications for the inherent assumptions, limitations, and delimitations (Antonakis et al., 2021). In this subsection, I identified and defined the assumptions, limitations, and delimitations pertinent to this study. Justifications are provided.

Assumptions

An assumption is a researcher's unexamined belief and inferences that aid the foundational role of the proposed research; an assumption is a researcher's belief that something is true without actual verification (C. Yang et al., 2018). According to C. Yang et al., a researcher should recognize the inferences that lack verification to avert bias in research, illustrate that the researcher is informed of possible self-bias, and avoid the impact of self-bias on the study. As I discussed in the Nature of the Study subsection, the pragmatic research design was the most appropriate for this study, and interviews were

one of the means of collecting data. Therefore, I assumed that the IT project managers I interviewed gave views representative of all project managers.

Limitations

According to Busse et al. (2016), a limitation is a shortcoming noted within a research study. One central limitation of this study is that it cannot be generalized because it is qualitative (Alase, 2017). Also, due to language barriers, research participants may need help conveying their opinions clearly, which can impact the study's findings due to researcher-induced bias (Alase, 2017; Eyisi, 2016). Another area for improvement in this study is purposive sampling, which is not a probability sampling technique; hence, it is difficult to generalize the research findings. The purposive sampling approach is a nonprobability technique that introduces problems of limited representativeness because the researcher only targets specific groups or individuals of interest (Rai & Thapa, 2015). Additionally, the purposive sampling approach is prone to selection bias that can lead to an unrepresentative sample (G. Sharma, 2017). However, using the purposive sampling approach, a researcher can recruit participants by offering detailed, context-specific descriptions and interpretations that could enhance transferability to similar contexts (G. Sharma, 2017).

Delimitations

Delimitations entail the study's scope as they define the boundaries researchers stay within as they conduct the study (Theofanidis & Fountouki, 2018). Theofanidis and Fountouki (2018) argued that delimitations narrow the research and make it practicable and more accessible for readers to follow and comprehend. One of the delimitations of

this research was the focus only on IT project managers. Second, I targeted only IT project managers in network engineering of nongovernmental organizations in Florida. The other boundary in this research relates to the topic of study, network automation. Therefore, this study's findings may not apply to other network or IT issues. Finally, I obtained publicly available documents and interviews for data collection. I could not access proprietary or internal documents, which might have offered different information.

Significance of the Study

Network automation is critical for network engineers to improve their operational efficiency. However, managers need help with adopting network automation. Therefore, exploring the challenges managers face in network automation could provide insights that may be used to improve the transition into agile operation systems, subsequently contributing towards improved operational efficiency.

The study's findings may allow business leaders to understand the strains of adopting network automation. Using this information, leaders may be able to develop better approaches; this may especially be true for small and medium enterprise businesses that invest little in IT (Yu et al., 2019). Furthermore, if implemented, the findings from this study may also enhance network engineers' operational efficiency, improving resource preservation for society. Resource preservation refers to the responsible and efficient use of resources involved in network operations by minimizing waste, optimizing resource utilization, and maximizing the lifespan and performance of network infrastructure (Piramuthu & Zhou, 2016). Resource preservation is beneficial because it can enhance environmental sustainability, reduce costs, increase access and affordability

of network infrastructure, and improve productivity and innovation for the benefit of society (Piramuthu & Zhou, 2016).

A Review of the Professional and Academic Literature

Some research has been done on the roles of project managers and network automation in organizations. In this section, I will review the literature on what is known about these concepts. I will also highlight the gap in the current practice that necessitates me to conduct this study. In this qualitative pragmatic inquiry study, I explored IT project managers' strategies in network engineering of nongovernmental organizations in Florida to curb the challenges they face when automating network services. The literature review focuses on the research question, which was, What strategies are used by IT project managers in network engineering to curb challenges when automating network services?

I extensively searched the literature revolving around challenges, strategies, and the role of IT project managers in network automation. The search was achieved by performing searches of the following databases and websites: Academic Journal, Business Source Complete, EBSCO Academic Search Ultimate, Elsevier, International Journal of Academic Research in Business and Social Sciences, Journal of Innovation & Knowledge, Sage Journals, Journal of Modern Project Management, and the Journal of Systems & Software. First, I used the following keywords to search the databases: change management, challenges, network, automation, IT, project manager, and Lewin's change model. Next, I combined the highlighted keywords to form search strings using Boolean operators such as AND, OR, and NOT. I then used the different combinations of the keywords to search the highlighted databases.

I retrieved 213 sources from the search in the highlighted databases. Based on assessing the titles and the abstract, I excluded 157 sources. Therefore, I reviewed 56 sources. I also obtained additional sources from the bibliography of the reviewed sources. This review includes the conceptual framework and themes from the assessed articles and books. The last section is the summary.

Conceptual Framework

I used Lewin's model of change as the framework to examine the strategies used by IT project managers in network engineering to curb the challenges they face when automating network services. In this section, I provide an in-depth description of Lewin's model. The aim is to offer the background information, analyze the theory by comparing it with other theoretical models, and demonstrate the relevance of the model to my study.

Since its development, Lewin's model of change has gained popularity across various organizations. Lewin published the change model in 1951. Lewin's model of change is widely used in organizations because it provides a simple, structured, and practical approach to managing change and has a successful track record of helping organizations achieve their goals (Eden et al., 2016). Furthermore, given that automating network services involves managing change in organizations, Lewin's model of change provides the basis for understanding the processes of planning, communicating, implementing, and consolidating changes to achieve automation of network services. Therefore, it is vital to know how Lewin's model of change explains the change in organizations.

Lewin's model of change provides various stages through which change can occur. The first step in Lewin's (1951) model is unfreezing the status quo. The unfreezing process involves discovering and adopting an appropriate method for individuals to dismiss old patterns and overcome strains of individual resistance and group conformity (Cummings et al., 2016; Lewin, 1951). Therefore, the unfreezing stage helps prepare organizational leaders for change, making them willing to part with the old ways of doing things. Lewin's model of change recognizes that change only occurs if people are eager to dismiss old patterns and acknowledge the potential benefits of the new approaches.

Using Lewin's model of change helps identify the challenges that managers are likely to face in doing away with the status quo. Lewin (1951) recognized that change is about overcoming the forces that can prevent (constrain) change from occurring and advancing the forces that promote (facilitating/driving forces) change (see also Cummings et al., 2016). Disrupting the equilibrium/status quo requires disrupting the balance between driving and restraining forces (Fritz et al., 2015). Constraining forces make it difficult for change to occur. Constraining forces include resistance to change, lack of resources, and resistance to new technology (Lewin, 1951). Countless factors influence an organization's willingness to change, such as technology, project capabilities, leadership culture, and change readiness (Alolabi et al., 2021). Individuals and organizations may feel uncertain about the future, which might cause concern about their value, competency, and coping abilities unless they are assured against the status quo (Cummings et al., 2016). The restraining forces counter the driving forces and hinder change by pushing individuals in the unintended direction.

As a result, individuals affect equilibrium by opposing change (Lewin, 1951). Lowering restraining forces that negatively impact change from the current equilibrium helps advance the change process (Cummings et al., 2016; Lewin, 1951). Wojciechowski et al. (2016) argued that change is facilitated when individuals are pushed and directed in the anticipated direction, which can cause a shift in the equilibrium towards positive change. The driving forces are significant because they motivate and go in the direction that inspires change (Wojciechowski et al., 2016). Based on Lewin's model, managers should intensify the driving forces to direct behavior in a different direction from the status quo. The ability of managers to identify and effectively address the challenges in the unfreezing stage facilitates the successful transition to automation of network services.

Unfreezing is achieved when organizations overcome resistance to change. Organizational leaders can overcome the challenges associated with the unfreezing stage by motivating and preparing employees for change (Asnan et al., 2015; Hussain et al., 2018). Organizational leaders also navigate the unfreezing stage by developing trust and raising awareness regarding the need for change among employees (Asnan et al., 2015; Galli, 2019; Hussain et al., 2018). The unfreezing step also involves actively identifying challenges and developing solutions (Burnes, 2020; Saleem et al., 2019). Most of the approaches that help address the challenges in the unfreezing stage focus on engaging the members of the organizations on the benefits of the change and addressing their fears of the potential changes to their regular routines. In the context of the automation of network services, the unfreezing stage requires managers to address the resistance to the

automation of network services through effective communication and engagement. Using approaches such as leadership support, clear communication, and the involvement of stakeholders, managers may succeed in ushering in the next step in the change process.

The second step of Lewin's model is change. The step allows organizations to reach a new equilibrium level (Burnes, 2020; Hussain et al., 2018; Saleem et al., 2019). In the change step, the management acknowledges that the status quo no longer benefits the organization and adopts a fresh viewpoint in addressing challenges (Asnan et al., 2015; Galli, 2019; Muldoon, 2020). The change step also involves training staff, updating processes and systems, and ensuring the change is integrated into the organization's governance structure. When applied to the automation of network services processes, the change occurs after the organization is convinced that the change is required. Management leads the way in implementing the steps needed to automate network services. The change step is where organizational leaders take action to implement change interventions and involve the participation of all the stakeholders within the organization.

The third step of Lewin's model is refreezing, which involves consolidating the changes and making them permanent by embedding them into the organization's culture and processes. The freezing step occurs after the change has happened, and its focus is to ensure the sustainability of the adopted change (Eden et al., 2016). Worley and Mohrman (2014) noted that the freezing stage ensures that change is sustained and that people do not revert to the previous state. To ensure the sustainability of the adopted change, organizational leaders integrate the new values and traditions through education,

reinforcing the new equilibrium (Muldoon, 2020). In the refreezing step, the change has occurred, and the organization's leaders are taking steps to ensure that the change becomes the status quo by embedding it within the organization's culture. The refreezing stage requires managers to provide organizational leaders with strategies to sustain change and become the new status quo.

Analysis of the Conceptual Framework

The analysis of Lewin's change model as a conceptual framework suggests that the model is rational and goal- and plan-oriented. As a sensible model, Lewin's change model is based on the idea that change can be planned and managed logically and systematically (Burnes, 2020; Muldoon, 2020; Saleem et al., 2019). The framework provides the basis for organizations to logically and structurally approach change management to their operations or processes. As a plan-oriented model, Lewin's change model ensures that the change is well-planned, implemented, and integrated for long-term success (Hussain et al., 2018; Saleem et al., 2019). Guided by Lewin's change model, organizational leaders need to develop a change plan and communicate effectively to those affected by the change. The planning involves identifying specific actions that need to be taken to achieve the desired outcome. The model also requires organizations to have a clear, well-thought-out, and executable plan that ensures the integration of the change and its long-term success.

As a goal-oriented model, Lewin's change model emphasizes achieving specific, predetermined outcomes through implementing a change. The model's three steps focus on enabling organizations to achieve set goals by developing a sense of urgency for

change, adopting a change plan, and consolidating that change to achieve sustainability (Bekmukhambetova, 2021; Muldoon, 2020). The model provides a clear roadmap for achieving the desired change and enables organizations to measure the progress and success of the change implementation (Burnes, 2020; Muldoon, 2020; Saleem et al., 2019). Using Lewin's change model could help managers identify milestones to guide the change process. Managers should apply Lewin's change model to develop the goals for the various stages of the change process.

The change model enables businesses to introduce change in a competitive business context by expounding on the capacity of organizations to regulate their approaches and structures. Hussain et al. (2018) stated that within Lewin's change model, unfreezing, change, and refreezing inspire the execution of leadership initiatives for change in complex organizations. When organizational leaders thoroughly research and plan using the three phases of Lewin's change model, they may achieve successful change because there is a change from the current state to the desired and unknown state (Hussain et al., 2018). In a competitive environment, the change model can enable managers to successfully implement change, allowing the businesses to achieve a competitive edge. Therefore, Lewin's change model provides the framework for assessing the manager's approaches to promoting the organization's competitiveness by implementing strategic changes.

Comparison With Similar Theories

In this subsection, I critically analyze how Lewin's change model compares to other theories. These include Bandura’s (1991, 1999) social cognitive theory; Lippitt’s

theory of planned change (Jung & Lippitt, 1966); the transtheoretical model of behavior change by Prochaska (2008); the theory of planned behavior developed by Ajzen (1991), Kotter's (2007) model; and the awareness, desire, knowledge, ability, and reinforcement (ADKAR) model by Hiatt (2006). I will show the extent to which Lewin's change model's assumptions agree or disagree with the other theories. By comparing Lewin's change model to the highlighted theories, I demonstrate the suitability of the theory to the study.

Social cognitive theory indicates that change occurs through socialization. The social cognitive theory created by Bandura (1991) is a psychological theory that focuses on how cognitive, behavioral, and environmental factors shape human behavior. According to the social cognitive theory, people learn by observing and imitating given behavior, which is influenced by cognitive, social, and cultural aspects (Bandura, 1999, 2002). The social cognitive theory identifies an individual's belief in their ability to successfully perform a specific task or behavior as a critical determinant of one's behavior (Bandura, 1991,1999). The theory stresses the importance of observation, modeling, and self-regulation for personal and behavioral change (Bandura, 1999, 2002). Socialization is the critical avenue through which learning occurs and can be an approach managers use to implement change. The social cognitive theory can be used to develop approaches to ensure successful change, which is Step 2 of Lewin's change model.

Lewin's change model and the social cognitive theory provide contrasting frameworks for understanding and managing change. First, unlike Lewin's (1951) change model, which focuses on managing change within organizations, the social cognitive

theory emphasizes the individual and how they learn and change their behavior (Bandura, 1991, 1999; Burnes, 2020; Muldoon, 2020). Second, Lewin's change model offers a structured and clear roadmap for achieving organizational change. However, the social cognitive theory only yields an understanding of the psychological mechanisms underlying the change process (Bandura, 1991, 1999; Burnes, 2020). The two theories conceptualize the change process differently, with Lewin's change model offering a structured and clear roadmap to organizational approaches.

In contrast, the social cognitive theory emphasizes the psychological mechanisms that underlie individual approaches to change. Additionally, the social cognitive theory has various limitations, including the limited attention to contextual factors, such as culture, social structure, and historical context, in shaping behavior or change (Bandura, 1991, 1999). Compared to Lewin's change model, the social cognitive theory is less suited for understanding how group dynamics impact change. Hence, it is not suited to framing the assessment of managers' challenges when automating network services in an organizational setting. Unlike Lewin's change model, which recognizes the influence of group dynamics, such as communication patterns, power dynamics, and social norms, on successful change implementation, the social cognitive theory emphasizes the role of individual cognitive processes (Bandura, 1991, 1999). The social cognitive theory recognizes individual aspects, such as self-efficacy, observational learning, and self-regulation, as important determinants of behavior change but fails to directly address the complexities and intricacies of group dynamics that impact organizational change efforts (Bandura, 1999).

Just like Lewin's change model, Lippitt's theory of planned change is a valuable framework for managing change within organizations, and it provides a clear roadmap for the change process. Lippitt's theory of planned change, developed by Lippitt in the 1950s, includes a diagnosis phase that involves identifying the need for change, assessing the existing situation, and the available resources (Lippitt et al., 1958; Vinter, 1960; Welch, 1979). The second phase is the change phase, which is focused on developing and implementing a plan of action to achieve the desired goals. The final phase is the evaluation phase, which focuses on assessing the change process's effectiveness and adjusting as needed (Lippitt et al., 1958; Szabla, 2021). Lippitt's theory of planned change aligns with Lewin's change model regarding the three-step approach to the change process.

Although Lippitt's theory of planned change emphasizes that change needs to be planned and managed logically and systematically, it differs from Lewin's change model in how change can be achieved. Unlike Lewin's change model, Lippitt's theory of planned change places more emphasis on the role of the change agent and the importance of building a coalition of stakeholders to support the change process (Hussain et al., 2018; Szabla, 2021). According to Lippitt's theory of planned change, the change agent is responsible for leading and managing the change process (Lippitt et al., 1958; Vinter, 1960). Compared to Lewin's model, one of Lippitt's theory's weaknesses is the limited focus on the "unfreezing" stage of change, a critical stage focusing on creating the motivation and readiness for change (Burnes, 2020; Muldoon, 2020). Lippitt’s theory of planned change is an extension of Lewin’s change model, with the difference being the

lack of emphasis on the first stage of change. Without elaborate framing of the unfreezing stage of change, Lippitt's theory of planned change is less suited than Lewin's change model to guide the assessment of change in this study.

The transtheoretical model of behavior change and Lewin's change model are frameworks for understanding and managing change. The transtheoretical model of behavior change developed by Prochaska and DiClemente in the 1970s and 1980s indicates that behavior change is a dynamic and non-linear process (Del Rio Szupszynski & de Ávila, 2021; Prochaska, 2020). According to the transtheoretical model, change occurs in five stages, including the pre-contemplation stage, where an individual is unaware of the problem and is not considering any change (Del Rio Szupszynski & de Ávila, 2021; Prochaska, 2020). The second stage is contemplation, where individuals are aware of the problem and begin to contemplate change. The third stage is preparation, where there is active planning for change, and individuals start taking small steps to realize the required change. The fourth stage is the action stage, characterized by a commitment to change and where steps are taken to achieve change. The fifth stage is maintenance, where individuals engage in activities that help to maintain the new behavior and prevent relapse (Hashemzadeh et al., 2019; Prochaska, 2008, 2020). Although the transtheoretical model of behavior change identifies the various stages of understanding and managing change, the process can involve back and forth between the stages, which could provide management challenges in setting targets.

Although the transtheoretical model of behavior change and Lewin's change model are frameworks for understanding and managing change, the two differ in critical

areas. Unlike Lewin's change model's approach, which focuses on the overall change process in organizations and groups, the transtheoretical model of behavior change focuses on individuals (Del Rio Szupszynski & de Ávila, 2021; Prochaska, 2020). According to the transtheoretical model, behavior change is a dynamic and non-linear process, and the individuals who relapse can revisit the contemplation stage and make plans for future change processes (Del Rio Szupszynski & de Ávila, 2021; Prochaska, 2020). The transtheoretical model of behavior change is criticized for being overly simplistic and not considering other factors that may influence behavior change, such as social and environmental factors (Hashemzadeh et al., 2019; Prochaska, 2008, 2020). There is also a lack of empirical evidence to support the model's validity (Joseph et al., 1999). The simplistic nature of the transtheoretical model of behavior change makes it less preferred than Lewin's change model.

The theory of planned behavior offers insights into the approaches managers can take to promote the acceptance of change within organizations as conceptualized within the unfreezing step of Lewin’s model. Ajzen (1991) developed the theory of planned behavior based on the assumption that to change behavior, an individual needs to change the factors that influence the person's intention to engage in the desired behavior change (Ajzen, 1991; Bosnjak et al., 2020). The theory of planned behavior highlights attitudes towards the behavior, perceived social pressure from others (subjective norms), and perceived ease or difficulty in performing the behavior (perceived behavioral control) as the critical factors that influence the person's intention to engage in a given behavior (Conner, 2020; Kan & Fabrigar, 2017). The theory of planned behavior argues that to

change a behavior, interventions should focus on changing attitudes, subjective norms, and perceived behavioral control. The term perceived behavior control refers to the extent of an individual's belief in overcoming barriers and successfully performing a particular behavior (Kan & Fabrigar, 2017). Perceived behavior control is an essential determinant of an individual's intention to engage in a specific behavior (Conner, 2020). Overall, the theory of planned behavior offers insights regarding the factors that influence behavior and guide the development of interventions that target the obstacles encountered while adopting network automation.

The theory of planned behavior and Lewin's change model are both frameworks that aim to explain and guide behavior change. The theory of planned behavior provides insight into the cognitive factors that influence behavior, while Lewin's model guides implementing and reinforcing the change (Ajzen, 1991; Bosnjak et al., 2020; Burnes, 2020; Muldoon, 2020). However, the theory of planned behavior is deemed inappropriate for this study because I will not explore the individual's behavioral intentions but focus on the strategies used by IT project managers in network engineering to curb the challenges they face when automating network services.

The other model that can be used to conceptualize change management processes is the one proposed by Kotter (2007). The model comprises eight steps geared toward guiding successful change processes. The eight steps are (1) establishing a sense of urgency about the need to achieve change, (2) developing a guiding coalition, (3) establishing a vision and strategy, (4) communicating the change vision, (5) empowering broad-based action, (6) generating short-term wins, (7) consolidating gains and produce

more change, and (8) anchoring new approaches in the corporate culture (Kotter, 2007). As Errida and Lotfi (2021) noted, most of the existing change models are extensions of Lewin's change model. Errida and Lotfi noted that steps one to four of Kotter's model correspond to Lewin's unfreezing stage. Steps five to seven of Kotter's model correspond to Lewin's change stage, while Kotter's eighth step corresponds to Lewin's refreezing stage.

Kotter's change model supports Lewin's change framework in various ways. First, Kotter's model expands on Lewin's model's unfreezing stage by providing practical steps needed to bring about change (Hussain et al., 2018; Kotter, 2007). In addition, Lewin's change model focuses on the role of leadership in bringing about change, while Kotter's model further emphasizes the need to create a vision and build coalitions (Hussain et al., 2018; Kotter, 2007). As already noted, one of the change steps proposed by Lewin's change model is implementing change. Kotter's model builds up the change step by providing practical steps for change implementation. Finally, Kotter's model improves Lewin's model by emphasizing the importance of creating short-term wins to sustain momentum for change.

The ADKAR model of change developed by Hiatt (2006) also provides a roadmap for individuals to navigate the change process by providing five elements corresponding with the three stages of Lewin's change model. The model is designed to be a short-term change management framework mainly for personal change (Hiatt, 2006). The model consists of five elements, including awareness, which refers to the individual's understanding of the need for change (Hiatt, 2006; Worley & Mohrman, 2014). The

second element is desire, which refers to the individual's willingness and motivation to support and participate in the change (Hiatt, 2006). The third element is knowledge, which refers to navigating the change successfully. The fourth element is ability, which refers to one's capability to implement the change successfully. The fifth element is reinforcement, which refers to continuous support and reinforcement required to achieve sustainability of the change (Hiatt, 2006; Worley & Mohrman, 2014). Awareness and desire align with Lewin's unfreezing step. Knowledge and ability correspond to the change step. Reinforcement reflects the refreezing step. Unlike Lewin's model, the ADKAR change model does not differentiate between organizational and individual changes. The model also needs to address the complex nature of change (Hornstein, 2015). The ADKAR change model also fails to offer continuous organizational improvement and, therefore, is limited in framing strategies used by IT project managers in network engineering to curb challenges when automating network services. Thus, the ADKAR model further demonstrates the importance of Lewin's change model in framing the change process.

The change model is an appropriate conceptual framework. Various researchers support using Lewin's change model in understanding change management in the IT field (Al-Alawi et al., 2019; Zeleke & McCollum, 2021). For example, Zeleke and McCollum (2021) used Lewin's three-step change process model in their study, which focused on the factors that affect software application deployment change management in agile software development settings. Zeleke and McCollum concluded that Lewin's change model should be adopted during the change management process. During the change

management deployment in agile software development settings, the unfreezing is characterized by reevaluating the existing structures and taking remedial actions for future occurrences (Zeleke & McCollum, 2021). Using Lewin's change model provides a framework for understanding how IT project managers in network engineering approach change by assessing approaches used to achieve the theory's unfreezing, change, and refreezing stages.

There is a logical link between Lewin's change model and my study as it encompasses similar facets of change addressed by Lewin's model. The change model provides foundational information in identifying the strategies required by IT project managers to adopt change and overcome network automation challenges (Alolabi et al., 2021). I will use this model to illustrate the steps involved in my research. When faced with specific data or an idea for a study, researchers experience "freezing." In the "change" phase, researchers attempt to solve the problem at hand, allowing them to advance to the next phase. The final phase, "unfreezing," occurs when the issue has been resolved and the researchers attempt to present their findings. My research will focus on the obstacles encountered while adopting network automation, a departure from the previously utilized manual network systems.

The Critical Role of IT Project Managers

Managers play critical roles that ensure the goals of the change process are achieved throughout the unfreezing, change, and refreezing stages. Top management is a moderator during the planning, monitoring, controlling, and evaluation phases for project success (Ahmad & Habib, 2021). The project managers are bridges between top

management and other team members in the stages of the project life cycle (Ahmad & Habib, 2021). Being the link between top management and the team members offers the project managers a unique vantage point to ensure the entire organization is involved across the different stages of the change process. The role of the project managers as the bridges also means that they must solve the various challenges that could cause a lack of a coordinated change process between management and the rest of the organization.

Project managers are critical in maintaining teamwork and a sense of organization togetherness. Cripe and Burleigh (2022) emphasized the crucial role of IT project managers in ensuring success, teamwork, and cohesion. Abu Aisheh (2022) also identified teamwork as one of the critical roles of project managers. Cripe and Burleigh (2022) noted that the role of managers in fostering cohesive team relationships could be vital in achieving the change, especially at the change step, which requires the participation of all stakeholders. Cripe and Burleigh (2022) used a qualitative case study approach in which semi-structured interview data were obtained from a sample of ten successful IT project managers from Northern California, highlighting the best practices utilized by IT project managers to build cohesive teams. Some highlighted practices include effective one-on-one communication, recognizing team accomplishments, adopting agile approaches to address flexible working approaches, and developing trust.

To promote successful teamwork, IT project managers should share their knowledge with other project team members, establish effective communication that builds trust, and adopt leadership roles (Cripe & Burleigh, 2022). Given managers' varying natures and attributes, Marcusson (2018) also noted that managers must

collaborate to achieve a successful change process. Marcusson (2018) also indicated that project managers are essential as shapers in project teams, ensuring team coherence and success. Marcusson (2018) based the observation on evaluating the IT project manager's team role and sense of coherence through a pilot study involving 35 IT project managers from Swedish public authorities.

Project managers also play an essential role in ensuring client satisfaction during the change process. Woźniak (2021) observed that when IT project managers adopt their roles to maintain internal sustainability that matches the external sustainability viewpoints of clients, there is an excellent possibility of client satisfaction compared to others with mismatched sustainability applications. Woźniak (2021) based the observation on data from 64 IT projects executed in Polish small and medium enterprise organizations. As noted by Shastri et al. (2021), ensuring an effective transition from traditional to agile operating is essential, with clients' satisfaction being one of the benefits. Shastri et al. used a mixed-method approach using numerous data sources, such as quantitative data from 57 questionnaire respondents and 45 hr of interviews with 39 software practitioners. The study aimed to determine the roles of project managers using a grounded theory study. The change to adopt agile processes should consider maintaining the organization's performance. The managers help promote client satisfaction by ensuring effective transition, which could be critical to the change process.

The type of project managers can influence the specific roles that the managers play (Baxter, 2017). There are two distinct types of IT project managers: the primary shapers and the secondary implementers, which are identified based on how they

implement change (Baxter, 2017). The primary role shapers are more significant, and the implementers are the second strongest in project management (Marcusson, 2018). The primary role shapers are more substantial because they are essential in defining the strategic vision, determining resource allocation, and making critical decisions for change. The primary role of shapers' active involvement and endorsement is to initiate a ripple effect that propels change (Baxter, 2017). Although the implementers may not wield similar formal authority as primary role shapers, they are responsible for managing the change activities. They directly address challenges or emerging resistance to change (Marcusson, 2018). The implementers play a crucial role in the change process since they understand the practical realities and dynamics affecting change at the operational level (Baxter, 2017).

For project managers to successfully plan the change process through the three stages of unfreezing, change, and refreezing, they must have the required skills. One way managers can acquire or improve their skills is through training. Abu Aisheh (2022) emphasized the need for managers to be trained to develop the required competencies for managing green construction projects successfully. Abu Aisheh (2022) based their recommendation on research investigating the competencies needed for Amman project managers (N = 100) to overcome challenges in green construction projects and successfully deliver them. According to Abu Aisheh, training helps managers improve their skills to engage the clients, the government, and team members, manage costs, ensure quality work, and adopt sustainable practices. Project managers can also obtain the required skills through engagement with peers and experienced colleagues. Cripe and

Burleigh (2022) noted that it is essential for project managers to adopt practical technology tools and communication and seek mentoring, coaching, and collaboration to maintain cohesive team relationships.

The Process of Adopting Network Automation

Adopting network automation involves several steps to ensure a smooth transition and successful implementation. A vital step project managers must undertake in adopting network automation is clearly defining the objectives (Delgado et al., 2019). The other essential step project managers should undertake is ensuring the team understands the existing network infrastructure, weaknesses, and strengths. Understanding the current network environment is critical in troubleshooting the possible challenges that could be faced in the adoption of network automation. Delgado et al. (2019) noted that weak interdependence between industry-specific factors restricts the adoption of automation. Delgado et al. (2019) based their observation on assessing specific elements in the construction industry that hinder the adoption and implementation of robotics and automated systems. Using a mixed-methods approach, Delgado et al. collected data from 28 specialists. The variables addressed in the study included factors such as the technical and work culture, the client's financial status, the contractor's financial status, and the delicate business case. The outcome of Delgado et al. (2019) implies that underlying challenges other than industry-specific factors would restrict the adoption of automation.

Adopting robotics and automation in the construction industry could be enhanced by addressing underlying challenges. Implementing automation processes, including adapting and enacting Industry 4.0, could be impeded by infrastructural and policy

challenges. Nagy et al. (2018) and Delgado et al. (2019) reported various challenges, including comprehensive procedures, techniques, policies, and systems for enacting and executing Industry 4.0 in supply chains. Nagy et al. (2018) conducted a research study of companies in Hungary to discover the severe concerns they undergo in the adaptation process, the IoT devices they employ, and how they comprehend the occurrence of Industry 4.0. In this study, the authors utilized Porter's value chain model. Using an online questionnaire for data collection, the authors sent the questionnaires to manufacturing companies and companies that offer logistic services. The variables addressed in this study were the IoT tools the companies employ, the challenges the companies go through, and the evolution stages of the IoT tools. The findings indicated that the distribution of actual data throughout all companies provided the availability of suitable quantitative tools and techniques, could significantly affect the entire company.

Ghadge et al. (2020) examined the influence of enacting Industry 4.0 on the logistic business network. They developed an enactment scheme by considering the possible effort and limits in the Industry 4.0 model. For this quantitative study, the researchers collected data using secondary data sources such as business reports, magazines, academic articles, and findings from consultancy companies. The variables addressed in this study were classified into four extents: administrative, technical, moral, legal, and strategic. The research findings show the need for comprehensive procedures, techniques, policies, and systems for enacting and executing Industry 4.0 in supply chains. Whereas Ghadge et al.'s (2020) study indicated the presence of specific challenges in implementing Industry 4.0 aspects, Nagy et al. (2018) suggested the use of

data could be a helpful way in Industry 4.0. Managers should, therefore, have the required skills to identify and effectively address the various challenges that could impede the implementation of automation processes.

Understanding and addressing the challenges in translating the available knowledge into practice is critical in implementing automated processes. Åkerberg et al. (2021) performed a case study in a process automation plant at Iggesund Paperboard to provide the characteristics of operational technology traffic. The study aimed to inspire more research and standardization toward converging IT and operational technology for process automation. The study focused on the paperboard machinery production network, limiting the investigation's scope to the server and control network traffic. It covered a small part of the overall operational technology network comprised of 5 different generations and vendors, along with 43 operator stations that linked directly to the system server network and 32 process controllers on several virtual local area networks. Traffic was captured and analyzed during paperboard production using a traffic recorder connected to the primary and backup networks. As per the research, there is a need to bridge the gap in the practice literature between operational technology and IT networks to take the next step in productivity and innovation in the process industry. Concentrated research is required to eventually add more functionality to integrate IT and operational technology systems into practice. Åkerberg et al. (2021) findings back up the need to conduct this research to help identify effective strategies to help smooth the network automation process.

Verhoef et al. (2021) note that transformations such as automation require concrete organizational structures. Verhoef et al. (2021) conducted another study to provide a multidisciplinary perspective on digital transformation. This study assessed how and why digital transformation had been approached in various fields to address the conceptualization of digital transformation across different fields. It dealt with firm-level analysis and excluded other fields that operate on an individual and industry level, such as entrepreneurship or organizational behavior. The study focused on operations and strategic management, information network systems, marketing, and innovation. A specific timeframe was chosen to include relevant academic papers published from January 2000 to October 2018. The academic documents under study included a large set of 42 leading journals in each select category. The study found that digital transformation requires concrete organizational structures. It mostly happens as a response to changes in digital technologies, excessive competition, and the consequences of customers' digital behavior. This is a buildup on Sohail's (2010) findings that, whereas automation is essential, digital transformation requires specific organizational structures. The finding also aligns with Kim et al.'s (2020) findings that solutions to some network automation challenges are found within the scope of the field in which automation occurs.

Project managers should also guide their teams in developing comprehensive strategies that clearly explain the goals of automation and the critical milestones. The developed comprehensive strategy should identify the tools and technologies required to implement network automation successfully. As noted by Sohail (2010), there are various automation goals that project managers can identify. Sohail (2010) explored multiple

problems in performance, fault, and security management categories and consequently proposed different autonomous solutions and application techniques. The author found that automation is necessary as it minimizes the involvement of people in network management, which is a complex and essentially dynamic field. The minimization of the participation of people in network management could bring increased efficiency, cost-effectiveness, reliability, and the ability to be agile and innovative (Sohail, 2010). Automation also improves performance, freeing human resources for more strategic tasks (Sohail, 2010).

After designing the automation workflow, ensuring proper validation and testing is vital. The implemented network automation process should be able to serve the intended purpose. Basa et al. (2020) emphasized the importance of ensuring reliability and operational tasks in their study of automated systems such as virtual machines. Basa et al. (2020) deployed a simple application with 1000 user requests for machines in different classifications of usage and price. The researchers reported that virtual machines are highly advantageous compared to the manual instructions required to deploy cloud systems. Maykot et al. (2019) conducted a study to explore which manual switches in a grid should be automated to initiate the self-healing process, whereby a network system reestablishes itself in case of permanent or transitory network failure. The authors also aimed to divulge information about self-regenerating systems and their importance in power distribution. The data utilized was from a real distribution utility out in São Paulo. The study used a mixed-method approach and utilized computational tools based on graphing, genetic algorithms, and other evaluations of multiple criteria. The concepts

addressed in the study were intelligent software, smart meters, and remote-controlled equipment. In addition to Zeitler et al. (2022) and Basa et al.'s (2020) findings, Maykot et al.'s (2019) study revealed that the power distribution sector has the requisite technology to fully transform the grid to become competent and, therefore, reliable. Automation is, hence, a facilitator of increased reliability.

Chen (2019) emphasized the need to ensure network automation aligns with the organization's needs and solves the existing challenges. According to Chen (2019), the design, fabrication, and modification of an electric grid automation system must be integrated with the regional distribution system support scale. Additionally, the design should meet utilization demands and be consistent with the distribution system control and maintenance system. The described design characteristics are necessary to satisfy the distribution network's reliability, financial performance, and operation demands and enhance the power provision quality and the systems supervision level of the supply network (Chen, 2019). The variables in the research study were the system's compatibility, maintainability, and scalability. The research findings indicate that the system is complex, well-advanced, and has quality maintainability, compatibility, and scalability. The results also demonstrated that the network automation system could provide a reliable power supply, reduce time for power shortages, and have a significantly enhanced and functional management level.

Reliability is an essential requirement if automation is to be readily accepted. Therefore, H. Yang et al. (2018) conducted a qualitative online survey study. A survey firm in Korea conducted the online survey, and the data for analysis was gathered from a

final sample of 216 respondents. This study aimed to investigate the intelligent home qualities that present consumers' demands and examine the interconnection between the crucial elements and network adoption practices. The concepts of this research study were perceived controllability, perceived automation, and perceived reliability. The research findings showed that reliability, interconnectedness, and controllability are crucial in adopting an automated smart home. Automation is associated with high reliability, even with minimal human involvement.

Reuter et al. (2019) conducted a study to test a software tool tentatively referred to as a trial promoter to support health and education research. The authors did this by automating certain aspects of the age group's behavior and distribution. They also assessed large numbers of health messages and user comments on social media to get a more accurate depiction. The concepts being tested were the tool's utility and reliability. For that, the researchers developed parameterized message templates, and the software tool generated, distributed and analyzed over 1,725 health messages in 85 days. The findings were that software tools have a high capacity to support the generation, distribution, and analysis of many health promotion messages together with additional user comments across various social media platforms with little to no human interaction and a high degree of functional correctness. These findings align with findings by Wabwoba et al. (2014) on crucial aspects of the network automation process. Successful implementation of automated processes enhances the organization's performance by reducing errors.

Successful implementation of network automation requires the training and education of the staff. Project managers must ensure that the staff have the skills and knowledge to use the automated processes effectively. Collaboration is needed to achieve automation successfully. Wabwoba et al. (2014) conducted a study to examine the impact of business process reengineering on business process automation. The researchers started by collecting the available data on the present deployment of information and communication technologies (ICT) resources and their consequent utilization, the type of resources available, where they were deployed, how they were used, and their actual purpose from a business process perspective. The sample was 107 respondents drawn from a population of 357 teaching staff from a local university. The researchers opted for a descriptive research approach due to the nature of the research. Questionnaires were administered for data collection. As per the study's findings, more was needed to purchase and deploy these ICT resources. More needed to be done for their implementation to be a success. Process reengineering also had to take place to pave the way for integrating these ICT resources with the business processes. Various ICT resources were purchased and deployed in the university's different departments under study. Still, the responsibility of automation had been left to the people to figure out. The end product of this development was that the ICT resources ended up being useful just for personal errands and the needs of the staff but in no way improved the business process. The study also concluded that service delivery stayed the same with the availability of these autonomy resources.

Upon implementation, the automated process should be monitored, optimized, and scaled as required (C. Sharma et al., 2023; Zeitler et al., 2022). Scalability and power intensity are essential considerations in network automation. Managers need to consider the organization's expansion when implementing robotic process automation. C. Sharma et al. (2023) reported that expandability harms the adoption of robotic process automation. C. Sharma et al.'s assertions were based on a study investigating robotic process automation and the integrative factors of robotic process automation in nonmanufacturing firms within the unfolding economy. In this quantitative study, researchers assessed the dependability of the survey tools by utilizing the field data and the measurement model. Data was collected using a piloted survey, and a sample from 313 participants, which involved middle and above middle-administration directors of nonmanufacturing industries in India, was gathered. The variables addressed by the authors were the industry, the industry size, the number of employees, and the employees' experience. The findings from the research study indicated little complication, and the industry's influence was significant in adopting robotic process automation for the nonmanufacturing industries in developing countries. Therefore, managers need to consider future expansion plans when implementing robotic process automation, which, like network automation, involves automating tasks and processes to achieve operational efficiency. Integrating robotic process automation with network automation could yield seamless end-to-end automation, facilitating enhanced productivity.

Domingues et al. (2016) noted that achieving network automation should be scalable, which ensures it is less power intensive. Domingues et al. (2016) based their

conclusions on a study that assessed the suitability of using narrowband Internet-of-Things (IoT). Zeitler et al. (2022) also acknowledged the importance of ensuring scalable approaches, noting that narrowband IoT for process automation was highly scalable and less power-intensive. The medium latency requirements were most suited for smooth operation. Zeitler et al. (2022) based their study on industrial-like applications and cloud-based developments in process automation. The researchers laid out the variables for this study in the form of the end-to-end system that was designed to constitute a base station that houses an array that produces a beam, a sensor connected to a narrowband IoT modem, and a private network that is composed of a system that helps in sensor management. The study comprised various fields in ordinary environments of an industrial nature, which were reliable, had coverage measurement, and offered latency. Therefore, adopting automation in organizations could be appealing because of the scalability and reduced power demand. Thus, project managers must implement network automation incrementally through scaling up to avoid disruptions and facilitate fine-tuning (Domingues et al., 2016; Zeitler et al., 2022).

The Importance of Network Automation

Despite concerns regarding the initial cost of implementing the automated services, the network automation process is associated with improved service delivery and practical administrative functions. Aldarthi and Sinha (2022) observed that although automation costs are significantly higher than the monetary advantages, the process is associated with significant non-monetary benefits that improve organizational efficiency. Aldarthi and Sinha studied the costs and potential benefits of adopting library automation

using observational and questionnaire data at Rabindra Library. The researchers also used yearly reports and budget forecasts from Rabindra Library to supplement the primary data in assessing the actual costs and benefits of Library Automation for the entire seven years of the study. The study found that the cost of implementing library automation was significantly higher than the monetary advantages accrued. However, the study showed that library automation improved services and the library's administration of resources, employees, and students. Thus, the benefits of automating a university library outweigh any cost associated with its implementation in the long run.

Automation is also beneficial in eliminating inconsistencies. According to Santyadiputra et al. (2021), automation enhances efficiency by eliminating configuration errors and inconsistencies. Santyadiputra et al. (2021) based their findings on a simulation of network automation involving ten layer-3 manageable switches from Cisco, eight proxy routers, and three Linux servers. The authors used the simulation to examine the efficiency of network automation in combating scalability challenges faced by IT organizations that use traditional manual networks in their administrative duties. Based on the simulation study, Santyadiputra et al. (2021) noted that automating networks in modern IT organizations was much more efficient than relying on manual human input, which is prone to error. According to Santyadiputra et al. (2021), network automation, executed as a program or application whose primary purpose is to automate routine tasks, uses algorithmic approaches to arrange steps in problem-solving, therefore eliminating configuration errors and inconsistencies. Similarly, Aldarthi and Sinha (2022) and Reuter et al. (2019) noted that automation is cost-efficient and improves service delivery.

Network automation has also been shown to be crucial in electric power supply. Chen (2019) observed that network automation helps electric power supply organizations maintain oversight and management of the supply network. According to Chen (2019), the design can guarantee the stability of the power supply, reduce loss due to power shortages, and significantly enhance the management of operations. Additionally, it employs relevant software frameworks to transform data and enable systematic supply network management. The supply network automation system plays the fundamental, extensive use of various communication techniques to obtain oversight and manage the supply network. Chen (2019) further observed that data transformation with relevant software frameworks also facilitates obtaining systematic supply network management. Chen (2019) conducted a study to fabricate a supply network automation communication system that enables data gathering, data analysis, remote control, and network supply inspection. The researcher focused on building a network automation distribution using the primary grid and appliances.

With the progressive advancement of the social economy, the inadequacy of electric power is becoming severe, and thus, the process of establishing smart grids is becoming more critical. According to Hu et al. (2022), the supply network automation system that uses low-voltage smart switches brings down the maximum interference period significantly, reduces the minimum interference interval period, and reduces the total interference period of each load by approximately 10% and, as a result, enhances proper usage of electrical power. The findings of Hu et al. (2022) align with the findings of Santyadiputra et al. (2021) that automation enhances efficiency. Hu et al. (2022)

proposed the introduction of a suitable low-voltage smart switch and the institution of the mathematical framework in reviewing the supply network automation technology. Hu et al.'s (2022) research used the low-voltage power supply switch to safeguard the main and branch electric lines. The variables in this study were interruption times, compensation fees, time intervals, and interruptible amounts.

Electric power providers undergo network automation to enhance network effectiveness, dependability, certainty, and quality of service. Girón et al. (2018) state that power distribution networks have changed significantly. At present, it is required that the power supplied to consumers is of improved quality and quantity to meet the power demand. Girón et al. (2018) conducted a study to assess the advancement realized in the dependability indicator after the automation of the secondary substation. The data for reliability indices were collected from several European countries, and most of the measured reliability indices were gathered between 1999 and 2012. The findings of Girón et al. (2018) indicated that network automation enhances system repair in case of failure. The findings also showed that the reliability variable significantly impacts the economic sustainability of the distribution system operators.

Network automation has broadly been explored in networking institutions since it is a more sensible and realistic way of handling and controlling complicated communication networks. According to Wu et al. (2022), an advanced knowledge-generated system enables the system to adjust successfully to the constantly changing complex conditions of the communication network. In Wu et al.'s (2022) research, a selection approach was designed to illustrate the effectiveness of the suggested system.

This qualitative study employed a theory built on causal induction and Bayesian interference. The concepts in this study identified substantial processes in path selection, precise guidelines for examining restrictions, exercise gathering data for system path selection, and checking the functionality of the studied causal conceptual framework in various network layout settings. The study findings indicate that the suggested knowledge-powered structure can present a readily understandable explanation by which the result of the network automation exercise is arrived at.

Automation can enable personalized performance surveillance and troubleshooting. According to Tang et al. (2020), system automation can oversee the packet and optical layers simultaneously. The elemental analyzer can influence artificial intelligence to pinpoint the fundamental causes of irregularities in the packet-over-optical system accurately and in time. Tang et al. (2020) based their observations on the assessment of network design of the Multilayer in-band network telemetry (INT) to determine how the rapid expansion of pillar networks has caused the trade, use, and framework of packet-over-optical networks to become progressively complex. Tang et al. (2020) explained how to oversee the multilayer INT by carefully sliding the INT subjects in packets into position. Tang et al. (2020) suggested a configurable complex INT system in which a packet-over-optical system can be pictured instantaneously and have personalized performance surveillance and troubleshooting.

Robotics and automation are embraced in different industries. According to Aghimien et al. (2020), there is increased interest and adoption of robotics and automation in graphic and 3D manufacturing. Based on the assessment of secondary data

obtained from Scopus archives, Aghimien et al. (2020) noted that increased efforts are invested in construction automation and the utilization of robotics in industries. Results further revealed that studies are focused on the modified employment of robotics and automation, mainly in graphic and 3D manufacturing. With the growing interest in automation, managers should be well-equipped to effectively implement automation processes in their organizations.

Kim et al. (2020) examined and surveyed study patterns and network attributes in construction, automation, and robotics by utilizing essential elements and keyword system surveys built on published documents. This quantitative study collected data from published articles from the International Symposium on Automation and Robotics in Construction archives. A bibliography made up of 9,837 keywords from a total of 2,080 publications issued from 2000 to 2016 was established (Kim et al., 2020). The variables tackled in this research study were the keyword system's collective extent dispersion and the connection between centrality measures and the keyword occurrence. The study's findings indicated that prominent keywords that engage in active keyword interaction also connect several groups of similar research topics. Findings further show that prominent topics with more related keywords remain to be selected and significantly play a part in the evolution of the network. These findings indicate that solutions to some network automation challenges are found within the scope of the field where the automation occurs.

IT Network Engineer Strategies

One of the significant roles of IT network engineers is configuring and upgrading new and prevailing network systems. Huang et al. (2019) reviewed the implementation of solutions and the advancement policies for hybrid software-defined networks (SDNs). These network systems contain both conventional and SDN networks. Hybrid SDN is a networking design in which both consolidated and fragmented concepts coexist and interact to varying extents to set up, govern, modify, and maintain network activity to enhance system capacity and consumer experience. The hybrid system blends the conventional protocol reliability with the SDN adaptability while limiting inconsistencies and restrictions (Huang et al., 2019). The researchers systematically assessed solutions on the control plane and data plane implementation and explained the specific case applications of the SDN systems. For this research study, the researchers systematically evaluated the deployment and enhancement alternatives for the hybrid SDN system using secondary data from previous research studies. The concepts addressed in this study were the security problems in implementing solutions, optimization policies for actual situations, and the virtualization solutions for hybrid SDN systems. The research findings provided researchers with a synopsis of the hybrid SDN implementation solution, the optimization policies, and the various utilization cases. Based on Huang et al.'s findings, improved focus on the control and data plane implementation alternatives could enhance systems performance and reliability.

Although SDN eases system management and allows for innovative interactions, they continue to doubt its reliability (Yu et al., 2019). According to Yu et al. (2019), even

though the existing solutions tackle issues regarding the SDN system's reliability, only some address strategies for SDN fault control. Yu et al. (2019) reviewed the SDN flaws and associated operation solutions defined through research studies and industry improvements. The researchers employed a structured designation of the SDN flaws, evaluated and analyzed current SDN fault solutions, and performed a gap assessment that exists between the solutions proposed in research studies and those implemented practically. From an evaluation of the gaps in SDN fault management, Yu et al. (2019) indicated that various projects were in their early stages and required more effort and commitment to progress further.

A digital twin, particularly model-based system engineering, is progressively valuable for systems engineering. Madni et al. (2019) showed that the digital twin concept is a useful strategic tool for engineers since it is crucial for obtaining important insights regarding network performance. Madni et al. (2019) provided insight and justification for merging digital twins with model-based system engineering in their study that explored the advantages of incorporating digital twins with the system model and the IoT in facilitating the advancement of model-based system engineering. The researchers used data collected from the IoT to address concepts such as digital twin and machine learning, digital twin simulation, digital twin costs, and linking the digital twin with the IoT. Madni et al. (2019) observed that the digital twin could employ simulation-based analysis and data management to evaluate returns and risks in cost and performance.

An automated process could facilitate obtaining construction operational data that can be used for energy projection. Fan et al. (2019) provided insights and strategies that

could be used as policies and references to design complex systemic concepts for short-term construction energy projections. Fan et al. (2019) evaluated the importance of complex repeated strategies built on neural networks for establishing energy projections. With the establishment of intelligent houses, vast amounts of construction process data are gathered and used for analysis. The collected data is utilized to generate practical approaches and strategies that facilitate the full realization of the usefulness of construction operational data in energy projection. The findings from the research study can be used to close the gap between construction experts and complex data analytics.

IT Project Manager Strategies

The project manager should have specific competencies to ensure the project's success. Good project manager strategies present comprehensive plans that allow for better and more progressive teamwork and improved project performance and efficiency (Alvarenga et al., 2019). According to Alvarenga et al. (2019), project management strategies and capacity have grown vast, and the field is continually undergoing significant changes. Alvarenga et al. (2019) aimed to investigate the relationship between project manager competencies and project performance to determine the most relevant competencies that foster project success. For this qualitative research study, the researchers collected data through a survey of project managers regarding the relevance of 28 different competencies and their importance to project success. The researchers employed univariate and multivariate methods for data analysis. The study findings indicated that commitment, communication, and leadership were the most critical factors. Results from the multivariate analysis showed that the most relevant competency issues

that facilitate project success were management, communication, self-control, interactive, practical, organizational, and producing competencies.

To ensure good project performance and success, project managers should be competent in managing collaborative and collective approaches. Collaborative project practices are progressively becoming common in building projects (Moradi et al., 2020). Based on a qualitative research study involving 33 project managers, Moradi et al. (2020) noted that the most common competencies for the satisfaction and success of the project manager included trust-based teamwork, alliance, and joint risk-reward arrangement. Managers who promote teamwork and collaboration ensure that members fully participate and bring on board their skills to implement automated processes successfully.

Project managers use risk management on the presumption that it creates more value for projects. Willumsen et al. (2019) indicated that using a risk management strategy, the practitioners' view of value determined how the value was generated. Willumsen et al. (2019) based their conclusions on a qualitative study that addressed value-making and risk-management practices. The authors also indicated a need for a more interpreted comprehension of the worth of risk management as a strategy.

The other essential requirement for successful project managers is fundamental self-assessment regarding the capabilities and strategies. Willumsen et al. (2019) also evaluated how cultural awareness influences the relationship between self-assessment and competence. Based on their qualitative research study, Willumsen et al. (2019) indicated that fundamental self-evaluation had positive and significant impacts on the

project managers' abilities and strategy, with psychological stability having the most significant impact.

There are various challenges project managers could face in the automation of networks, one of the challenges being the management of stakeholder expectations. Based on a case study where 12 respondents were interviewed, Nesheim (2021) found out that the key challenges are the magnitude of stakeholders, particularly the connection with the project manager. To endure these challenges, resource managers engage in extensive networking and recurrent dialog with the project manager. In addition, system knowledge and a friendly personality are perceived to enhance coping.

Arzo et al. (2021) examined the best achievable research guidelines and challenges to address to attain complete network automation. The authors evaluated and surveyed the prevailing works before and after the software-defined networking and network-function visualization launch. The variables tackled in this study included the major trending patterns that were being emulated. These variables were software-defined networking, microservices, containerization, network-function visualization, and machine learning. The study findings provided insights into achievable research requirements in network automation, such as retracting from an on-premises system to a virtualized system to achieve cloudification. This change is piloted by machine learning, cloudification, software-defined networking, and network-function-virtualization factors.

Transition and Summary

This section provided a detailed description of the proposed research. Evidence shows that project managers are tasked with ensuring the transition into agile systems of

operation, which includes enforcing the automation of networks in their organizations. The assessment of the existing evidence revealed that project managers face challenges as they enforce the automation of networks in their organizations. However, there needs to be more evidence on how IT project managers in network engineering address the challenges they face when automating network services. Therefore, this study explores strategies IT project managers use in network engineering in Florida to curb the challenges they face when automating network services. Section 2 provides the research approaches to address the highlighted gap in the practice literature.

Section 2: The Project

In this research, I intend to address the specific IT problem that IT project managers in network engineering need strategies to curb their challenges when automating network services. Addressing the highlighted problem is vital because automation of network systems and operations is critical to organizations' technological growth and internal expansion. It is the role of the IT project managers to coordinate agile software projects (Shastri et al., 2021)

Section 2 provides an in-depth description of the adopted research methods. The description includes the role played by the researcher in the data collection process, the description of the participants, and the research methods and design. The section also provides an in-depth description of the approaches used in recruiting participants, collecting, and analyzing data. Aspects associated with the reliability and validity of the adopted research approaches are also discussed.

Purpose Statement

This qualitative pragmatic inquiry study explored strategies IT project managers use in network engineering of non-governmental organizations in Florida to curb the challenges they face when automating network services. Data collection in the pragmatic research design involved interviews and the collection of documents. The study's target population comprised of IT personnel, managers, engineers, and administrators. The study may contribute towards enabling small and medium enterprise, to take advantage of the benefits of IT by adopting network automation, which may enhance business performance and improve the economy and the well-being of society.

Role of the Researcher

In the proposed research, I was the data collection instrument. As noted by Collins and Stockton (2022), qualitative research approaches place the researcher as the primary tool for data collection. In this role, I developed the semistructured interview questions, conducted participant recruitment and the analysis of the interview data from individual participants to gain deeper insights into valuable and actionable information regarding IT project managers' challenges.

As the data collection instrument, I got involved with the participants throughout the process of interviews by engaging with the participants regarding aspects of the interviews, acknowledging their views and contributions to the research, and adopting transparency concerning how data will be used, stored, and protected. I occupied the outsider position in my engagement with the participants and collected data. Morgans (2017) noted that researchers occupy the outsider position if they have limited personal experience with the research topic. However, being an outsider could result in wrongful interpretations of the views shared by the participants because of a poor understanding of the culture and jargon used (Alase, 2017; Attia & Edge, 2017). To address this challenge, I educated myself by studying widely regarding the topic.

Being a data collection instrument is not without concerns of bias. As Alase (2017) noted, researchers have their perspectives, views, and maybe experiences regarding the research topic, which could lead to biases when interacting with participants. Additionally, such biases could interfere with the collection and interpretation of the data (Hatch, 1996; Ortlipp, 2008). I took steps to mitigate bias in

data collection and interpretation of the findings. I ensured the interview protocol was peer-reviewed and developed based on expert opinion. I sent the transcripts to the participants for review to ensure correct transcription and for them to add or remove any information. Additionally, I conducted member checking of the data interpretation to check whether it resonates with them. I identified my input in the research and opinions through bracketing (Dörfler & Stierand, 2020). I took steps to ensure that research adheres to research ethics. To this end, I ensured that the recruitment of the participants, collection, handling, analysis of data, and dissemination of the findings adhered to the Belmont Report protocol (Miracle, 2016). I upheld the principles of respect for persons, beneficence, and justice.

Participants

I followed specific inclusion and exclusion criteria when selecting participants for the study. Participants who were considered met the following selection criteria: (a) were an IT project manager; (b) were actively involved in coordinating agile software projects by overseeing activities that include budgeting, management, and time management; (c) worked for a nongovernmental organization in Florida; and (d) had over one year of experience in the management position. I excluded those who (a) were unwilling to share their experience regarding the challenges they faced when automating network services, (b) expressed discomfort with taking part in a Zoom interview, and (c) did not meet any of the defined inclusion criteria.

I recruited the participants after obtaining approval from the Walden University Institutional Review Board (IRB). I posted an invitation on social media platforms like

LinkedIn, Facebook, and Twitter to recruit the participants. The social media post (see Appendix A) welcomed prospective participants to the study. I included the inclusion criteria and my email and phone contacts to enable those willing to participate to reach out. Those who expressed willingness were issued an informed consent form to familiarize them with the study, including risks, benefits, roles, steps to safeguard the data, and upholding their rights and procedures. The eligible individuals who consented were included in the study.

The strategies I used to establish a working relationship with participants included clearly and respectfully communicating to the participants the purpose of my research, their role, and expectations. I created a comfortable and trusting environment for effective communication by showing genuine interest in the participants' experiences, perspectives, and backgrounds. Using informed consent, I clearly explained the research process and the potential risks, benefits, and confidentiality measures. I respected the participants' time, availability, and personal boundaries. I will also adhere to ethical guidelines and regulations.

Research Method and Design

In this section, I describe the qualitative research method. I also compare qualitative, quantitative, and mixed methods approaches. I will cover why the qualitative method will be used instead of quantitative or mixed methods approaches. This section will describe the pragmatic inquiry research design, specifically focusing on the central tenets. I also explain why pragmatic inquiry research design will be used instead of other qualitative research designs.

Method

As observed from the stated purpose statement, I used the qualitative method to explore and obtain more profound insights into challenges faced by IT project managers automating network services. The qualitative method is research that explores and offers a deeper understanding of real-world problems through contextual data (Tenny et al., 2022). I used the qualitative research design instead of quantitative options because of the need to focus on contextual aspects in addressing the research question. The qualitative method is based on the subjective view that allows exploration of the research topic considering the prevailing contextual aspects (Alase, 2017; Eyisi, 2016). Furthermore, the subjective approach is based on the thinking that there is more than one truth (Alase, 2017). Therefore, using the subjective view of this method will allow me to understand the challenges faced by IT project managers based on their views. I did not attempt to identify an absolute truth or generalize the findings using this approach. However, instead, I considered the emerging meanings as the contextual truth, as directed by Alase (2017). By relying on the data collected through semistructured interviews, the qualitative research approaches give the participants room to express their versions of truth without questioning the validity or the trueness of their understanding of their experiences (Eyisi, 2016). Therefore, the qualitative research approaches are best suited for exploring IT project managers' challenges.

Quantitative research is a type of research that involves measurements or statistics to investigate social phenomena (Watson, 2015). I did not use the quantitative research method because I explored challenges that are wide and difficult to quantify, as they may

differ from individual to individual. Unlike qualitative research approaches, which are subjective, quantitative research methods are objective (Bloomfield & Fisher, 2019). The objective approach could have been more suitable for this study because it focuses on obtaining universal truth and pays little attention to individual experiences (Bloomfield & Fisher, 2019). It should be noted that personal experiences are essential in providing a unique insight into the feelings and person-specific factors associated with such observations. Therefore, quantitative research approaches were not used because they eliminated the actual voices of the individual participants from the research.

Mixed methods research refers to research in which the researcher(s) incorporates quantitative and qualitative research elements (Schoonenboom & Johnson, 2017). I did not use the mixed method because my study will not involve numerical data, an aspect of the quantitative research method. Additionally, mixed methods are unsuitable because they introduce the problem of combining and interpreting findings from conflicting research paradigms (Timans et al., 2019). The quantitative aspect of mixed-method research focuses on providing conclusive, generalizable, and objective findings, making it challenging to compare with qualitative, subjective findings.

Research Design

Duram (2022) defined a pragmatic inquiry as a research design that identifies a problem, focuses on a given decision-maker within a real-world situation, and examines it within a broad context to understand and solve the problem. I used this research design because it helped provide in-depth information on challenges facing IT project managers through interviews and document collection. One of the critical tenets of pragmatic

inquiry is the assumption that research is carried out with the need to obtain valuable and actionable knowledge that can be used to address existential problems (Feilzer & Yvonne, 2010; Kelly & Cordeiro, 2020). Furthermore, unlike other qualitative approaches, such as phenomenological designs that focus on the nature of truth and reality, the pragmatic inquiry design offers a strategy to address issues of human significance (Feilzer & Yvonne, 2010; Kelly & Cordeiro, 2020; Patton, 2014). Therefore, the pragmatic inquiry design is suited for this study because it enabled me to engage with multiple experiences of the challenges faced by IT project managers, thus orienting the inquiry towards problem-solving.

The other fundamental tenet of pragmatic inquiry is that experience, knowledge, and acting are interconnected. Based on this view, the exploration of participants' experiences and document analysis, themes, and hidden issues emerge. As Kelly and Cordeiro (2020) noted, the interconnectedness of experience, knowledge, and acting can be achieved by triangulating the participant's views and experiences and what can be observed, such as from document analysis. Therefore, pragmatic inquiry is superior to other qualitative approaches, such as phenomenological designs, because it relies on the knowledge advanced from the participants' experiences and encourages analyzing organizational practices through document analysis.

The other fundamental tenet of pragmatic inquiry is that inquiry is an experiential process (Kelly & Cordeiro, 2020). Based on this view, research should be performed more carefully and self-consciously (Dewey, 2007). This research approach is beneficial because it combines macro- and micro-level perspectives, facilitating an inclusive

research process that yields a more detailed understanding of the phenomena under investigation (Kelly & Cordeiro, 2020). The selection of pragmatic inquiry as the preferred design is based on the view that other qualitative research designs are unsuitable for the proposed study. A pragmatic inquiry with a case study is a pragmatic research design that restrains itself from a particular context, institution, or situation. I did not use it because I wanted to be able to obtain the findings from different contexts.

A phenomenological design with a case study research design looks into experiences from the perspective of an individual(s) in a given context (Watson, 2015). Phenomenological design is based on the interpretative approach, which empirically focuses on beliefs. It should also be noted that in phenomenological design, the researcher engages in understanding, unlike in pragmatic inquiry, whose ultimate goal changes (Watson, 2015). I did not use the phenomenological design with a case study research design because I do not want to restrict my study to individuals' perspectives but rather be able to look at my research problem from a broader perspective. As Kelly and Cordeiro (2020) noted, pragmatic inquiry differs from phenomenological design because it focuses on the nature of experience instead of reality. By focusing on the nature of reality, the pragmatic inquiry design provides practical, practice-based knowledge regarding vital and social experiences (Kelly & Cordeiro, 2020).

The ethnography research design involves immersing oneself in a given research population and using several data collection techniques to examine a social phenomenon (Watson, 2015). One of the defining characteristics of ethnography is that it focuses on assessing culture and beliefs. Additionally, unlike the pragmatic inquiry, ethnography

design may take considerably longer. Therefore, I did not use the ethnographic research design because my data collection method will not involve immersing myself in my prospective population and studying their culture. I was also constrained by the time required to complete the research; therefore, using an ethnographic research design could cause unwanted delays.

I used different approaches to ensure data saturation. I used purposeful sampling to select participants with varying characteristics to increase the likelihood of reaching data saturation. I also collected and analyzed data in an iterative manner, which will help determine if additional data will be required to answer the research questions comprehensively. I engaged in ongoing reflection and documentation of the research process, which enabled me to track my progress and know when data saturation was approaching.

Population and Sampling

This research's target population comprised IT project managers, particularly managers, engineers, and administrators working for non-governmental organizations in Florida. I used this population because the members of the population have the required experiences to address the research question adequately. As noted from the study, I focused on exploring strategies IT project managers use in network engineering to curb the challenges they face when automating network services.

The approach I used to determine the sample size involves assessing the previous qualitative research. I noted that qualitative research studies do not require large sample sizes, as with quantitative research (Malterud et al., 2016). I established that for

qualitative studies, especially those not based on non-case study design, the sample size ranges between 5- 20 participants (K. Costa & Tumagole, 2020; Gunasekara et al., 2014). However, data saturation is another factor in qualitative sample size determination. According to Fusch and Ness (2015), an adequate sample size is attained upon reaching data saturation. When interviewing an additional participant, the term data saturation point is a point in data collection that does not yield new information or lead to views similar to the previous interviews. Therefore, I intend to have a sample size of 10 participants in the proposed study. However, I will consider data saturation in determining the final sample size.

I used non-probability sampling strategies because I relied on the qualitative research method. I intend to sample the participants and select those with the required experience to address the research question adequately. Therefore, I used a purposive sampling strategy. Campbell et al. (2020) indicated that purposive sampling enables researchers to select participants with qualities and characteristics defined in the selection criteria. The appropriateness of the purposive sampling approach for qualitative studies is evident in its wide use in qualitative studies (Campbell et al., 2020). I used a purposive sampling approach based on defined selection criteria.

Snowballing is a non-probability sampling technique that depends on a referral system where the researcher relies on participants to reach others (Ayhan, 2011). Although snowballing allows access to small and hard-to-reach samples, I did not use it because it is likely that subjects will nominate those they know, which could limit getting diverse views and introduce challenges in maintaining confidentiality. The other non-

probability sampling technique is convenience sampling, where the researcher selects conveniently available participants (Ayhan, 2011). I did not use the convenience sampling approach because I needed those with specific qualities defined in the selection criteria rather than seeking conveniently available samples.

Ethical Research

I took various steps to ensure that the proposed research adhered to the required ethical procedures to protect participants at different stages of data collection, analysis, and presentation of the findings. Before conducting participant recruitment, I obtained ethical approval from the IRB (approval no. 09-26-23-1019972). I gained approval by presenting the completed proposal with other details, including the invitation email and data collection material. In addition, I provided the informed consent documents to the IRB. I did not need to contact the IRB for changes to the research procedures, including data collection approaches, methods for analysis, and presentation of the data.

I upheld various ethical considerations, including the confidentiality principle. Surmiak (2018) noted that researchers must protect the participant's confidentiality. Protecting the participants' identity helps uphold their rights and could encourage them to express themselves freely without fear. Anderson and Munoz Proto (2016) noted that some ways researchers can maintain participant confidentiality include avoiding collecting information that could be used to link the data to the participants. The steps I took to protect the participant's identity included using interview questions that did not require the participant to disclose name, PIN, physical address, or other personal identification details. If the participant discloses any personal identification details, I

conceal such details in the transcripts using pseudonyms or fake names. As noted by Allen and Wiles (2016), pseudonyms help researchers protect the participant's identity by ensuring that no particular interview responses, transcripts, or quotes can be linked to any specific participant. Therefore, when presenting the findings, I used pseudonyms to identify quotes associated with emergent themes.

The other ethical procedure I took relates to protecting the participant's data. According to Pietilä et al. (2020), researchers must take the necessary approaches to prevent data access by unauthorized third parties. One of the approaches I used to safeguard the data would be to store the interview responses, transcripts, and audio recordings in an encrypted flash drive in a lockbox. I also placed the data in an encrypted file and prevented unauthorized access by using a strong password known only to me. For any printed transcripts or any other documents that might have participant's details, I stored them in a locked cabinet that only I could access. Furthermore, I conducted all data management and analysis procedures on my secured laptop to limit possible data leakage to unauthorized individuals. The security of the data is further bolstered by the fact that I worked alone and carried out data collection and analysis, limiting unauthorized access to the data by third parties.

I adhered to voluntary participation throughout participant recruitment and data collection. No incentives were offered. As noted by Sil and Das (2017), researchers should ensure that participants voluntarily agree to participate in scientific research that includes human participants. Researchers must offer participants adequate information for voluntary participation to make an informed decision. According to Pietilä et al.

(2020), the provision of informed consent enables participants to understand the study well. In this study, I provided the participants who expressed their willingness to participate with the informed consent document. The information I provided in the informed consent document will include the description of the study's aim, objective, and purpose and the benefits and risks associated with the study. I also disclosed my identity as the researcher, the reason for carrying out the research, and the affiliate institution. I sent the informed consent to the participants via email. Upon receiving the consent document, I requested each participant to read and understand the informed consent and then provide affirmation by indicating "I consent." Those who declined were asked not to respond to the email. I gave participants two weeks to read and respond to the consent document. During the two weeks, I was available to answer any questions the participants had about the contents of the informed consent.

It should be noted that once they agreed voluntarily to participate, the participants maintained the right to withdraw from the study. I informed the participants about their withdrawal rights during the recruitment and data collection. Before commencing the interviews, I reminded the participants of their rights to skip any of the questions or withdraw. The participants were informed that once they withdrew from the interviews, the data that had been recorded would not be used but instead destroyed through permanent deletion. Additionally, I reminded the participants that I would collect the data using an audio recorder, and any participant not willing to be audio-recorded would be free to withdraw. To ensure that the participants do not feel threatened if they refuse to answer questions or withdraw from the study, I assured them they will face no

consequences or punishment. Additionally, I asked the participants to provide reasons for refusing to answer any question or withdrawing from the study.

I adhered to research ethics in data analysis by adopting data analysis procedures that resulted in the findings emerging from the collected data. I identified my perspectives and views using bracketing. Finally, I will disseminate the findings to interested parties using accessible avenues. I shared the study's results with the participants using a summary of not more than two pages. I will also disseminate the results through PowerPoint presentations in selected conferences and workshops. After the completion of the study, I will securely store the data for five years in a password-protected laptop to protect the rights of participants, as required by the principles of the American Psychological Association ethics code. After five years of safe storage, I will destroy the data by permanently deleting the digital data and shredding paper documents.

Data Collection

Instruments

I was the primary data collection instrument. In this position, I collected data by conducting interviews with the participants. I collected the data using semistructured interviews as the primary data collection instrument and through the analysis of documents to obtain secondary data. The documents that I received include the publicly available organizational or institutional reports. I obtained information about network automation endeavors and challenges from these reports. I carried out the semistructured interview based on an interview protocol (see Appendix B) comprising open-ended questions. Adeoye-Olatunde and Olenik (2021) noted that the open-ended questions

allowed the participants to express their views and experiences exhaustively and comprehensively. Therefore, I developed the interview protocol based on existing literature and expert opinion. In formulating the interview protocol, I ensured the interview questions were relevant to the study's research question. I also incorporated elements that promote engagement, such as follow-up questions and ice-breakers, into the interview protocol.

To enhance the credibility of the interview protocol, I took steps including peer review. I organized semistructured interviews with two of my friends (managers) to assess the suitability of the interview protocol. The pretest participants will also offer verbal. Based on the agreed-upon date and time, I conducted the pretest interviews via Zoom. I analyzed the data thematically to see if the responses addressed the expected research question. I also checked for issues with the language or the interview questions' organization and made the necessary adjustments. Additionally, I sought the opinion of the doctoral study chair.

Data Collection Technique

I collected the data using face-to-face interviews via Zoom video conferencing and document collection from publicly available sources. The documents I collected included evidence of the strategies used by IT project managers in automating network services. Dodds and Hess (2020) noted that online face-to-face interviews allow researchers to engage the participants and observe non-verbal cues, such as facial expressions, while avoiding the challenges associated with physical face-to-face interviews, such as cost and scheduling limitations. Evidence from previous qualitative

studies suggests that online-based data collection approaches are practical and beneficial (Lobe & Morgan, 2020; Terry et al., 2017). Using online face-to-face interviews, I was able to reach geographically dispersed participants. I used Zoom, an online cloud-based video conferencing platform that allowed me to communicate in real time and store the recordings without requiring third-party software (Archibald et al., 2019). By not using other third-party recording software, I reduced the possibility of privacy infringement and improved data security. I also chose the Zoom platform because it allows user-specific authentication to ensure that only the invited participants participate and enhance privacy. Evidence also suggests that Zoom video conferencing is easy to use and safe (Archibald et al., 2019).

Before the interview date, I agreed with the participants on the scheduling of the interviews. However, I encouraged the participants to find a quiet, private room to conduct the interviews to limit the risk of disturbance and privacy infringement. Additionally, I advised the participants to obtain a stable and secure internet connection, preferably private, because public Wi-Fi may need to be more secure. Finally, two days before the interviews, I sent a reminder email to the participants to alert them about the interviews.

During the actual date of the interviews, I sent an invitation link to the participants. Once they joined, I welcomed them and reminded them of the purpose of the research, their role, how long the interviews would take, and that their responses would be audio recorded. I used the interview protocol to carry out the interviews. I asked the first question and let the participants respond exhaustively before I continued to a follow-

up question if necessary. I followed these steps for the rest of the interview, which lasted between 45 min and 60 min. The participants were free to excuse themselves at any point, refuse to answer any question, or even withdraw from the study without any questions. If the participant chooses to withdraw, they will be informed that the data will be destroyed. At the end of the interview, I asked the participants if they had anything to add in the form of comments or questions. After responding to the additions made by the participants, I thanked them and ended the interviews. I transferred the audio recording to an encrypted file on my password-protected laptop.

Data Organization Techniques

I kept a reflective journal throughout the research to record what I did and my thought process. I documented my feelings during data collection and analysis in the reflective journal (Ortlipp, 2008). Additionally, I kept research logs where I documented my learning experiences (Caroleo, 2002). Once I obtain the data, I will identify the participants using pseudonyms (such as P1 and P2). I stored the digital data, including audio recordings and participant recruitment documents, in an encrypted file on my password-protected laptop. I will use a locked cabinet in my office to store the paper documents safely. After five years of safe storage, I will destroy the digital data upon completing the study by permanently deleting and shredding paper documents (Barnhill & Barnhill, 2014).

Data Analysis Technique

I analyzed the data using the context analysis process described by A. P. Costa and Amado's (2018) guidelines. The content analysis procedure postulated by A. P. Costa

and Amado involves logically organizing data while preserving the original reflection of content shared by the participant. With this approach, rigor is expected to be achieved through the data collection stages, allowing the researcher to validate the information obtained from the participants (Kelly & Cordeiro, 2020). A. P. Costa and Amado's approach also advocates for complex, rigorous, and iterative data analysis processes.

MAXQDA is a software tool used for qualitative data analysis. The tool offers a range of features and functionalities that assist researchers in organizing, analyzing, and interpreting qualitative data (Kuckartz & Rädiker, 2019). I chose MAXQDA because it allows for importing, organizing, and managing qualitative data. The tools facilitate data analysis through transcripts, documents, audio and video recordings, and images (Kuckartz & Rädiker, 2019). The tool also allows systematic storage and organization of data. Using MAXQDA, the data can be coded by assigning labels or codes to specific data segments to identify themes, concepts, or patterns. The coding options offered by MAXQDA include in-vivo, hierarchical, and color-coded coding stripes (Elaldi & Yerliyurt, 2017). The tool provides data visualization capabilities, including charts, diagrams, and graphs. Thematic analysis output can also be reported in Microsoft Word, Excel, PDF, and HTML. Before data analysis, I exported the audio files to MAXQDA software for transcription.

Heeding A. P. Costa and Amado's (2018) guidelines, I carried out the first analysis step, data familiarization. I read the transcripts multiple times to understand the participant's interpretation of the world. I sought to understand each participant's worldview regarding the research topic and how they conveyed their understanding of

their experiences. I proceeded to start the coding. I read the interview records line by line again to create posterior codes by categorizing significant statements and meaning units verbalized by the participants. The third step was sorting the created codes by classifying them and reducing them by deleting or combining redundant or similar codes. In this step, I demonstrated the relationship between codes by searching for similarities and loosely grouping the codes. The final step was theming. I developed the subtheme from the closely related posterior codes. I also developed themes and linked them to the subtheme and the respective posterior codes. The literature and an adopted conceptual framework underpinned the development of the key themes. Finally, I used triangulation by comparing the interview themes and the document analysis findings to establish common themes.

Before obtaining the final draft of the findings, I carried out member checking to get the participants' input into the findings. I engaged the willing participants in a 20-minute conversation about the findings derived from their interview responses. The participants reviewed the findings, selected quotes, and how they have been interpreted. I asked them to give their general thoughts about the findings, how accurately they feel they captured their thoughts and experiences, what I could add to better capture their experiences, or what could be removed. I will then integrate their input into the final draft of the findings.

Reliability and Validity

Reliability

In qualitative research studies, the discussion regarding the reliability of the study focuses on dependability, which refers to how well the methods used in obtaining findings are documented (Nowell et al., 2017). Dependability can be enhanced through member checking of data interpretation, pilot tests, expert validation of the interview protocol, and data saturation (Constantinou et al., 2017). I used member checking for transcript review. I tested the interview protocol using peer review. After the pretest, I sought expert opinions in validating the interview protocol. Finally, I ensured that data saturation was achieved.

Validity

In qualitative studies, validity refers to the findings' credibility, transferability, and confirmability. Credibility is an aspect of research that relates to whether the findings are addressed from the participants' perspective (Flynn & Korcuska, 2018). Confirmability is a qualitative concept that describes how others can confirm or support results (Nowell et al., 2017; Sinclair et al., 2018). Finally, transferability focuses on whether research conclusions are based on the collected data (Nowell et al., 2017). Each of the highlighted aspects of study validity is described below.

Credibility

Credibility can be enhanced through member checking the data interpretation, participant transcript review, triangulation, and interview protocol (Flynn & Korcuska, 2018). To enhance credibility, I tested the interview protocol using peer review. After the

pretest, I sought expert opinions in validating the interview protocol. Additionally, I requested the participants to offer their opinions regarding the interpretation made from their responses. Finally, I enhanced the credibility of the findings through data triangulation, where I relied on various data sources, including document analysis and interviews.

Confirmability

The approaches that enhance confirmability include probing during interviews and follow-up, member-checking interviews, and questions from different perspectives (Nowell et al., 2017). In this study, I included follow-up questions to the interview protocol. Additionally, I used member checking for transcript review.

Transferability

Steps that can be taken to enhance the transferability of the findings include well-documented evidence of adherence to the data collection and analysis techniques that correspond to the research design (Sinclair et al., 2018). Other approaches involve reaching data saturation and participant transcript review (Sinclair et al., 2018). I used thick descriptions to discuss comprehensively the methods used in the analysis. I also ensured that data saturation was achieved. According to Fusch and Ness (2015), an adequate sample size is attained upon reaching data saturation. When interviewing an additional participant, a point in data collection does not yield new information or lead to views similar to the previous interviews. Finally, I used member-checking approaches for transcript review.

Transition and Summary

In this section, I provided a detailed description of the proposed qualitative method based on a pragmatic inquiry design and a discussion of why the approach suits the study's purpose. I also described my role as a data collection instrument and my outsider positions, highlighting the risk of bias and how I would mitigate it. I also described eligibility requirements that, along with purposive sampling, will be used to recruit the participants using social media posts. Using this approach, I intend to have a sample size of 10 participants, depending on when data saturation is attained. I also described the ethical considerations that will be followed throughout the data collection, analysis, and presentation of the findings. I also described the interview protocol and how it will be used to collect data using semistructured interviews via Zoom. The section also explains how the data will be recorded, organized, and analyzed, ensuring reliability and validity. Finally, section 3 will present findings along with the application to professional practice, implications for social change, recommendations for action, recommendations for further research, and reflection.

Section 3: Application to Professional Practice and Implications for Change

Section 3 provides an in-depth description of the findings, focusing on the professional practice and implications for change. First, the findings obtained from the thematic analysis of the interview data are presented and compared with the existing literature and the adopted conceptual framework. The applicability of the findings concerning the professional practice or application of IT is provided by implications for social change. The recommendations for action and further study are also offered, along with a reflection on the researcher's experience with the research process.

Overview of Study

The IT project managers in network engineering play a pivotal role in overseeing and coordinating agile software projects that enable this transformation. However, they often encounter a multitude of challenges in the process. This study's central issue is the technological hurdles IT project managers encounter in network engineering when automating network services. The significance of addressing this problem lies in the critical role that network service automation plays in the modern organizational landscape. As highlighted by Shastri et al. (2021), it is essential for IT project managers to successfully coordinate agile software projects for the automation of network services.

I completed the study using the qualitative method because of the need for this study to explore and obtain more profound insights into challenges faced by IT project managers. The adopted qualitative approach was based on the pragmatic inquiry design because it will help give in-depth information on challenges facing IT project managers through interviews and document collection. Semistructured interviews were conducted

with 10 IT project managers, particularly managers, engineers, and administrators working for nongovernmental organizations in Florida. The data were thematically analyzed.

Thematic analysis yielded four themes (see Table 1). Theme 1 addresses the technical capabilities and skills managers require for successful agile operation systems. Theme 2 describes the approaches and techniques to engage with the people you lead to ensure a successful transition into agile operation systems. Theme 3 explains the challenges faced by managers in network automation. Theme 4 documents solutions to IT managers' challenges when automating network services.

Table 1

Themes and SubThemes

Theme	Subtheme
1: Technical capabilities and skills required by managers for successful transition to agile operation systems	1a: Technical knowledge and expertise 1b: Communication and leadership skills 1c: Problem-solving and adaptability 1d: Stay updated with industry trends
2: Approaches and techniques for management of people for a successful transition into agile operation systems	2a: Regular meetings and feedback 2b: Training and skill development 2c: Culture of Collaboration 2d: Involving team members in decision-making
3: Challenges faced by managers in network automation	3a: Resistance to change 3b: Inadequate knowledge of project management

	methodologies
	3c: Resource constraints
	3d: Technical complexities
	3e: Challenges hindering the long-term embedding of the change
4: Solutions to the challenges faced when automating network services.	4a: Training, skill development, and continuous learning
	4b: Planning and regular assessment
	4c: Budgetary and resource allocations
	4d: Phased implementation and adaptability
	4e: Communication and collaboration

Presentation of the Findings

Theme 1: Technical Capabilities and Skills Required by Managers for Successful Transition to Agile Operation Systems

Theme 1 provides insights into the technical expertise, communication skills, adaptability, and continuous learning required for successful transitions to agile operation systems in IT project management. The list of sub-themes that make up Theme 1 is provided in Table 2, which offers insights into the symbiotic relationship between technical expertise and successful agile transitions. The existing literature also reinforces that practical technology tools and expertise are crucial for managers (Cripe & Burleigh, 2022). Subtheme 1b underscores the critical role of open, clear, and transparent

communication in addressing challenges during the automation of network services. Alvarenga et al. (2019) also emphasized the significance of communication and leadership for project success.

Subtheme 1c addresses the vital nature of adaptability in the toolkit of IT project managers. Subtheme 1c emphasizes the consistent need for continuous learning and adaptation. The importance of managers engaging in ongoing learning has been reported by Abu Aisheh (2022). Finally, Subtheme 1d emphasizes the significance of Staying Updated with Industry Trends, illustrating how IT project managers proactively stay abreast of technological advancements and industry trends. This proactive approach aligns with the literature's recommendation for managers to engage in continuous learning, reinforcing the dynamic nature of network engineering and the commitment of managers to overcome challenges (Abu Aisheh, 2022).

Table 2

Prevalence of Theme 1 Subthemes in Participant Responses

Subtheme	No. of occurrences
1a: Technical knowledge and expertise	13
1b: Communication and leadership skills	8
1c: Problem-solving and adaptability	11
1d: Stay updated with industry trends	8

Subtheme 1a: Technical Knowledge and Expertise

The insights from the participants emphasized the need for IT project managers to continuously update and expand their technical knowledge base to successfully address the challenges inherent in automating network services within agile operation systems. Participant 1 emphasized, “Managing agile transitions requires technical knowledge in network engineering and an understanding of automation tools and technologies.” The participant, therefore, underscored the significance of having a solid foundation in network engineering while also being well-versed in the various automation tools and technologies essential for managing agile transitions.

Participant 2 also stated, “Managing the transition into agile systems requires technical knowledge of network engineering, project management methodologies...” The participant highlighted the integration of technical knowledge in network engineering with project management methodologies. Participant 5 added, “It's crucial to have knowledge of network automation tools, cloud technologies, and software-defined networking.” Participant 5 indicated the need for managers to expand their spectrum of technical knowledge required, encompassing network automation tools, cloud technologies, and software-defined networking.

Subtheme 1b: Communication and Leadership Skills

The subtheme considered communication and leadership skills essential for effective collaboration, problem-solving, adaptability, and overall project success in transition into agile operation systems. Based on the views shared by the participants, IT project managers need to possess technical prowess and the ability to communicate, lead,

and adapt in dynamic environments. Participant 1 emphasized the significance of effective communication, leadership, and problem-solving skills in managing IT projects in network engineering. Participant 1 noted that "…effective communication, leadership, and problem-solving skills are crucial." The perspective shared by Participant 1 underscores that IT project managers need to possess the ability to communicate effectively, lead their teams, and tackle problems efficiently. Participant 2 further reinforced the importance of solid communication and leadership skills, noting that "…strong communication and leadership skills are crucial for facilitating collaboration..."

Participant 6 further expanded on the soft skills by highlighting the necessity of effective communication, leadership, and adaptability to change. The ability to adapt to changing technological landscapes is particularly relevant in the context of network engineering, where new technologies and methods continually emerge. Participant 6 noted, "On the soft skills side, effective communication, leadership, and the ability to adapt to change are essential." Participant 9 echoed the sentiments of the previous participants, stressing the need for excellent communication skills, adaptability to change, and strong leadership skills. According to Participant 9, "...excellent communication skills, the ability to adapt quickly to change, and strong leadership skills..." are seen as interrelated and essential for ensuring successful IT projects in network engineering, where complex technical challenges demand effective communication to convey ideas and solutions, adaptability to respond to evolving circumstances, and strong leadership to guide the team toward project success.

The subtheme also underscores the critical role that open, clear, and transparent communication plays in the strategies employed by IT project managers in network engineering to address challenges during the automation of network services. Participant 1 emphasized the importance of communication, stating, “Communication is key” in navigating the challenges of network service automation. Participant 2 shared a similar perspective, highlighting their focus on “open communication and transparency,” indicating that the willingness to share information freely, with clarity and honesty, is critical. Participant 4 echoed the same sentiments by emphasizing that “open and transparent communication” is a core principle in managing IT projects related to network service automation. Participant 7 reinforced the need to “prioritize open and transparent communication,” implying the need for a deliberate and structured approach to ensure communication remains open and transparent throughout the project. Participant 8 took a slightly different angle by noting, “I emphasize clear and open communication with team members,” emphasizing the need for information to be easily understood. Participant 10 broadened the scope by emphasizing the importance of “building a collaborative and communicative team,” recognizing that it's not just about individual communication skills but fostering a culture of collaboration and communication within the team, which is crucial for success.

Subtheme 1c: Problem-Solving and Adaptability

According to the views shared by the participants, the managers must be adept problem solvers and quick adapters to effectively address the challenges associated with automating network services in the dynamic IT landscape of nongovernmental

organizations in Florida. Participant 6 emphasized the importance of adaptability and problem-solving skills, stating that "the ability to adapt to change are essential." The participant suggests that successful IT project managers must be able to swiftly adjust their strategies and approaches in response to changing circumstances and emerging challenges.

Participant 8 echoed Participant 6's sentiment, highlighting that "the ability to adapt to changing circumstances" is crucial. Participant 8 reiterates the significance of adaptability, emphasizing that IT project managers must be prepared to address unexpected developments and evolving conditions effectively. Participant 9 further underlined the necessity for adaptability by stating that "the ability to adapt quickly to change" is essential. Participant 9 underscored the urgency of adaptability, implying that IT project managers in network engineering must be adaptable and capable of rapidly responding to shifts in technology and project requirements.

Subtheme 1d: Stay Updated with Industry Trends

The subtheme underscores the dynamic nature of network engineering and the proactive strategies IT project managers employ to overcome challenges and achieve success in automating network services within agile operation systems. Participant 3 emphasized the significance of staying updated with industry trends by stating, "Staying updated with industry trends and technology advancements is also crucial." Participant 3's perspective underscores the proactive nature of IT project managers in their pursuit of knowledge and their commitment to keeping abreast of the latest developments in the field. Participant 10 offered a complementary viewpoint by stating, "To manage the

transition into agile operation systems, I need a deep understanding of network technologies...” Participant 10 emphasized the need for IT project managers to be aware of industry trends and comprehensively understand network technologies.

Theme 2: Approaches and Techniques for Management of People for a Successful Transition Into Agile Operation Systems

Theme 2 encompasses various subthemes (see Table 3), each shedding light on crucial aspects of managing teams in IT project management within network engineering. The collective insights across these subthemes contribute to a comprehensive understanding of the approaches and techniques necessary for successfully managing people during the transition to agile operation systems in IT project management within network engineering. Subtheme 2a emphasizes the central role of collaboration in achieving a successful transition to agile operation systems. Subtheme 2b explores the participants' recognition of the value of providing training opportunities, mentorship, and ongoing support to enhance the skills of team members. Abu Aisheh (2022) also emphasized the need for training for skill development and highlighted the multifaceted strategies managers employ to nurture and enhance the capabilities of their teams in the agile operational context.

Subtheme 2c underscores the importance of creating a collaborative and supportive work environment. The findings presented in Subtheme 2c resonate with Moradi et al.'s (2020) observation that trust-based teamwork and collaboration are crucial for project success. Finally, Subtheme 2d explores the pivotal role of collaborative decision-making in the context of IT project management in network engineering. The

findings presented in Subtheme 2d underscoring the need for active involvement of team members in decision-making processes align with literature emphasizing leadership support and stakeholder involvement (Burnes, 2020; Saleem et al., 2019).

Table 3

Prevalence of Theme 2 Subthemes in Participant Responses

Subtheme	No. of occurrences
2a: Regular meetings and feedback	11
2b: Training and skill development	11
2c: Culture of Collaboration	7
2d: Involving team members in decision-making	9

Subtheme 2a: Regular Meetings and Feedback

The subtheme explains the central role of collaboration in IT project management within network engineering. The views shared by the participants highlight that regular team meetings, one-on-one discussions, and continuous feedback sessions are fundamental strategies IT project managers employ to engage with their teams and ensure a successful transition into agile operation systems. Participant 1 stated, “I ensure regular team meetings,” indicating the manager's commitment to fostering consistent communication within the team. Participant 2 emphasized the value of regular meetings and feedback sessions by stating, “Regular meetings and feedback sessions help address any issues promptly.” Participant 2 underlined the proactive approach to identify and resolve potential issues promptly.

Participant 7 provided a more comprehensive view, stating, “Regular team meetings, one-on-one discussions, and providing continuous feedback are key approaches,” demonstrating a commitment to fostering team and individual engagement. Participant 5 expressed a similar view: "I encourage open communication and regular meetings to address concerns and provide updates.” Participant 5, therefore, underscored the dual purpose of regular meetings: addressing concerns and keeping team members informed about project progress. Participant 6 echoed Participant 5's sentiment: "I encourage open communication and regular meetings to keep everyone informed.” Participant 6's response emphasizes the role of regular meetings in maintaining transparency and ensuring that all team members are well-informed about project developments.

Subtheme 2b: Training and Skill Development

The participants recognized the value of providing training opportunities, mentorship, resources, and ongoing support to enhance the skills of their team members. Participant 1 stated that “training opportunities” are fundamental in preparing the team for agile operations. Participant 2 expanded on this approach, “I provide training and mentorship opportunities to enhance team members' skills,” indicating a complementary strategy to nurture and further develop the skills of the team members. Participant 4 affirmed, “I provide them with the necessary training and resources,” underscoring the importance of offering training and ensuring that the team members have access to the required resources.

Like Participant 4, Participant 8 emphasized the need for resources in conjunction with training, emphasizing the comprehensive approach to skill development. Participant 8 reiterated the importance of resources: "Provide training and resources for skill development." Participant 6 added, "Offering training and development opportunities helps enhance the team's skills." Participant 6 reiterates the significance of providing opportunities for both training and development, indicating a commitment to continuous improvement in skill sets. Participant 5 supports training, suggesting that simply offering training is insufficient without ongoing support for the successful development of skills relevant to agile operations. Participant 5 emphasized, "Team members receive proper training and support to develop the necessary skills for agile operations."

Subtheme 2c: Culture of Collaboration

The subtheme describes the importance of creating a collaborative and supportive work environment. The participants indicated that IT project managers can successfully transition to agile operations by actively encouraging collaboration, setting clear expectations, involving team members in decision-making processes, providing training and resources, and emphasizing the importance of teamwork and continuous development. Participant 5 expanded on the importance of collaboration, stating that "building a collaborative and supportive team culture is vital." Participant 6 emphasized the importance of clear expectations and team involvement in decision-making, fostering engagement. Participant 6 noted, "Setting clear expectations and involving team members in decision-making processes also fosters engagement." Participant 8 stressed the need to "encourage collaboration" and recommended providing training and resources for skill

development. Participant 8's response highlights a holistic approach to cultivating a collaborative culture. Participant 9 echoed the sentiment of emphasizing teamwork and suggested providing regular training and coaching to support this culture. Participant 9 replied, “Emphasize the importance of teamwork, providing regular training and coaching.” Regular training and coaching can help team members improve their collaborative skills, ensuring a successful transition into agile operation systems.

Subtheme 2d: Involving Team Members in Decision-Making

The subtheme underscores the pivotal role of collaborative decision-making in IT project management in network engineering, especially when addressing challenges associated with automating network services. Participant 1 stressed the value of fostering a culture of collaboration, recognizing team achievements, and reinforcing and motivating team members to engage actively in the decision-making process. Participant 1 noted, “Encourage a culture of collaboration, provide training opportunities, and recognize team achievements.” Participant 6 concurred with the notion that involving team members in decision-making processes fosters engagement. Participant 6 stated, “Involving team members in decision-making processes also fosters engagement.” Participant 8 also advocated for actively involving team members in decision-making processes. This participant's emphasis on “active” involvement highlights the need for a proactive approach to engage team members in discussions and decision-making activities. Participant 8 noted, “Actively involve team members in decision-making processes.”

Theme 3: Challenges Faced by Managers in Network Automation

Theme 3 encompasses several subthemes (see Table 4) that shed light on IT project managers' hurdles in implementing and sustaining network automation initiatives. Subtheme 3a describes the obstacle of resistance to change, indicating how individual team members and organization segments pose challenges during the initial stages of transitioning to agile systems. Building upon the findings presented in Subtheme 3a, Subtheme 3b focuses on the inadequate knowledge of project management methodologies, emphasizing its foundational nature and interconnectedness with other challenges, such as resistance to change. Subthemes 3c and 3d shed light on resource constraints and technical complexities, further complicating the landscape for IT project managers. Subtheme 3e delves into the challenges hindering the long-term embedding of change, emphasizing the dynamic nature of technology and the evolving business landscape. The comprehensive exploration of challenges within Theme 3 provides valuable insights into the intricate landscape IT project managers face in network automation.

Table 4

Prevalence of Theme 3 Subthemes in Participant Responses

Subtheme	No. of occurrences
3a: Resistance to change	9
3b: Inadequate knowledge of project management methodologies	12
3c: Resource constraints	7
3d: Technical complexities	5
3e: Challenges hindering the long-term embedding of the change	7

Subtheme 3a: Resistance to change

Within the broader theme of challenges faced by IT project managers in network automation, resistance from individuals emerged as one of the challenges faced during the initial stages of introducing agile systems. Participant 1 underscored the presence of resistance from individuals and various organization segments. Participant 1 expressed, "Yes, there were challenges related to convincing stakeholders of the benefits of agile, and we did encounter resistance from both individuals and some parts of the organization." Participant 2 also emphasizes the initial phases of implementing automation as particularly challenging. Participant 2 noted, "Yes, during the initial stages, one of the main challenges was getting buy-in from individual team members and

the organization as a whole." Obtaining buy-in from individuals and the entire organization is a pivotal early step.

Participant 4 and Participant 10 described the dual nature of resistance emerging from employees who prefer traditional methods and concerns from the organization regarding potential disruptions. Participant 4 shared, "Yes, there was resistance from some team members who were comfortable with the traditional way of working. Additionally, the organization was cautious about the potential impact on productivity and operations." Participant 10 affirmed, "Yes, there was resistance from both individuals who were accustomed to traditional approaches and from within the organization itself, which required a shift in mindset." Similar concerns were shared by Participant 6, who stated, "Yes, both individual and organizational resistance were present. Some employees were accustomed to traditional methods and were concerned about the impact on job roles."

Subtheme 3b: Inadequate Knowledge of Project Management Methodologies

The subtheme points to inadequate knowledge of project management methodologies as a foundational issue impacting various aspects of network automation projects. The highlighted challenge is significant since effective project management is essential for planning, executing, and controlling complex IT projects like network automation. Participant 1 succinctly expressed the challenge, stating, "...inadequate understanding of project management methodologies..." could negatively impact the success of network automation projects, highlighting the deficiency among IT project managers.

Participant 5 elaborated on the challenge, noting, "Managers in network automation often face challenges such as resistance to change and inadequate knowledge of project management methodologies." Participant 5 emphasized that inadequate knowledge of project management methodologies is not an isolated issue but is closely intertwined with other challenges, such as resistance to change. Participant 8 echoed Participant 5's sentiments, stating, "Managers in network automation often face challenges related to resistance to change, inadequate knowledge of project management methodologies among team members..." The views shared by the participants highlight the IT project manager's knowledge gap and the importance of ensuring that the entire project team is well-versed in project management methodologies to mitigate challenges effectively.

Sub theme 3c: Resource Constraints

The views shared by the participants indicated that the challenges related to infrastructure readiness were recurrent issues faced by IT project managers working in nongovernmental organizations in Florida. Participant 4 noted, "During implementation, we faced challenges related to infrastructure readiness..." The participant recognized the critical role of infrastructure readiness during the implementation phase of network automation projects. Participant 5 echoed Participant 4's sentiments: "Yes, we faced challenges related to having the required infrastructure..." The participant explicitly acknowledged the importance of having the required infrastructure to support network automation efforts. The term "required" implies that specific infrastructure elements were essential for successfully executing their projects, emphasizing the need for careful

planning. Participant 8 affirmed the presence of infrastructure-related challenges, stating, "Certainly, we faced challenges related to infrastructure readiness..." The word "certainly" suggests high agreement among IT project managers regarding the significance of infrastructure readiness challenges.

Financial constraints also emerged as a significant challenge faced by IT project managers in network engineering when automating network services. Participant 1 pointed out, "…limited infrastructure for testing, and tight budgets..." underscoring the financial limitations that IT project managers encounter while attempting to automate network services. Another perspective on financial constraints was provided by Participant 4, who noted, "During implementation, we faced challenges related to budget constraints…" emphasizing that budget constraints are not limited to the planning phase but extend into the implementation stage. Participant 10 offered a comprehensive view of financial constraints, stating, "During implementation, we faced challenges related to insufficient infrastructure, the need to upskill the workforce, and budget constraints." Participant 10 suggested that financial constraints are intricately connected to other resource limitations, such as insufficient infrastructure and the need to upskill the workforce. The mention of "budget constraints" again underscores the recurring issue of limited financial resources in IT project management for network automation.

Subtheme 3d: Technical Complexities

The subtheme of technical complexities emerged as a recurring challenge faced by IT project managers in network engineering when automating network services. The technical complexities encompass the intricate nature of network automation

technologies, their integration into existing systems, and the broader organizational challenges associated with managing these complexities. Participant 2 stated, "Managers often face challenges related to the complexity of network automation technologies..." underscoring the acknowledgment among IT project managers that network automation technologies are intricate and require a high level of technical expertise to navigate effectively. These complexities could range from the intricacies of scripting and coding necessary for automation tasks to dealing with diverse networking hardware and software components.

Participant 4 provided a more comprehensive perspective on this subtheme, noting, "Managers in network automation often face challenges related to resistance to change, limited knowledge of project management methodologies among team members, and the complexity of integrating automation into existing systems." This statement reflects a multi-faceted view of the technical complexities within network automation. It encompasses not only the technical intricacies of the automation technologies themselves but also the challenges arising from organizational factors, such as resistance to change and the need for skilled team members.

Subtheme 3e: Challenges hindering the long-term embedding of the change

The IT project managers in network engineering expressed concerns about the constant technological changes and how they impact their projects. Participant 1 noted, "Challenges can arise from evolving technology, changes in business goals, and the need for continuous adaptation." The participant highlighted the interplay between evolving technology and shifting business goals, emphasizing that project managers must

continuously adapt their strategies and approaches. Participant 2 echoed Participant 1's sentiments: "Long-term embedding faces challenges related to maintaining updated skills among team members adapting to evolving technologies." Participant 2 emphasizes the importance of keeping team members' skills up to date to cope with the ever-changing technology landscape.

The other long-term challenge is maintaining momentum and avoiding complacency, which sheds light on the critical aspects of sustaining change in the context of IT project management for network automation. As revealed by Participant 3, IT project managers recognize that the initial enthusiasm and momentum generated during the implementation of automation initiatives can wane over time. Participant 3 articulated, "Maintaining the momentum of change can be challenging. Complacency and a return to old practices can occur." Participant 3 suggests that IT project managers are aware of the risk of complacency, which could potentially undermine the long-term success of automation initiatives. Participant 6 shared insights: "Long-term challenges often include keeping technology up to date, maintaining employee skills, and ensuring that the organization continues to embrace agile methodologies." Participant 6 acknowledges the ongoing hurdles, including the need to keep technology current, ensure that employees maintain relevant skills, and foster a culture of agility within the organization.

The participants also highlighted the critical issue of ongoing training and skill development as a significant challenge hindering the long-term embedding of change in network automation. Participant 4 emphasized the importance of continuing training and

skill development when discussing the challenges that could potentially obstruct the sustained integration of automation in network engineering. Participant 4 noted, “Some of the challenges that could hinder the long-term embedding of the change include complacency, the need for ongoing maintenance, and updates to automation systems.” These challenges, as indicated by Participant 4, are inherently linked to the need for IT professionals to remain updated and competent in the rapidly evolving network engineering field. Participant 7 also echoed this sentiment, pinpointing the requirement for ongoing training and skill development as a crucial aspect that could impede automation initiatives' long-term success. Participant 7 stated, “Challenges that could hinder long-term embedding include the need for ongoing training and skill development to keep up with evolving technology.” Participant 7 highlighted that the constant evolution of technology necessitates a continuous commitment to learning and skill enhancement.

The views shared by the participants also reflected the difficulties associated with incorporating and adapting to new technologies while ensuring that they align with evolving business requirements. Participant 5 emphasized, “Maintaining the momentum of automation and ensuring that the technology remains up to date can be challenging.” Participant 5 underscored the need for continuous vigilance and proactive efforts to keep automation processes current. Participant 5 noted, “Adapting to evolving business requirements and integrating new technologies can pose ongoing challenges.” Participant 5 highlights the dynamic nature of business needs and how IT project managers must align automated systems with these evolving requirements.

Participant 8 also provided valuable insights into integrating new technologies, noting, “Long-term embedding challenges can include maintaining skill levels as technology evolves.” Participant 8 points out the importance of IT professionals keeping their skill sets up-to-date to manage and integrate new technologies effectively. Participant 8 also noted, “Managing ongoing maintenance and ensuring that the automated systems align with evolving business needs.” Participant 8 emphasizes the need to establish sustainable maintenance practices to ensure that automated systems remain aligned with the organization's changing goals and requirements.

Theme 4: Solutions to the Challenges Faced When Automating Network Services.

Theme 4 addresses the complex issues encountered in network engineering and automation within nongovernmental organizations in Florida. This theme comprises several interconnected subthemes (see Table 5), each shedding light on distinctive strategies employed by IT project managers to overcome hurdles in network service automation. Subtheme 4a emphasizes the importance of ongoing education and skill development. Abu Aisheh (2022) also acknowledged the crucial role of training in competency development. Subtheme 4b includes conducting thorough needs assessments, maintaining flexibility in project frameworks, and cultivating a culture of continuous improvement. Abu Aisheh also recommended the importance of effective planning and evaluation in addressing challenges.

Table 5

Prevalence of Theme 4 Subthemes in Participant Responses

Subtheme	No. of occurrences
4a: Training, skill development, and continuous learning	9
4b: Planning and regular assessment	7
4c: Budgetary and resource allocations	10
4d: Phased implementation and adaptability	6
4e: Communication and collaboration	6

Subtheme 4a: Training, Skill Development, and Continuous Learning

The subtheme reflects proactive measures, tailored training programs, establishing a learning culture, and continuous assessment and improvement efforts as critical components of this overarching strategy. The views shared by the participants underscored the significance of ongoing education and skill development in effectively managing challenges in network engineering and automation within nongovernmental organizations in Florida. Participant 1 stated, “We initiated training programs...” suggesting that organizations proactively recognized the need for training to address network automation challenges. Participant 4 expressed, “We addressed these challenges through... targeted training programs...,” reinforcing the deliberate approach taken by organizations to tailor their training efforts to address specific challenges related to network automation. Participant 5 contributed, “We conducted training programs...”

highlighting the practical implementation of training programs as a direct response to the challenges. Participant 6 offered valuable insights: "We ensured the development of regular training and development programs, conducted periodic technology assessments, and created a culture of continuous improvement." Participant 6 emphasized the importance of regularity in training and development efforts, aligning these initiatives with technology assessments, and fostering a culture of continuous improvement beyond mere training sessions. Participant 2 emphasized the importance of constant learning, providing insights into establishing a learning culture, and evaluating the impact of training on automated systems. Participant 2 contributed, "We provided training to our existing team members. To address these challenges, we establish a culture of continuous learning and improvement. We provide ongoing training opportunities, stay informed about industry trends, and regularly evaluate the efficiency and effectiveness of our automated systems."

Subtheme 4b: Planning and Regular Assessment

The subtheme encompasses strategies such as needs assessment, resource allocation, talent development, ongoing evaluation, staying updated on technology trends, and fostering a culture of improvement. These strategies collectively form a holistic approach employed by IT project managers to effectively address the challenges associated with network service automation. Participant 2 emphasized the importance of conducting a thorough assessment of their organization's needs, noting they "Conducted a thorough assessment of [their] needs and developed a comprehensive project plan..." Participant 1 articulated a comprehensive approach that includes regular assessment of

automation processes, staying updated on emerging technologies, and maintaining a flexible framework. Participant 1 responded, “We regularly assess our automation processes, stay updated on emerging technologies, and have a flexible framework to adapt to changing business needs.” Participant 1's comments illustrate the importance of ongoing evaluation and adaptability as part of the solution to challenges. Participant 4 echoed the sentiment of regular assessment but also stressed the importance of cultivating a culture of continuous improvement. Participant 4 noted, “To address these challenges, we maintain a culture of continuous improvement, regularly assess the performance of our automation systems, and stay updated on emerging technologies.”

Subtheme 4c: Budgetary and Resource Allocations

The subtheme underscores the critical role of financial planning and resource management in addressing challenges associated with network service automation. IT project managers in nongovernmental organizations in Florida employed strategies such as securing funding through project proposals, optimizing workforce allocation, making strategic hires, and collaborating with finance departments to ensure the success of their automation initiatives. Participants 1, 2, 5, and 9 emphasized securing funds for network automation projects. Regarding the importance of funding in addressing various challenges faced by IT project managers when automating network services, Participant 1 noted, “Secured funding through project proposals...,” Participant 2 added, “Secured additional funding...,” and Participant 9 responded, “Worked closely with finance to secure necessary funding....” The views shared by the participants suggest that IT project managers in network engineering actively prepare and present comprehensive project

proposals to secure essential financial resources. Moreover, Participant 9's mention of collaborating closely with the finance department underscores the necessity of forming internal alliances to ensure adequate funding.

Participant 3 focused on the strategic allocation of human resources, emphasizing the need to allocate skilled personnel effectively to meet project goals and minimize resource wastage. Participant 3 highlighted the significance of allocating dedicated time and resources to the automation project. Participant 3 responded, “Allocating dedicated time and resources to the project were essential steps...” indicating that the commitment ensured that the project received the required attention and resources were appropriately channeled to address challenges. Participant 4 mentioned, “Strategic allocation of resources...” emphasizing the strategic nature of resource allocation and suggesting that IT project managers carefully allocate resources based on project priorities and needs. Participant 6 contributed by stating, “Made strategic hires...” recommending strategic hiring decisions to acquire specialized skills or expertise that may be lacking in the existing team and indicating a proactive approach to resource allocation.

Subtheme 4d: Phased Implementation and Adaptability

The subtheme underscores the importance of taking a gradual approach to automation, staying flexible in response to changing technology, and continuously improving processes and team skills. Participants 4 and 10 emphasized the significance of a phased implementation approach, which involves breaking down the automation process into manageable phases or stages rather than attempting a full-scale overhaul. Participant 10 noted, “Gradually built the required infrastructure...” highlighting the

importance of building the necessary infrastructure incrementally. By gradually building the required infrastructure, IT project managers can ensure that the network can support automation processes effectively, avoiding bottlenecks and system failures that could arise from rushed implementations.

Participants 3 and 7 emphasized the need for continuous review and adaptation of automation strategies. Participant 7 noted the need to "regularly review and update automation strategies to stay relevant and adaptable," which acknowledges that technology is constantly evolving, and network automation solutions must evolve. Participant 3 said, "We conduct regular reviews to assess the effectiveness of the new processes and make adjustments as needed. Continuous training and mentoring programs help ensure that existing and new team members remain aligned with agile principles." Participant 3 emphasized a holistic approach to phased implementation and adaptability, stressing the importance of regular reviews and highlighting the significance of continuous training and mentoring programs.

Subtheme 4e: Communication and Collaboration

The subtheme addresses the importance of effective communication in garnering support for automation and fostering an environment of continuous learning and adaptability. Collaborative efforts, characterized by open communication channels, ensure that teams remain agile and responsive to the evolving technological landscape, thus contributing to the successful automation of network services. Participant 6 emphasized the significance of communication in maintaining organizational support for automation initiatives. Participant 6 stated, "We also communicate the long-term benefits

of agility and automation to maintain organizational buy-in." The participant recognized the importance of regularly conveying automation's advantages and potential gains to key organizational stakeholders.

Participant 7, in discussing strategies to address automation challenges, highlighted a multifaceted approach that includes communication and collaboration. Participant 7 stated, "To address these challenges, we prioritize continuous learning and development, maintain open lines of communication, and regularly review and update our automation strategies to stay relevant and adaptable." Participant 7's response underscores the interconnectedness of communication and collaboration with other crucial aspects of successful automation projects.

Alignment With the Existing Literature

The assertions made by Participant 1 in Subtheme 1a regarding the significance of having a solid foundation in network engineering are supported by McDermott et al. (2022), who also outlined the importance of having sound technical knowledge and understanding of automation tools. The findings also confirm the observations by Kahl et al. (2022), who noted the importance of highly qualified personnel in agile transitions. The responses provided by Participants 2 and 5 in Subtheme 1a about the need for managers to expand their spectrum of technical knowledge corroborate the recommendations made by Cripe and Burleigh (2022) that also highlighted the importance of technical knowledge, including proficiency in network engineering and automation tools among IT project managers.

Effective communication and leadership skills are emphasized in Subtheme 1b as crucial for addressing challenges. The findings align with Alvarenga et al. (2019), who noted that communication and leadership are critical for project success. The importance of leadership skills also confirms the conclusions made by Gren and Ralph (2022) in their work that reiterated the need for effective leadership characterized by the ability to share responsibility and address ongoing tensions. The outcome also confirms that Gahroee et al. (2022) assert that communication is an essential feature of organizational culture that facilitates the seamless implementation of agile processes. The importance of communication and leadership skills mentioned by Participants 1 and 2 in Subtheme 1b is supported by Gandomani et al. (2020), who noted that communication skills are outstanding characteristics of premier managers. Participant 9 and Participant 6's views about the need for excellent communication skills, adaptability to change, and strong leadership skills corroborate Santos and de Carvalho (2022) conclusions that solid leadership is vital for the effective adoption of agile processes.

The views shared by Participants 6, 8, and 9 in Subtheme 1c stressing the need for managers to be adept problem solvers and quick adapters is consistent with Abu Aisheh's (2022) emphasis on managers needing to engage in continuous learning and adaptation. The importance of adaptability in the transition to agile processes supports the observations made by Sutherland and Schwaber (2017), which indicated the role of managers in boosting adaptability by embedding short planning cycles in agile project management. As mentioned in Subtheme 1d, staying updated with industry trends and

understanding network technologies aligns with the literature's recommendation for managers to engage in training and continuous learning (Abu Aisheh, 2022).

The findings in Subtheme 2a emphasize the importance of regular team meetings and feedback sessions for effective communication. The outcome aligns with the literature's recommendation for clear communication and involvement of stakeholders (Saleem et al., 2019). The result also confirms the conclusions made by Djursén and Herlenius (2022), who acknowledged the importance of regular meetings and feedback. The views shared by Participants 4, 6, and 8 in Subtheme 2b, highlighting the role of training in improving managers' skills, correspond with Abu Aisheh's (2022) emphasis on training for skill development. Similarly, the findings corroborate the observations made by Gahroee et al. (2022) that showed constant staff training to be essential in achieving seamless transition to agile processes. Djursén and Herlenius (2022) also noted that training is a critical success factor in adopting agile transformation, which aligns with the findings reported in this study.

As mentioned in Subtheme 2c, Moradi et al. (2020) supported creating a culture of collaboration and noted that trust-based teamwork and cooperation are essential for project success. The findings also confirm the assertions made by Burga et al. (2022) regarding the importance of creating a collaborative environment in the transition into agile operation systems. The findings in Subtheme 2d stress the importance of involving team members in decision-making, which is consistent with the literature's recommendation for leadership support and involvement of stakeholders (Burnes, 2020; Saleem et al., 2019).

The resistance to change, as highlighted in Subtheme 3a by Participant 4 and Participant 10, corresponds with Ahmad and Habib's (2021) mention of challenges in coordinating change between management and the organization. As noted in Subtheme 3b, the challenges due to insufficient knowledge of project management methodologies align with Vujović et al.'s (2020) observation of inadequate professional analysis and knowledge gaps. The findings in Sub-theme 3c, emphasizing resource constraints as significant challenges, are consistent with the literature's recognition of the importance of resource allocation (Abu Aisheh, 2022). The technical complexities highlighted in Subtheme 3d align with the literature's acknowledgment of challenges in addressing technological complexities (Cripe & Burleigh, 2022). The long-term difficulties mentioned in Subtheme 3e correspond with the literature's emphasis on continuous improvement and alignment with evolving business requirements (Burnes, 2020; Saleem et al., 2019).

The findings in Subtheme 4a, stressing the role of training and continuous learning in addressing challenges, are consistent with Abu Aisheh's (2022) emphasis on training for competency development. The findings in Subtheme 4b highlight the importance of needs assessments and planning, aligning with Abu Aisheh's recommendation for effective planning and evaluation. The strategies mentioned in Subtheme 4c, such as securing funding and optimizing resource allocation, correspond with Abu Aisheh's mention of managing costs and resources. The findings in Subtheme 4d emphasize phased implementation and adaptation, which aligns with the literature's recognition of the importance of gradual change and adaptability (Burnes, 2020; Saleem et al., 2019).

Effective communication and collaboration, as emphasized in Subtheme 4e, are consistent with the literature's recommendation for clear communication and teamwork (Cripe & Burleigh, 2022; Marcusson, 2018).

Alignment With the Conceptual Framework

The assessment of the study findings shows alignment with the conceptual framework of Lewin's change model. Lewin's model includes the phases of unfreezing, change, and refreezing. Unfreezing represents the need to break existing patterns and overcome resistance to change (Lewin, 1951; Wojciechowski et al., 2016). In this section, the alignment of each of the themes with Lewin's change model is presented. According to Lewin's change model, the unfreezing construct represents the need to break existing patterns and overcome resistance to change. Theme 1, especially technical knowledge and expertise (Subtheme 1a) and staying updated with industry trends (Subtheme 1d), emphasizes the importance of unfreezing by updating skills and knowledge to adapt to technological advancements. Effective leadership and communication skills, highlighted in the findings in Subtheme 1b, further support Lewin's change model arguments regarding the environment leaders should create to facilitate the unfreezing and adoption of change (Lewin, 1951).

In Lewin's change model, driving forces push individuals and organizations toward change (Cummings et al., 2016). The findings in Theme 2 discuss the importance of creating a culture of collaboration (Subtheme 2c) and involving team members in decision-making (Subtheme 2d) as examples of the driving forces. These elements align

with Lewin's concept of cultural change, where the organization's culture needs to shift to support the desired change (Lewin, 1951; Wojciechowski et al., 2016).

Lewin's change model also identifies the restraining forces as the aspects that resist change (Cummings et al., 2016; Wojciechowski et al., 2016). The findings in Theme 3 highlight various restraining forces, such as resistance to change, inadequate knowledge of project management methodologies, resource constraints, and technical complexities. These forces act as barriers to the successful adoption of network automation. In the context of this study, the challenges (Theme 3) disrupt the equilibrium by creating resistance and obstacles to change and also represent the need for change.

In contrast, the solutions identified in Theme 4 can be seen as strategies to increase the driving forces and mitigate the restraining forces. The solution (Theme 4) is the refreezing phase, where new practices and approaches become the norm. Lewin's model suggests that change occurs when the equilibrium between driving and restraining forces is disrupted. In contrast, the solutions (Theme 4) aim to restore equilibrium by reducing resistance and enhancing the motivation for change. Lewin's model emphasizes continuous learning and adaptation to maintain change (Lewin, 1951). The findings in Subtheme 4a (Training, skill development, and constant learning) and Subtheme 4d (Phased implementation and adaptability) echo this concept by emphasizing the importance of ongoing training, skill development, and adaptability in network automation, which are instrumental in intensifying driving forces, lowering restraining forces, and facilitating the change process.

Applications to Professional Practice

The findings of this study are highly applicable to the professional practice of IT. The findings emphasized the importance of IT project managers continuously updating their technical knowledge. In the rapidly evolving field of IT, staying updated on network engineering, automation tools, and technologies is crucial. This finding is applicable as IT professionals must prioritize continuous learning and skill development to remain effective. The study also noted that effective communication and leadership are fundamental skills for IT project managers. Clear and transparent communication helps address challenges, and leadership skills are needed to guide teams through complex projects. The reported communication effectiveness applies to IT managers and professionals in various roles within the IT industry.

Problem-solving and adaptability were noted as essential skills for IT project managers. Quickly adapting to changing circumstances and finding solutions to technical challenges is critical in IT project management. These skills are universally applicable in IT and beyond. Staying updated with industry trends is a common requirement for IT professionals. It applies to everyone in the IT field, as technology evolves rapidly, and being aware of the latest trends and innovations is essential for success.

Effective communication through regular meetings and feedback sessions applies to IT project managers, team leaders, and members in various IT roles. Collaboration and open communication are crucial to project success. Training and skill development are essential for IT professionals at all levels. The study emphasizes the importance of investing in the growth and development of team members, which is a universal practice

in the IT industry. Creating a culture of collaboration is applicable across all IT organizations. Collaboration fosters innovation, teamwork, and improved project outcomes. Involving team members in decision-making is a best practice in IT project management. Engaged team members are more likely to contribute positively to projects, and this approach is widely applicable.

The study identified various solutions to the challenges faced by managers when automating network services. The identified training, skill development, and continuous learning are universally applicable in the IT industry to address challenges and improve performance. Effective planning and constant improvement are standard practices in IT project management. Securing funding and optimizing resource allocation are common concerns in IT projects. A phased implementation approach and adaptability are essential in managing complex IT projects. Finally, effective communication and collaboration are critical success factors for IT projects.

Implications for Social Change

The study's focus on understanding the challenges of adopting network automation, as mentioned in the Significance section, has the potential to benefit small and medium enterprises. By developing better approaches and solutions for network automation, this research can make IT more accessible and affordable for smaller businesses, ultimately contributing to their growth and competitiveness. The findings from this study, particularly in Theme 1, emphasize the importance of technical capabilities, communication skills, problem-solving abilities, and staying updated with industry trends for IT project managers. These insights can contribute to enhancing the

operational efficiency of network engineering teams. By improving the skills and knowledge of managers, organizations can streamline network automation processes, resulting in quicker responses to network issues and improved service delivery. This change benefits society by ensuring reliable and efficient network services.

As highlighted in the Significance section, network automation contributes to resource preservation by minimizing waste, optimizing resource utilization, and extending the lifespan of network infrastructure. The solutions presented in Theme 4, such as planning, budgetary allocations, and phased implementation, can help organizations manage resources more effectively. By reducing resource wastage, these practices align with environmental sustainability goals, reduce costs, and make network services more affordable for society. The emphasis on training, skill development, and continuous learning in Theme 2 suggests that organizations are investing in the growth of their employees, which not only enhances the capabilities of individuals but also opens up economic opportunities. Investing in employee development can lead to a more skilled workforce, contributing to economic growth and stability within a community or society.

Subtheme 2c provides the importance of creating a culture of collaboration in IT project management. Fostering such a culture can have broader implications for social change by promoting teamwork, inclusivity, and active participation within organizations. This cultural shift can extend beyond the workplace and positively influence how individuals engage in their communities and society. Subtheme 3a addresses the challenge of resistance to change when implementing network automation. Overcoming this resistance can lead to a more adaptable and innovative society. By

understanding the reasons behind resistance and implementing strategies to address it, businesses can create a more agile and forward-thinking organizational culture, which can, in turn, influence broader societal attitudes toward change and innovation.

Recommendations for Action

Based on the findings, I developed various recommendations related to the methods used by IT project managers in network engineering to curb technical challenges when automating network services. The first recommendation is for IT project managers to adopt continuous technical skills development and monitoring of industry trends. IT project managers in network engineering should prioritize ongoing technical knowledge enhancement, focusing on network engineering, automation tools, and emerging technologies. IT project managers should also commit to staying updated with industry trends and network technologies. To promote the adoption of this recommendation, regular training sessions, workshops, and seminars should be conducted for IT project managers, emphasizing the importance of continuous learning and industry trend monitoring.

The second recommendation is to establish a culture of collaboration and decision-making involvement. IT project managers, team leaders, and organizational leaders should create a collaborative work environment by setting clear expectations, involving team members in decision-making, and promoting teamwork and continuous development. Furthermore, they should encourage team members' active involvement in decision-making to foster engagement and a culture of collaboration. Adopting this recommendation can be enhanced by organizing workshops and seminars on promoting

cooperation and involving team members in decision-making. Secondly, there is a need to promote these principles through company-wide communications and training programs.

The third recommendation is to plan and allocate resources for automation initiatives. The IT project managers, finance departments, and organizational leaders should conduct thorough needs assessments, collaborate closely with finance departments to secure funding through well-structured project proposals, optimize workforce allocation, and strategically hire personnel as needed for automation initiatives. This recommendation can be disseminated by sharing best practices and guidelines for resource planning and allocation within the organization. The second dissemination approach could include regular meetings between IT project managers and finance departments to align resource allocation with automation project requirements.

The fourth recommendation for action is to consider phased implementation and adaptability. IT project managers, technical teams, and organizational leaders should implement a phased approach for automation projects, gradually building infrastructure and continuously reviewing and adapting automation strategies in response to evolving circumstances and technical complexities. This recommendation can be disseminated through workshops and training sessions on phased implementation and adaptability strategies for IT project managers and technical teams.

Recommendations for Further Study

This research offers various recommendations for further study, providing valuable insights into improving IT project management practices in network automation

and addressing technical and organizational challenges. One of the recommendations is to explore how the depth and breadth of technical knowledge and expertise possessed by IT project managers influence the success of network automation projects. Future researchers should delve into specific technical skills and knowledge areas most critical for project success and identify effective strategies for continuous skill development. The second recommendation is to investigate the various methods. IT project managers employ approaches to mitigate resistance to change from individuals and within the organization when transitioning to agile operation systems through network automation. Such future research could provide insights into best practices for change management in the context of IT projects.

The third recommendation is to explore the long-term challenges and solutions for sustaining network automation initiatives. Future researchers should examine how organizations maintain momentum, prevent complacency, and ensure that network automation remains aligned with evolving business requirements over time. Future researchers should also investigate the role of ongoing training, skill development, and technology adaptation in achieving long-term success. The final recommendation is for further studies to understand the impact of effective communication and collaboration on the success of network automation projects. Future researchers should explore specific communication strategies, tools, and collaborative practices that IT project managers can employ to facilitate project success and organizational support.

Reflections

As a doctoral researcher who has completed a qualitative study on the technological hurdles encountered by IT project managers in network engineering when automating network services, I'd like to reflect on my experience throughout the research process, including possible personal biases, the impact of my role as a researcher on the participants and the situation, and how this study has influenced my thinking. Throughout the research process, I was acutely aware of the potential for personal biases and preconceived ideas to influence the study. I consciously tried to mitigate my personal biases associated with my passion for agile practices and the need for organizations to embrace automation by remaining open-minded and receptive to the diverse experiences and perspectives of the IT project managers I interviewed. To counteract these biases, I approached the research with a pragmatic inquiry design, emphasizing practical knowledge over theoretical assumptions, helping me maintain a neutral stance.

The nature of qualitative research involves a close interaction between the researcher and the participants. I was mindful of the potential effects of my presence on the participants and the situations I observed. Being an outsider to the organizations and professionals I interviewed, I had to establish trust and rapport to obtain candid responses. I maintained a transparent and nonjudgmental approach to ensure participants felt comfortable sharing their experiences and challenges. My role as a researcher might have introduced observation bias, but I strived to minimize this by adopting a participant-observer approach and being as unobtrusive as possible.

This qualitative research study has significantly influenced my thinking and understanding of the subject matter. Through the thematic analysis of the data, I gained more profound insights into the complex challenges IT project managers face in network engineering when automating network services. I could identify recurring themes and patterns not apparent from the literature or my preconceived ideas. This research gave me a more nuanced understanding of the issues, allowing me to challenge and expand my previous assumptions.

Furthermore, by listening to the experiences and perspectives of the IT project managers, I developed a greater appreciation for the practical and real-world aspects of network automation. It highlighted the importance of context-specific solutions and the need for flexibility in addressing the unique challenges faced by nongovernmental organizations in Florida. This study reinforced the value of qualitative research to gain deeper insights into complex, real-world problems. In conclusion, this qualitative research study was a valuable and enlightening experience. It allowed me to confront and address potential biases and preconceived ideas while navigating the researcher-participant dynamic. The study provided insights into the technological hurdles IT project managers face in network engineering. It contributed to my personal and professional growth by challenging and expanding my understanding of the subject matter.

Summary and Study Conclusions

This study has provided valuable insights regarding the challenges and solutions IT project managers encounter in network engineering when automating network services. From this research, the dynamic IT field requires IT professionals to

continuously update their technical knowledge, develop their problem-solving skills, and enhance their communication and leadership abilities. The practical recommendations from this study emphasize the importance of continuous technical skills development, fostering a culture of collaboration, effective resource planning, and phased implementation. These recommendations can serve as actionable steps for IT project managers and organizations looking to overcome the hurdles associated with network automation.

Furthermore, the research highlights the potential for social change through enhanced network automation, benefitting small and medium enterprises, contributing to resource preservation, and promoting a culture of collaboration and adaptability. These findings underscore the broader societal impact of effective IT project management practices. As the IT landscape evolves rapidly, embracing these recommendations can lead to project success and help IT professionals and organizations thrive in an ever-changing environment. Ultimately, this research reinforces the idea that in the digital age, staying up to date, fostering collaboration, and adapting to change are the keys to success in IT project management.

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Appendix A: Social Media Post for Participant Recruitment

Interview Study seeks IT Project Managers

There is a new study about the experiences of IT Project Managers that could help the IT community better understand and help strategies in employing network automation. For this study, you are invited to describe your experiences coordinating agile software projects by overseeing activities that include budgeting, management, and time management.

About the study:

- One 45–60-minute phone interview that will be audio recorded (no videorecording)
- To protect your privacy, the published study will not share any names or details that identify you

Volunteers must meet these requirements:

- 18 years old or older
- IT project managers
- Actively involved in coordinating agile software projects by overseeing activities that include budgeting, management, and time management
- Employed by non-governmental organizations in Florida
- With over one year of experience in the management positions

This interview is part of the doctoral study for Joshua Kerley, a DIT student at Walden University. Interviews will take place during September.

Please message Joshua.kerley@waldenu.edu privately to let them know of your interest.

Appendix B: Interview Protocol

Before beginning: Hello, I am Joshua Kerley, a doctoral student at Walden University. Thank you for your time and consideration in participating in my study. I would like to audio record this interview. However, you can turn off your camera to avoid being recorded visually. In addition, I will protect your identity using a letter or number instead of names ensuring that your responses are confidential. However, participation is voluntary. You may choose to stop being in this study at any time during the interviews by refusing to participate or answering any questions you are uncomfortable answering. If you choose to leave the study, I will not use the information I gathered from you. Instead, I will destroy it by permanent deletion.

Do you have any questions before we begin?

(Participant allowed time to respond, and the researcher will address the concerns)

Do I have your permission to the recording of this interview?

(Participant allowed time to respond)

For the next 45 min to 60 min, I will ask questions, and if necessary, I will also add follow-up questions. Can we start the interviews?

(Participant allowed time to respond)

Research Question: What strategies do you use in network engineering to curb the challenges they face when automating network services?

1. To get us started, kindly let me know your managerial experience.

   Follow-up:

   How long have you managed agile systems of operation?

What is your qualification?

How many employees work under your supervision?

2. Please share your roles as the manager in the transition into agile operation systems.
3. Please share with me the technical capabilities and skills you need to manage the transition into agile operation systems successfully.
4. Please share the approaches and techniques to engage with the people you lead to ensure a successful transition into agile operation systems.
5. Based on your managerial experiences in implementing network automation projects, what key project management processes do you consider essential?
6. What are your experiences regarding challenges faced by managers in network automation?

Follow-up:

Based on your experience, can challenges be faced in the professional analysis of the required project processes?

What are your views regarding the level of knowledge of project management methodology among the individuals involved in the transition into agile systems of operation?

7. Can you recall any challenges you faced during the initial stages of introducing the need to adopt agile systems?

Follow-up：

Did you face individual and organizational resistance to the proposed change? Please explain.

What approaches do you use to address the challenges you mentioned?

8. Can you recall challenges you faced, if any, during the implementation of the network automation project?

Follow-up:

Did you have the required infrastructure, skills, workforce, finance, and time to effectively implement the network automation project?

What approaches do you use to address the challenges you mentioned?

9. After successfully implementing the network automation project, what challenges could hinder the long-term embedding of the change in your organization?

Follow-up:

10. What approaches do you use to address the challenges you mentioned?

I want to inform you that I will share the information from this study. Do you have any questions before we close?

(Participant allowed time to respond, and the researcher will address the concerns)

I am grateful for your time and willingness to share your thoughts regarding my topic of study. Thank you so much.