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Scope Management Strategies for Engineering Leaders to Improve Project Success Rates

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This is to certify that the doctoral study by

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Abstract

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by

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MBA, Brenau University, 2013

BS, Florida International University, 1998

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Civil engineering projects undertaken without successful implementation of scope

management strategies by project leaders are approximately 10% more likely to fail than

projects undertaken with scope management strategies. Using scope management theory,

the purpose of this single case study was to explore scope management strategies used by

some project leaders in the engineering field to improve project success rates. Data were

collected using semistructured interviews with 3 purposefully selected project leaders in

Georgia, and a review of project completion reports, budget reports, government

proposals, and scope management documents. Data analysis occurred using Yin's 5-step

process of compiling, disassembling, reassembling, interpreting, and concluding the data.

The 3 emergent themes were client management strategy, schedule adherence strategy,

and communication strategy. The findings indicated that implementing the scope

management strategies of client management, schedule adherence, and communication

with all stakeholders are essential for improving engineering project success rates. The

implications for social change include the potential to elevate the use of sustainable-

design application through water, energy, and natural resource conservation by project

leaders through scope management strategy implementation. People in communities

potentially benefit from the findings of this study because of the increased use of

sustainable materials, reduced use of water, energy, and natural resources, and an

improved local environment.

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Dedication

I dedicate this study to my parents and my son without whose support and motivation, this effort would not have been possible.

Acknowledgments

I would like to thank all of the faculty members at Walden University without whose help and patience, this study would not have been possible.

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Section 1: Foundation of the Study

Engineering project leaders have needed to improve their scope management strategy handling in order to elevate project success rates (Worthington & Higgs, 2014). Engineering projects failed at a higher rate when project leaders failed to implement scope management strategies in comparison to when project leaders used effective scope management strategies (Du Randt, Van Waveren, & Chan, 2014). Through enhancement of the descriptions of scope management strategies some project leaders used, increased project success rates occurred when other project leaders implemented the identical scope management strategies (Worthington & Higgs, 2014). Furthermore, an improved understanding of successful scope management strategies used by some project leaders led to the increased effectiveness of project management (Worthington & Higgs, 2014).

Background of the Problem

Project leaders have defined project success as a finite endeavor taken on to bring about a service or product (Mirza, Pourzolfaghar, & Shahnazari, 2013). Inaccurate descriptions, misunderstandings, and a lack of recognition of the benefits of scope management strategy by project leaders has negatively affected project success rates (Mirza et al., 2013). Project leaders needed a complete understanding of scope management strategy to enhance project success (Mirza et al., 2013). Without effective scope management strategies, reduced effectiveness for budget, schedule, and quality has occurred (Colmenar-Santos, Perez, Norge-Diez, & Perez-Molina, 2015). In the absence of effective scope management strategy, the decreased usage of innovative concepts for

scope management by project leaders occurred (Colemenar-Santos et al., 2015). Scope management is one of the five paramount project success factors, and a lack or deficiency of scope management strategy may have resulted in project failures (Mirza et al., 2013). Mirza et al. (2013), Colmenar-Santos et al. (2015), and Du Randt et al. (2014) noted the need for additional research regarding scope management strategy to fully understand the phenomenon. Mirza et al. (2013) reported project leaders who lacked knowledge of scope management strategies contributed to project failures.

Problem Statement

Project leaders lacking comprehension of scope management strategies contributed to project failures (Mirza et al., 2013). Engineering projects failed at a rate of 21.85%, because of ineffective use of scope management strategies versus a failure rate of 13.89% when effective implementation of scope management strategies occurred (Du Randt et al., 2014). The general business problem was the probability of engineering project failure increased without the implementation of effective scope management strategies (Du Randt et al., 2014). The specific business problem was that some project leaders in the engineering field lacked scope management strategies to improve project success rates.

Purpose Statement

The purpose of this qualitative single case study was to explore scope management strategies used by some project leaders in the engineering field to improve project success rates. The targeted population was 10 project leaders within an

engineering firm in the U.S. state of Georgia because they had implemented scope management strategies to improve project success rates. Civil engineers who successfully implemented scope management strategies used sustainable resources, reduced material waste, and engaged in water, energy, and natural resources conservation (Russell-Smith & Lepech, 2015; Zuchowski, 2015). People in communities potentially benefit from the findings of this study because of the increased use of sustainable materials, reduced use of water, energy, and natural resources, and an improved local environment. Community organizations might benefit from this study because of the reduced use of water and energy creating long-term cost savings.

Nature of the Study

The three research methods are qualitative, quantitative, and mixed (Yardley, Brosnan, & Richardson, 2013). Qualitative researchers seek to discover the deeper meaning of a phenomenon through open dialog with participants (Kahlke, 2014). I selected the qualitative method to discover the deeper meaning of a contemporary phenomenon through open dialog with participants. In contrast, quantitative researchers use statistical analysis of numeric data to test hypotheses regarding relationships between variables (Kahlke, 2014). Mixed-methods research includes both a qualitative element and quantitative element (Kahlke, 2014). To answer the research question, I did not statistically analyze numeric data to test hypotheses for regarding relationships between variables; therefore, a quantitative study or a mixed methods study was not appropriate.

I considered four research designs: (a) phenomenology, (b) ethnography, (c) narrative inquiry, and (d) case study. Phenomenological researchers describe similarities and differences within the broader phenomenon through the lived experiences of participants (Kumar, 2012). Phenomenology was not appropriate for this study because I did not collect data regarding the lived experiences of participants. Business researchers use ethnographic research to concentrate on cultural aspects of the phenomenon studied (Moustakas, 1994). An ethnographic design for the study was not appropriate because I did not focus on the cultural aspects of engineering firms. A narrative inquiry design entails spoken or written text or illustrations of participants' stories (Moustakas, 1994). I did not focus on participants' stories; therefore, a narrative inquiry was not appropriate. Case study researchers try to enhance the descriptions of the phenomenon through the focus on the *how* and *why*; furthermore, case studies contain boundaries unlike the seemingly limitlessness of phenomenological research (Applebaum, 2012; Yin, 2014). I chose the case study design to explore a phenomenon within the limited boundaries of an engineering firm.

Research Question

What scope management strategies do some project leaders in the engineering field use to improve project success rates?

Interview Questions

1. How do you define scope management strategies?

2. What scope management strategies did you use to improve project success rates?

3. What scope management strategies were effective in improving project success rates?

4. How did you measure the effectiveness of the implemented scope management strategies?

5. What were the organizational benefits of improving project success rates through scope management strategies?

6. Why, if at all, did your scope management strategy change after a project commenced?

7. How do you typically manage scope management strategy?

8. What challenges did you face in implementing scope management strategies to improve project success rates?

9. How did you address the key challenges for implementing scope management strategies to improve project success rates?

10. What additional feedback can you provide on scope management strategies?

Conceptual Framework

I used scope management theory, originated by Fayol (1917), as the conceptual framework for this study. Project leaders defined scope management as the supervision of the rules that govern an endeavor (Fayol, 1917). The tenets of scope management theory are: (a) communication, (b) leadership, (c) negotiation, (d) motivation, and (e)

performance management (Naor, Bernardes, & Coman, 2013). The origin of scope management theory traced back to the origins of project management theory in 1917 when Fayol sought to cure project failures. Fayol maintained scope management strategy was a part of planning; noting that implementing the strategy during the initial planning stage and continuing the process in all project phases resulted in improved project success rates. The utilization of scope management strategy by the project leader was paramount to the project's overall success due to internal and external factors (Fayol, 1917). Project leaders realized the importance of accepting scope management strategy as a critical success factor (Fayol, 1917). Fayol pointed out the importance of the project leader's understanding of the five tenets of scope management theory for the overall success of the project. I used scope management strategy as a lens through which to the strategies engineering project leaders used to improve project success rates.

Definition of Terms

Change management plan: A change management plan is the arrangement of processes for the management of an endeavor (Ionescu, Meruta, & Dragomiroiu, 2014).

Configuration management plan: A configuration management plan depicts the viability for requirement of formal change management and the procedures for supervision of the alterations (Bartusevics & Novickis, 2015).

Control scope data flow diagram: A control scope data flow diagram is the visual diagram illustrating project scope supervision and scope control from mandatory collect items (Diaz-Cacho, Delgado, Prieto, & Lopez, 2012).

Organizational process assets: Items that can change the control scope processes, which included present formal and informal scope changes and control requirements, actions, and rules (Cao, Thompson, & Triche, 2013).

Requirements documentation: Requirements documentation shows how sole requirements satisfy the business aims of the project and the commerce goals for the endeavor (Huysegoms, Snoeck, Dedene, Goderis, & Stumpe, 2013).

Requirements management plan: A requirements management plan is the strategy the project leader utilizes to calculate the requirement to complete a project (Violante & Vezzetti, 2014).

Requirements traceability matrix: A requirements traceability matrix table illustrates the connections between the mandatory items and the rules and regulations (Torkar et al., 2012).

Scope management plan: A scope management plan is the plan of actuating a project's goals and implementing changes if needed during an endeavor (Mirza et al., 2013).

Scope management understanding: Scope management understanding is the understanding of scope supervision by project leaders for scope oversight and administration (Mirza et al., 2013).

Work performance information: The work performance information is the data for the project status with a concentration on deliverables (Michaelis, Wagner, & Schweizer, 2015).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions in qualitative research are aspects that a researcher perceives to be correct but that have not been substantiated (Yin, 2014). I received permission to review company records, documents, archived financial statements, and project reports. I assumed all company documents were accurate. The project leaders at a civil engineering firm in Georgia, answered all the interview and follow up questions. I assumed that the participants answered the questions honestly and accurately. Engineering firms depend on successful scope management for profit through cost, time, and performance (Worthington & Higgs, 2014). I assumed the participants recognized that scope management is a function of technical and functional performance, labor cost, and the time required for the project.

Limitations

A limitation in a qualitative study is a shortcoming (Yin, 2014). Limitations are potential weaknesses outside of the researchers' realm of influence (Yin, 2014). Limitations potentially affect the result of the study. The reliance on the experience and opinions of project leaders in the civil engineering firm in Georgia, for accurate scope management strategy data was a limitation. A limitation was that I relied on the honesty of the potential participants as well as the accuracy of the supporting documentation to identify leaders in the civil engineering industry who had implemented successful strategies to improve project success rates. A limitation was that scope management

remained underutilized in the field of project management (Mirza et al., 2013). The engineering industry harbored the increased utilization of technology-based approaches for quality and scope with several differences (Saguy, 2015). A limitation was the engineering industry is more technical than other industries; therefore, the findings of this study may not be applicable to other industries. Limited, if any, transferability of the findings to other engineering firms by future researchers exist because of the limited scope of this study.

Delimitations

Researchers define delimitations in a qualitative study as the boundaries or the range of the study up to the furthest outer-limit; therefore, the study only includes everything within the topic boundary (Yin, 2014). The boundary of scope management in the practical strategic structure for civil engineers was a delimitation. The geographic region of the Southeastern United States, Georgia, was a delimitation. The sample population of three project leaders in an engineering firm was a delimitation. The participant eligibility criteria limited the scope of this study. The final delimitation was that answering the research question required focusing on strategies to manage scope; therefore, I did not seek to answer other questions that might have affected project leaders in the civil engineering industry.

Significance of the Study

Business leaders in the engineering industry might find value in the findings of this study because of the insight they offer into the use of successful scope management

strategies to improve project success rates with more effective business practices and to provide a positive social outcome as well. An improved scope management strategy by project managers proves the value to business practice through increased profits and company growth (Kolympiris & Kalaitzandonakes, 2013). Improved value to business practices occur with increased earned value and effective strategy implementation (Trejo, 2014). An increased awareness of the value of scope management strategy by project leaders provides an enhanced value to business practice through cost savings and leads to a positive social impact (Sussman, Khemlani, & Oppenheimer, 2014). Project leaders create value for stakeholders using sustainable design initiatives, reduced use of water, energy, and natural resources, and long-term operational cost savings.

Contribution to Business Practice

Leaders might improve business practices by implementing the strategies proven to enhance project success described and explained in the findings of this study. The findings of this study might result in improvements to scope management strategy implementation, creating the potential for business leaders in the engineering industry to improve profitability and growth. An improved understanding of the scope management strategy by project leaders advances the scope-range framework in the building industry as well as the potential for improved profitability and growth (Kolympiris & Kalaitzandonakes, 2013). The improvements to scope management strategy result from elevated alignment with corporate and stakeholder interests and accurate descriptions of the strategy (Mizra et al., 2013). Using scope management strategy controls could occur

with increased efficiency for actual projects and could assist the business leaders through

expanded comprehension by project leaders of scope management strategy controls

(Sussman et al., 2014). Increases in scope management strategy knowledge result in

enhancements in scope assumptions and scope attributes (Sussman et al., 2014).

Trejo (2014) discovered that scope management strategy importance emerged

with construction sector developments for scope change processes. Increased budget

framework rigors resulted with the improved project efficiency (Thakurta, 2013). An

increase in scope creep handling by project managers for local businesses led to the

improved descriptions for scope creep issues (Tisak, 2015).

Implications for Social Change

The implications for social change include the potential to elevate the utilization

of sustainable-design application for water, energy, and natural resource conservation by

project leaders through scope management strategy implementation. Colmenar-Santos et

al. (2015) claimed improved scope management strategy by engineers elevated the

efficiency of sustainable practices for effective social change. People in communities

will potentially benefit from the findings of this study because of the increased use of

sustainable materials, reduced use of water, energy, and natural resources, and an

improved local environment. Exposing engineers to ways to advance social change

through implementation of effective scope management strategies might provide societal

benefits. Engineers developing energy efficient buildings constructed from recycled

materials have proved beneficial to society because of reduced material waste and

disposal (Russell-Smith & Lepech, 2015). The increased utilization and effectiveness of sustainable approaches for building materials through improved inventory scope management benefits the environment (Zuchowski, 2015). Sustainable uses and experience by engineers assists with scope management understanding for modern engineering regulations from the local, state, and federal government (Russell-Smith & Lepech, 2015). The goal of local government was to improve scope management within the water services sector for increased efficiency of water usage and mitigation of higher water prices in the future (Zuchowski, 2015). Community and governmental organizations might benefit from this study because of the reduced use of water and energy creating long-term cost savings.

A Review of the Professional and Academic Literature

Opening Narrative

I reviewed the literature of sources for the scope management topic, which included Business Source Complete, Google Scholar, Ebsco Host, Sage, and the Walden University Library, as well as various reports, papers, journals, and scholarly seminal publications obtained from the Internet or the actual publications' website. I utilized search terms such as *scope, scope management, golden triangle, iron triangle, planning, coordination, controlling, commanding, change,* and *scope management strategy* with an emphasis on scope management theory and the conceptual framework. I researched the conceptual framework from tracing back the origins of project management and scope management to Fayol (1917) using Google Scholar and Business Source Complete. I

used 110 peer-reviewed sources with 121 total sources, equating to 91% peer-reviewed. I used 109 sources within the 5-year currency range for this study, equating to 90% current sources. Seventy-four sources were unique to the literature review.

I provided a section on scope management theory and a respective section on the tenets of scope management theory: communication, leadership, motivation, negotiation, and performance management. The literature review includes an opening narrative, scope management theory section, communication section, leadership section, motivation section, negotiation section, performance management section, alternative theories section, and a transition section. Incorporated into each section are synthesis, critical analysis, and contrasts to scope management strategy. I used the most frequently occurring descriptions and concepts of scope management theory in all sections of the literature review, providing an explanation for the use of these descriptions and concepts in the transition section.

Purpose of the Study

The purpose of this qualitative single case study was to explore scope management strategies used by some project leaders in the engineering field to improve project success rates. The targeted population consisted of 10 project leaders in an engineering firm in Georgia, who implemented scope management strategies to improve project success rates. The objective of this study was to provide leaders in the engineering industry with added insight into effective scope management strategies,

which may allow these leaders to improve business practices as well as their local communities.

Scope Management Theory

Scope management theory was the conceptual framework and lens for my exploration of scope management strategies used by some project leaders in the engineering field to improve project success rates. Fayol (1917) originated the scope management theory. Witzel and Warner (2015) noted that Fayol furthered scope management theory with modern project management theory through the five management pillars including project planning, project baseline, project reporting, change management, and project ending. Scope management is part of the project planning process as a function of time, cost, and performance, and the project baseline grounds scope management to the original goals of the project (Fayol, 1917). Project reporting is important because the project leader must monitor the progress of the project as well as instigate changes to the scope in the middle of the project. The project ending is paramount for judging the overall success of the project (Fayol, 1917). The scope management strategy became an important part of the project management process through linkages to all of the five pillars of project management through the planning stage and the remaining stages through change management with constant reflection back to the original scope and improved understanding of scope management by project leaders (Fayol, 1917).

Civil engineering project managers' efforts for manipulating scope management strategy increased the likelihood of the contractor to start additional contracts for new work because of cooperation with developers and owners (Trejo, 2014). Project leaders who enhanced the dialog regarding scope management strategies and project scope handling with stakeholders improved success rates (Thakurta, 2013). Project supervisors elevated the inclusions of scope changes into the proposal that resulted from the enhanced handling of scope management strategyby project leaders through decreased scope framework (Thakurta, 2013). For instance, a business used the decreased scope framework method through altering the changes to the project scope yet experienced no observed losses regarding time or budget (Tisak, 2015). Trejo (2014), in agreement with Thakurta (2013), Tisak (2015), and Donmez (2014), highlighted the linkages for scope management strategy cross-phenomenon which led to optimized scope management handling by project leaders with enhanced long-term scope management strategy. Developments of scope management strategy resulted through program and budget structure optimization; moreover, developed study synthesis with ties to accepted theories (Donmez, 2014). For instance, regarding the Gieresun Sports project, changes to the scope management strategy by investors and designers in midproject resulted in reduced project time (Donmez, 2014). Trejo and Thakurta concentrated on project goals while Tisak and Donmez paid more attention to descriptions and improved scope management strategy with a trial and error approach.

Increased scope management strategy practice has led to schedule, budget, and financial changes with improved results. Gharaibeh (2013) stated improved scope positioning resulted from long-term strategy developments to budget structure through the energy industry and power transmission endeavors in which the scope was strategized and altered throughout the process, especially in regard to budget and schedule (Gharaibeh, 2013). Gharaibeh discounted project quality whereas Beringer, Jonas, and Kock (2013) noted that improved user feedback resulted from the developed project portfolio management structure and positioning through strategic constructs to scope management strategy by concentrating on not only budget and schedule, but quality as well. This led to enhanced risk management synergy that spawned greater effectiveness for project portfolio management alignment for different time-spanned endeavors (Teller, 2013). For example, increased understanding and strategy with risk-identifiers and consumer indicators has elevated planned productivity (Teller, 2013). Once again, the enhanced descriptions of understanding and strategy with a scope concentration has increased productivity in terms of budget, schedule, and quality improvements, and thus gave evidence of the effectiveness of scope management strategy.

Improved efficiency for cost, plans, and range has raised the probability of company collaborations through high scope dealing (Hora & Dutta, 2013). Standardization of new product development has resulted in improvements and enhanced scope with the use of an elevated project portfolio management framework (Kester, Hultink, & Griffin, 2014). Similar to Hora and Dutta (2013), Allen, Alleyne, Farmer,

McRae, and Turner (2014) found scope management strategy relates to project costs. Through a qualitative approach, Allen et al. found that success rates for scope management strategy decreased within the engineering industry because of inadequate stakeholder involvement, project leader absence, increased depth of scope, and an inaccurate cost breakdown (Allen et al., 2014). Allen et al. sought to pinpoint critical success factors of project management. Allen et al. concluded the application of critical success factors such as cost, time, scope, project leader adequacy, and stakeholder involvement increased the chance of successful projects. Hora and Dutta and Kester et al. (2014) identified critical success factors involving cost without actually setting out to do so, while Allen et al. set out to improve scope management strategy through cost relations with critical success factors from the beginning.

The five tenets of project management, communication, leadership, motivation, negotiation, and performance management, emerged from scope management theory (Naor et al., 2013). The key to effective implementation of scope management strategy is that project leaders must use an approach that incorporates the five tenets. Failure to implement all five tenets lowers the probability of project success.

Communication

Communication is an important component of scope management strategy. Austin, Browne, Haas, Kenyatta, and Zulueta (2013) maintained scope management strategy communication as an important factor within higher education construction projects at Drexel University through a qualitative investigation. The goal of Austin et al.

was to answer questions of why project management techniques were not popular within higher education projects with interviews of project leaders at Drexel University. Austin et al. concluded scope management strategy communication to be a paramount factor when the project scope and objectives were left incomplete. Bartusevics and Novickis (2014), in agreement with Austin et al. theorized that incomplete data is a cause of poor communication and project ineffectiveness. Bartusevics and Novickis reported decreased scope management strategy communication effectiveness within the internet technology industry and the urgency of addressing the issue. Bartusevics and Novickis recommended an increase in the usage of software models for enhanced scope management strategy communication inclusion on IT projects. A need exists for enhanced computer software for effective communication to implement scope management strategies (Austin et al., 2013; Bartusevice & Novickis, 2014).

Du Randt et al. (2014) discussed the critical nature of scope management strategy communication through a quantitative study of a civil engineering company by the project leaders for reaching the conglomerate goals of an endeavor including cost, time, and quality. Du Randt et al. identified scope management communication as a critical success factor for schedule, but not for budget. Du Randt et al. concluded a significant relationship existed between time and scope management through planning and clear objective setting. Scope management strategy communication clarity was ranked within the top 10 factors of lessons, problems, and solutions for two projects within the civil engineering industry (Gharaibeh, 2013). Client requests directly related to scope

management strategy communication or the lack thereof (Gharaibeh, 2013). Gharaibeh
(2013) claimed that when project leaders poorly described scope management processes
to contractors, subcontractors, and suppliers, client inquires increased, scope creep costs
increased, and communication among all stakeholders suffered. Du Randt et al.
mentioned scope management strategy communication goals through cost, time, and
quality; however, Gharabeh expanded upon the scope management strategy
communication goals with additional descriptions from actual project leaders. Gharabeh
was able to enhance descriptions to ineffective understanding of scope management
strategy communication by project leaders, whereas DuRandt et al. did not proceed as far
within their research.

Scope management strategy communication relates significantly to engineering
project success. Hora and Dutta (2013) held that scope management communication had
a positive relationship with project success. Hora and Dutta examined project portfolio
management through a quantitative study, which involved 728 firms sampled within the
software engineering industry, specifically biomedical-technical engineering firms. Hora
and Dutta claimed scope management communication to be a significant factor for
project success. Hora and Dutta maintained project portfolio management constraints
occurred with improper scope management strategy communication whereas Mirza et al.
(2013) maintained that scope management strategy communication and scope definition
were major constraints to project success in terms of cost, quality, stakeholder
satisfaction, and time. Mirza et al. noted that only nine of the 25 participants in their

study found scope management strategy as a major factor of project success; therefore,

scope management strategy might be underrated in the engineering industry. Scope

management strategy communication clarity and scope management details not passed on

to stakeholders appeared to be the main reasons for scope management deficiencies

(Mirza et al., 2013). Hora and Dutta noted that scope management communication was

an area of concern for project leaders because of ineffectiveness of clarity; however,

Mirza et al extended the finding of Hora and Dutta, tying scope management strategy

ineffectiveness to a lack of project leader comprehension.

Leadership

Effective leadership is an integral element of engineering project success. Nowak

(2014) explored scope management strategy and the linkages to civil-environmental

engineering for sustainable development practices. Nowak investigated 43 cases under

appeal for environmental decisions regarding sustainable development. The cases were

energy, road, and deforestation projects design with sustainable development

requirements (Nowak, 2014). Nowak concluded that scope management strategy

leadership within the environment had a significant relationship to environmental

officials' decisions within the appeals cases. While Nowak (2014) pointed to

deficiencies within scope management strategy leadership, Parker, Charlton, Rubeiro,

and Pathak (2013) noted many scope management strategy leadership successes with the

use of project management practices, such as project management book of knowledge.

Parker et al. advocated for more of a link between scope management strategy and

leadership through a concentration on project manager aspects rather than tasks and outcomes. Parker et al. concluded that improved effectiveness existed when project leaders used a combination of project management and change management rather than a sole concentration on one or the other exclusively. Nowak realized that the formality of scope managed; however, flexibility must be maintained in the field, whereas Parker et al. took a more rigid approach and advocated for strict adherence to the project management book of knowledge to attain affective scope management strategy leadership.

Although the majority of researchers maintained that project management and project maturity as being major factors for scope management strategy leadership effectiveness, Doloi (2013) does not consider project management and project maturity to be major factors of scope management strategy leadership effectiveness, but rather a minor one. Doloi maintained the bulk of the responsibility for scope management strategy leadership effectiveness was tied to upper level management support; conversely, Hora and Dutta (2013) stated a large part of the responsibility of scope management strategy leadership effectiveness rested with the project leader's personality characteristics and leadership drive.

DuRandt et al. (2014) acknowledged personality attributes of the project leader as a factor for scope management strategy leadership yet concentrated on the more traditional approach of the iron triangle, that being time, cost, and quality. In agreement with Thakurta (2013) and Neverauskas, Bakinaite, and Meiliene (2014), DuRandt et al.

followed a traditional approach to project management for scope management strategy leadership. Mirza et al. (2013) followed a similar approach, but tied time, cost, and quality within scope management strategy leadership ineffectiveness to a lack of comprehension by project leaders. Spalek (2014), comparable in approach to Mizra et al., yet concentrated on the golden triangle of time, cost, and scope with an emphasis on scope management strategy leadership. Spalek described further the problem branched into economies of scope as well beyond traditional project management considerations and factors. Farshad, Hamed, and Reza (2017) took a golden triangle approach to solving the scope management strategy leadership dilemma; furthermore, they incorporated a fuzzy analytical hierarchy process to assist with selection of the best scope management strategy leadership decisions by project leaders. Farshad et al. increased the magnitude of scope creep over the course of the project of being a major factor of scope management strategy leadership ineffectiveness.

Project management improved when leaders recognized and understood scope management practices. Varajao, Colomo-Palacios, and Silva (2017) tied scope management strategy leadership levels to increased understanding of information systems project management practice. Although Varajao et al. maintained scope, time, and cost as the important factors when analyzing scope management strategy leadership effectiveness, they acknowledged quality and risk management as minor factors; furthermore, when practiced correctly by project leaders, increased the effectiveness of scope management strategy leadership when scope changes were implemented. The

approach Varajao et al. took increased the overall project management performance. Allen et al. (2014), somewhat comparable in approach as Varajao et al, concentrated on engineering requirement aspects in addition to elevated scope management strategy leadership effectiveness through a slight hybrid of traditional-agile approach in lieu of solely a traditional approach to project management.

Austin et al. (2013) maintained a traditional approach to scope management strategy leadership increased the likelihood of project success rates through the utilization of project portfolio management. Mirza et al. (2013) acknowledged the linkage between project portfolio management and traditional approaches to project management; consequently, increased the effectiveness of scope management strategy leadership as long as the project manager had attained an acceptable level of understanding for scope management strategy techniques. DuRandt et al. (2014) and Hora and Dutta (2013) maintained the same belief; however, DuRandt et al. and Hora and Dutta stated that even with elevated effectiveness of scope management strategy leadership, the increased likelihood of rework still existed but with less magnitude.

Motivation

Researchers noted that motivation is a required construct for scope management strategy implementation. Motivation relates to scope management strategy through the effectiveness in conjunction with digital applications that were geared to tracking scope changes throughout a project (Hora and Dutta, 2013). Neverauskas et al. (2013) and Nowak (2014) offered similar approaches; however, Neverauskas et al. and Nowak

utilized best management practices concentrations incorporated within the digital

applications. Trejo (2014) noticed that increased usage of computer applications to assist

with scope management strategy motivation occurred with mixed results; however, when

combined with other drivers, such as transactional leadership, the effectiveness of scope

management strategy motivation for project leaders was elevated. Spalek (2014)

maintained a similar approach as well which combined traditional with agile techniques

for solutions to the scope management strategy motivation dilemma; furthermore,

increased innovation efforts elevated the scope management strategy motivation of

project leaders the highest. Conversely, DuRandt et al. (2014) maintained that strict

adherence to the project management book of knowledge appeared to be the most

effective for increasing the scope management strategy effectiveness of project leaders,

yet acknowledged further research was needed to prove statistical significance.

Thakurta (2013) maintained that increased effectiveness in scope management

strategy by project leaders elevated project success rates. DuRandt et al. (2014) and Hora

and Dutta (2013) acknowledged the higher project success rates in conjunction with

scope management strategy effectiveness by project leaders; however, DuRandt et al. and

Hora and Dutta stated rework was present with most projects even with the higher

success rates because of elevated scope management strategy effectiveness by project

leaders. Conversely, Robinson, Tewkesbury, Kemp, and Williams (2017) assessed that

policy changes at an organizational level had to occur in order to achieve enduring

increased effectiveness of scope management strategy motivation by project leaders in conjunction with elevated project success rates.

Nowak (2013) and Parker et al. (2013) maintained that self-management was the only way to effectively achieve and elevated level of scope management strategy motivation for project leaders; however, Nowak linked self-management to an adequate project management office. Parker et al. assessed that in addition to self-management, a project-based intervention was needed in order to successfully implement scope management strategy motivation for project leaders. Shehzad (2016) concurred that self-management enhanced scope management motivation for project leaders through project-based intervention; however, Shehzad maintained permanent policy changes to achieve long-term scope management strategy motivation effectiveness.

Lukas (2017) acknowledged policy changes elevated the chances of scope management strategy motivation effectiveness increasing; furthermore, decreased politicization of controversial findings, such as in the case of watershed management or the global warming debate. Increased utilization of erosion control methods through best management practices occurred when scope management strategy motivation increased with decreased politicization of the controversial findings, and actually utilizing techniques, such as silt fences at the down-slope of the limits of construction disturbance to catch sediments before entering the watercourses (Lucas, 2017). Frontuto, Dalmazzone, Vallino, and Giaccaria (2017) utilized a similar approach with a concentration on one policy shift, such as decreased politicization in order to increase the

effectiveness of scope management strategy motivation through increased donations by the public. Frontuto et al. maintained that increased funding subsequently elevated the ability to raise environmental awareness in a nonpolitical manner; consequently, increasing the project leaders scope management strategy motivation, with the knowledge of public support.

Jenkins, Thompson, Bourillon, and Peckham (2017) utilized policy changes for increased scope management strategy motivation for project leaders through elevated upper level management support. Jenkins et al. acknowledged increased safety features in the work place minimized danger and injuries; furthermore, increased scope management strategy motivation effectiveness and awareness of the project leaders. Sageer and Barto (2014) maintained a similar approach to Jenkins et al.; however, they advocated for elevated awareness of decreased danger levels in the workplace through increased education of scope management strategy motivation for the project leaders. Jeffery, Dickinson, Ng, DeGeorge, and Nable (2017) agreed that increased levels of scope management strategy motivation were achieved through effective policy change and safety awareness; consequently, caused benefits in other areas. For example, the reduction of accidents during a project by employees through the dispersing of safety procedures pamphlets to project leaders; subsequently, increased scope management strategy effectiveness of the project leaders.

Negotiation

Engineering project leaders engage in negotiation to use effective scope management strategies. Spalek (2014) maintained the majority of researchers utilized a form of conflict management through effective negotiation in the civil engineering industry with links to negotiation through scope management strategy; therefore, increased the effectiveness of scope management strategy negotiation. Moyer, Gadsby, and Morris (2017) maintained that in order for the effectiveness of scope management strategy negotiation to last, organizational policy changes had to take place. Lukas (2017) agreed with policy change being a precursor to effective scope management strategy negotiation by project leaders; however, Lukas insisted that every individual within the organization used an identical convention or varied results would occur. For example, silt fence usage in conjunction with sediment ponds, in order to reduce silt deposits in the watercourses, increases the effectiveness of scope management negotiation, but if not everybody in the same organization designs with the same strategy, an increased loss of the effectiveness of the scope management strategy negotiation process occurs. Lytvynchenko (2016) acknowledged that policy change worked for scope management strategy negotiation effectiveness increases; however, program management change occurring in conjunction with the policy changes elevated the likelihood of elevated effectiveness in negotiation. Lytvynchenko conceded that new approaches and styles emerged over time to reduce the effectiveness of the scope management strategy negotiation effectiveness through decreased convention utilization.

Increased usage of agile approaches within the engineering industry elevated successful scope management strategy implementation through adequate negotiation. Pawlowski (2015) attributed the increased effectiveness of the scope management strategy negotiation to the elevated emotional intelligence of the project leader. The higher the emotional intelligence of the project leader, the more successful the negotiation for scope management strategy (Trejo, 2014). Allen et al. (2014) acknowledged that increased effectiveness of the personality traits of the project leader occurred with elevated emotional intelligence; however, further increased effectiveness occurred through the utilization of requirements engineering in conjunction with successful negotiation of the scope management strategy by the project leaders. Hora and Dutta (2013) and Mirza et al. (2013) concurred with a similar stance towards the increased emotional intelligence of the project leader along with elevated organization of one's environment in conjunction with a project plan. Without the project plan, Mirza et al., and Hora and Dutta maintained increased scope management negotiation by other means was ineffective.

Hora and Dutta (2013) assessed that adequate schedule management increased the chances of any scope management strategy negotiation effort; furthermore, this often involved the negotiation of resource management. Mirza et al (2013) concurred with the schedule management as being a factor for increased effectiveness of scope management strategy negotiation; however, with the addition of front end loading matrices. Thakurta (2013) and Trejo (2014) adhered to time being the sole-major factor of proper scope

management strategy negotiation because of the dynamic scope change environment in which budgets change daily. Robinson et al. (2017) maintained that rules-leverage increased the effectiveness of the scope management strategy negotiation by project leaders, especially when the project leaders worked for the government or larger institutions. Spalek (2014) acknowledged the fact that sometimes for conflict management to be effective which encompassed scope management strategy negotiation, the likelihood of the project leaders being successful hinged on their ability to apply leverage within the rule framework system. For example, a government employee whom was the project leader would have more power to implement or change rules than a small civil engineering firm (Spalek, 2014). Conversely, Hora and Dutta advocated that those in powerful positions did not necessarily have the authority to implement rule-leverage; therefore, the perceived increased effectiveness of the scope management strategy negotiation by the government employee was in fact a negotiation technique itself. In essence, Hora and Dutta believed the chances of successful rule-leveraging by project leaders decreased when powerful project leaders were negotiating scope management strategy, if they did in fact work for larger institutions or the government. For instance, project leaders might say one thing to offer a good perception but have no true intention of successfully rule-leveraging; subsequently, passing the blame to a higher-up to maintain the illusion of a successful scope management strategy negotiation effort.

Performance Management

Agility and flexibility within performance management practices improves the effectiveness of scope management strategies. Spalek (2014) maintained agile project management was a better approach over traditional project management for implementing a scope management strategy. Spalek argued that an agile approach was easier for project leaders to track scope management strategy changes in real time. Pawlowski (2015) confirmed this through the effective utilization of scope management strategy for performance management by project leaders; however, noted the need for determinants in order to switch from traditional to agile approach. Berlato and Correa (2017) maintained difficulty with project management problems from scope management strategy performance management based on traditional approaches.

Parker et al. (2014) acknowledged that performance management within scope management strategy for project leaders was primarily budget based which ties into Spalek's iron triangle approach of time, cost, and quality; however, Parker et al. discounts time and quality. Gharibeh et al. (2014) took the concept a step further and identified critical success factors, such as cost, time, scope, and quality, considered the fundamental performance management measures. Allen et al. (2014) and Yang (2013) confirmed performance management being a function of cost, time, scope, and quality.

Doloi et al (2013) agreed with the performance management measuring approach for scope management strategy yet tied the project success to the life cycle of the project as well. In other words, performance management could be fine, but if the life cycle of

the project goes too long, the scope management strategy was ineffective. Doloi et al. advocated for increased monitoring as a way to increase the effectiveness of scope management strategy performance management and maintained performance management as a major factor of scope management strategy by project leaders as a way to enhance performance management. Doloi et al. linked performance management to risk management for effective scope management strategy by project leaders.

DuRandt et al. (2014) stated productivity measure through performance management were the key to effective scope management strategy by project leaders. DuRandt et al. maintained project schedules and time were major factors to achieving effective scope management strategy performance management by project leaders. Mirza et al. (2013) concurred with DuRandt et al. regarding project schedules and productivity yet maintained the key to achieving advanced scope management strategy through performance management was the education of the project leaders. Thakurta et al. (2014) acknowledged project schedules as being an important element of scope management strategy performance management; furthermore, maintained that soft skills for the project leader further enhanced the scope management strategy effectiveness of the project leaders. Allen et al. (2014) agreed that soft skills were an important component for project leaders to possess for effective scope management strategy performance management.

Effective project leaders link quality management to performance management for use of scope management strategies. Neverauskas et al. (2013) maintained quality

management was the major factor of performance management for scope management strategy by project leaders. Mirza et al. (2013) acknowledged quality management as being a factor of effective scope management strategy by project leaders for enhanced performance management; however, Mirza et al. maintained schedule variance and budget variance were more important for effective scope management strategy performance management. Trejo (2014) and Varajao et al. (2014) placed more of an emphasis on time management rather than quality management; consequently, differences in opinion by top researchers of project management continue to confuse practitioners, such as project leaders, which led to performance management for scope management strategy an elusive goal to achieve by project manager. Trejo similar to Mirza et al. believed education was a key component to achieving effective project management through scope management strategy and performance management. Mirza et al. maintained an increased understanding of budget, time, quality, and performance scope yielded increased competence of project leaders for scope management strategy and performance management.

Loop (2014) acknowledged a work breakdown structure as the key component to performance management for scope management strategy by project leaders. Loop also maintained that earned value measures were necessary for effective scope management strategy by project leaders for enhanced performance management. Silva and Oliveira (2015) maintained global trends should be adhered to for enhanced earned value measurement; however, enterprise resource plans were needed for elevated scope

management strategy by project leaders for enhanced performance management. Silva and Oliveira stated that the scope have to originally be properly defined at the commencement of a project in order to increase the likelihood of successful implementation of a performance measurement effort by project leaders for enhanced scope management strategy.

Alternative Theories and Concepts

In addition to the five tenants of scope management theory: communication, leadership, motivation, negotiation, and performance management, alternative theories and concepts to scope management strategy have been proposed and discussed by researchers and project leaders. Recognizing the differences in expert opinions within the existing body of topical knowledge is paramount to understanding the broad range of theories pertaining to scope management strategy. All alternative theories and concepts require additional research in order to be widely accepted by researchers and practitioners (Hora and Dutta, 2013).

Fuzzy decision analysis. Farshad et al. (2017) stated fuzzy decision analysis for endeavor change supervision was paramount to scope management strategy success. Farshad et al. proposed the triple constraints of time, cost, and scope on project management are important; however, scope management strategy effectiveness by project leaders is of a higher degree of importance, because scope encompassed all of the procurements required for completion of an endeavor. Farshad et al. acknowledged that over the course of a project, pros and cons would occur for the endeavor, yielding the

project leaders having to deal with how to incorporate new scope items into the budget and schedule, all creating fuzzy decision-making. Sommer et al. (2016) maintained a similar approach; however, included quality management as relevant to any approach. Sommer et al. acknowledged in addition to scope, budget, and time, the need for quality existed for enhanced documentation and integration of technical improvements in order to effectively evaluate the scope management strategy improvements or ineffectiveness. Sommer et al., unlike Farshad et al., followed the golden triangle approach that included quality with time, cost, and scope in order to achieve effective scope management strategy. The golden triangle approach and the iron triangle approach have become the foundations of most alternative theories and concepts, which primarily are of a higher degree of complexity.

Employee happiness and organizational success. Berlato and Correa (2017) maintained that organization, society, and culture have a much greater impact on scope management strategy than previously thought. Berlato and Correa acknowledged the importance of cost, time, and scope; however, they focused on employee happiness and organizational success. In addition, Berlato and Correa did not confine their research to the engineering sector but broadened into the health and education sectors. They noted the need to include the human challenges of balancing a career and family when measuring the effectiveness of project leaders in terms of scope management strategy. In agreement with Berlato and Correa, Varajao et al. (2017) maintained the inclusion of human factors, such as personality traits in measuring project leader effectiveness;

however, noted that combining a golden triangle (cost, time, scope, and quality) management approach with information systems management was the key to mastering scope management strategy. Varajao et al. cited that the engineering industry is moving towards an agile approach to scope management strategy in lieu of the heavy reliance on traditional project management the engineering industry almost exclusively relies on. Varajao et al., and Berlato and Correa called for further research in order to prove the tenets of their respective theories.

Supply and demand. Moyer et al. (2017) examined the degree of effectiveness of scope management theory within the National Park Service, which departs from the traditional studied approach within the private sector that contained predictable supply and demand functions. Within government organizations, supply and demand do not necessarily follow predictable patterns, such as in the private sector (Moyer et al., 2017). For civil engineering projects, regarding archaeological and heritage management situations, scope management strategy was more turbulent than in the private sector; furthermore, Moyer et al. recommended increased education opportunities for project leaders embarking on charitable goals. Shehzad (2016) noticed these problems within government agencies and advocated for policy management approaches in order to enhance scope management strategy effectiveness. Both Shehzad and Moyer et al. noted the need for more research in order to prove statistical significance for their respective theories; consequently, increased innovation and education opportunities for project

leaders may contain the answer for enhanced scope management strategy for project leaders.

 Broadened scope. Lukas (2017) maintained that in addition to cost, time, and quality, the need exists to broaden scope on a much wider scale in order to effectively manage scope management strategy for project leaders. Lukas focused on the watershed management problem for increased silting by construction activities. Lukas conceded that more environmental factors had to be included for his research to be completely accurate, such as volcanism and naturally occurring silting from runoff; however, concentrated on the willingness of the stakeholders to comply with erosion control measures when voluntary. Project leaders were more effectively tackling the situation and enhancing scope management strategy once all of the stakeholders involved had received education on the detrimental effects of the environment from the silting due to construction activities (Lukas, 2017). Frontuto et al. (2017) maintained that in addition to stakeholder education increases, a concentration of specific scope management strategy by project leaders is more effective than grouping all scope changes together. An increased focus on the major factors yielded enhanced results whereas when project leaders encounter multiple factors for scope management strategy, there was more of a likelihood the projects' scope management strategy by project leaders would fail. Frontuto et al. acknowledged the need for additional research to link the single-attribute theory versus multiple attributes faced by project leaders in order to achieve increased effectiveness of scope management strategy.

Schedule management. Agunbiade et al. (2016) maintained that with the foundation of an iron triangle approach of time, cost, and quality, scope management strategy was important, but not as important as schedule management. Lacking effective schedule management, project leaders will find difficulty in achieving effective implementation of scope management strategies (Agunbiade et al., 2016). Agunbiade et al. noted that because multiple government agencies had to collaborate, schedule management is an essential element of successful scope management strategy. Agunbiade et al. advocated for more process integration and agency collaboration in order to project leaders to become more successful for scope management strategy. Abrantes and Figueiredo (2014) held to a similar belief; however, they insisted new product development and innovation practices were key to improving scope management strategy advances that had reached a plateau. Abrantes and Figueiredo maintained that this was possible even with more dynamic project portfolios with feature modeling; furthermore, offered evidence with action-research cases from past projects. Abrantes and Figueiredo called for further research to validate their findings regarding schedule management, agency collaboration, and new product development.

Scope of practice. Ourth, Groppi, Morreale, and Quicci-Roberts (2016) stated that in addition to the golden triangle approach of scope, time, cost, and performance quality, the need existed to incorporate scope of practice in order for project leaders to effectively enhance scope management strategy. Effective material management occurred when scope of practice was successful, and project leaders were effective in

terms of scope management strategy (Ourth et al., 2016). Jenkins et al. (2017) agreed

that the proper foundation was the golden triangle; however, they advocated for learning

exchanges as a means for project leaders to increase their scope management strategy

effectiveness. An open exchange of innovations, products, and ideas assisted with

increased awareness of the project leaders for scope management strategy deficiencies

(Jenkins et al., 2017). Ourth et al. (2016) conceded the need for more research in order to

prove the scope of practice link with scope management strategy effectiveness by project

leaders; however, preliminary observation in the engineering industry was encouraging.

Jenkins et al. (2017) noted that a gap existed in the literature regarding the concept that

learning exchanges increased the likelihood of scope management strategy successes

within the engineering industry.

     Employee satisfaction. In addition to golden triangle initiatives to improve

scope management strategy, Jordan, Hennenfent, Lewin, Nesbit, and Weber (2016)

acknowledged that employee satisfaction is highly underrated by upper level

management as being a key to the successful implementation of scope management

strategies by project leaders. When upper level managers state the successes of

employees, especially in public forums, project leaders tend to reciprocate the efforts of

other project leaders, and successful implementation of enhanced scope management

strategies by project leaders occurred (Jordan et al., 2016). Ourth et al. (2016), as

accepted by Jeffery et al. (2017, linked scope of practice to successful scope management

strategy efforts by project leaders. Jeffery et al. acknowledged employee satisfaction as

minor factor, yet not as important as scope of practice. Jeffery et al. maintained that universities and government agencies need to take the lead in the implementation of proven scope management strategy mechanisms that improve the effectiveness of scope management strategy by project leaders. Jordan et al. recommended additional research to address employee satisfaction and increased recognition by upper level management to project leaders improved scope management strategy by project managers.

Financial, managerial, and legal mechanisms. Lytvynchenko (2016) emphasized in addition to successful project management, improved program management was the key to enhanced scope management strategy by project leaders. The need exists for financial, managerial, and legal mechanisms in order to improve scope management strategy by project leaders within program management (Lytvnchenko, 2016). Lytvnchenko acknowledged that with a higher degree of uncertainty of upper level management and stakeholder participation remained a huge problem for improved scope management strategy within the context of program management by project leaders. Kostalova, Tetrevova, and Svedik (2015) recognized effective program management as being important but maintained a successful project management information system used by project leaders and all stakeholders, as being the ultimate way to effectively manage scope management strategy along with an iron triangle approach. Kostalova et al. stated project life cycle remained a problem with analyzing post-mortem projects' effectiveness in terms of scope management strategy by project leaders. The need exists for future research to prove statistical significance to

project management information systems and scope management strategy effectiveness of project leaders (Kostalova et al., 2015).

Data driven. In order to assess the problem, some researchers, such as Bray (2016), noted the need for vast amounts of data order to enhance the effectiveness of scope management strategy by project leaders. Bray implemented income management programs in order to manage scope management strategy for private and public sector entities. Researchers recognized new income management from new clients as the most likely factor for scope management strategy effectiveness issues by project leaders. Bray conceded that he had not achieved prolonged enhancement of scope management strategy by project leaders, even with vast amounts of data to analyze over long time periods. This seems to indicate the problem is more elusive than previously thought; however, Pawlowski (2015) pointed out with vast amounts of data, the problem was nestled within resource flexibility of project leaders and acknowledged in most cases project leaders had little or no resource control. Holding to a golden triangle approach, combined with effective resource management, increased the likelihood of scope management strategy effectiveness by project leaders. Pawlowski acknowledged the need for more research in order to prove statistical significance existed between resource flexibility and the effectiveness of scope management strategy by project leaders. In both cases, the need existed for a knowledge-based economy along with past-data of scope, time, quality, and cost data for projects.

Upper management policies and decisions. Sageer and Barto (2014) attributed scope management strategy to upper level management and policy decisions rather than project leaders. They maintained the unlikeness of the emergence of an effective scope management strategy if a lack of support exists from upper level management support (Sageer & Barto, 2014). Loop (2014) maintained a similar approach for seeking after upper level management support to scope management strategy, but held that although an important factor, scope, schedule, and budget were paramount to a project's success. The key to understanding failures of scope management strategy was a post-mortem study of projects' work breakdown structure; furthermore, a flaw occurred within the work breakdown structure for almost every project that contained deficiencies in scope management strategy by project leaders (Loop, 2014).

The need exists for an increased level of engagement by upper level management in order for scope management strategy by project leaders to be effective (Bruce-Low, Burnet, Arbver, Price, Webster, & Stopforth, 2013). Bruce-Low et al. (2013) acknowledged scope, cost, budget, and quality as being important factors, but without upper level management support of an endeavor, the scope management strategy is highly likely to fail; furthermore, this is due to strategic decisions typically having to go through upper level management prior to acceptance (Bruce-Low et al., 2013). Borrego, Foster, and Froyd (2014) advocated for increased systematic reviews of projects by upper level management; furthermore, monthly, if not weekly, especially for long-term projects.

Melian-Gonzalez and Bulchand-Gidumal (2017) took a more human approach to scope management strategy, and blamed scope management strategy failure upon employee injustices by upper level management upon project leaders or other employees associated with the projects. Also acknowledged were the fact that a client's perception of whether or not the scope management strategy was successful governs upper level management decisions (Melian-Gonzalez & Bulchand-Gidumal, 2017). Robinson et al. (2017) maintained similarities in approach and acknowledged the need for all stakeholders to understand the client-driven upper level management decisions. The need for more research exists to prove client attitudes effected the success of scope management strategy by project leaders, as well as to prove upper level management decisions were related (Melian-Gonzalez & Bulchand-Gidumal, 2017).

Multiple projects. Ponteen and Kusters (2015) maintained that scope management strategy effectiveness for multiple projects was achieved differently than for a single project. Although the iron triangle of cost, time, and quality is an important factor in multiple projects, scope management strategy for multiple projects required centralization in order to be more effective. Single projects managed by project leaders could be decentralized and still achieve great success; however, this did not occur with multiple projects (Ponteen & Kusters, 2015). Multiple projects required more upper level management involvement and support (Ponteen & Kusters, 2015). Silva and Oliveira (2015) confirmed the difficulty of multiple projects for project leaders attempting to achieve enhanced scope management strategy. They believed that information

technology and organizational performance, along with process of scope, were tools that the project leaders needed in order to alleviate any scope management strategy dilemmas (Silva & Oliveira, 2015). Ponteen and Kusters acknowledged the need for further research in order to prove the decentralized single project versus multiple projects in conjunction with centralized upper level management involvement tenet is necessary for enhanced effectiveness of project leaders regarding scope management strategy.

      Resource constraints and budget deficiencies. Allen et al. (2014) maintained that in addition to the golden triangle of project management, external influence, micro-managed project leaders, broad scope, and insufficient budgets, accounted for deficiencies to scope management strategy by project leaders. The project management plan and the responsibility assignment matrix were critical success factors associated with scope management strategy success by project leaders (Allen et al., 2014). Austin et al. (2013), in agreement with Allen et al., acknowledged resource constraints and budget deficiencies as contributing to the lack of success by project leaders for scope management strategy; however, Austin et al. maintained that the presence of a project management office enhanced the scope management strategy effectiveness of project leaders. The lack of full resources increased the likelihood of scope management deficiencies occurring; furthermore, the need for further research exist in order to shore the link between project management office presence and scope management strategy effectiveness by project leaders (Austin et al., 2013).

Stakeholder engagement. Beringer et al. (2013) maintained that scope management strategy success by project leaders in larger organizations was paramount to the success of project portfolio management and stakeholder management. Beringer et al. identified intensity of engagement of the stakeholders within a project as a key factor to successful implementation of scope management strategy by project leaders, adding more weight to stakeholder management theory. Successful implementation of project portfolio management is important, such as upper level managers will take advantage of resources dedicated to successful project leaders (Beringer et al., 2013). Bhoola, Hiremath, and Mallik (2014) acknowledged stakeholder approval was paramount to the scope management strategy effort by project leaders; however, they cited the key to success was within risk management that encompassed avoidance, transference, mitigation, and acceptance.

Environmental strategies. Environmental necessity within the construction industry is a driver of scope management strategy solutions, especially since most environmental strategies are long-term endeavors (Colmenar-Santos et al., 2015). Holding to an iron triangle approach, Colmenar-Santos et al. (2015) held scope management strategy and knowledge management as important as cost, time, and quality regarding implementing environmental strategies. Cao et al. (2013) acknowledged knowledge management within the context of environmental strategies as an important factor for successful scope management strategy by project leaders.

Qualitative results. Unlike the majority of research on scope management strategy effects, Chowdhury (2015) relied on qualitative results exclusively in order to enhance descriptions of the phenomenon. Chowdhury utilized qualitative data analysis to enhance descriptions of scope management strategy through coding, sorting, sifting, and other data collection techniques. With the enhanced descriptions, Chowdhury attributed more momentum to human factors regarding upper level management involvement and personality attributes of the project leaders after the traditional reasons of communication, leadership, motivation, negotiation, and performance management. Quantitative researchers were highly critical of the work (Chowdhury, 2015); however, increased descriptions of human factors add to a better understanding of project life cycle for scope management strategy (Corabieu & Vasilescu, 2015). Gaps continue to exist in the existing body of literature regarding the link between human factors and project life cycle through scope management strategy by project leaders (Corabieu & Vasilescu, 2015).

Creasy and Anatatmula (2013) mentioned the likely significance of personality traits of project leaders related to the effectiveness of scope management strategy effectiveness, as well as soft skills; however, they acknowledged that more research is needed and the problem remained to be elusive. Cronin (2014) supported qualitative methodologies and case study research for social science problems, such as scope management strategy, but conceded the need for additional research to find reliable solutions to the effectiveness of scope management strategy by project leaders.

Organizational size. DuRandt et al. (2014) noted that the size of the organization is paramount to understanding the extent of ineffectiveness for scope management strategy by project leaders. DuRandt et al. primarily studied small and medium size firms because the scope management strategy issues differed from larger enterprises. Clear and realistic goals were a key element of success (DuRandt et al., 2014). Doloi (2013) supported the idea of unrealistic goals as being a factor to scope management strategy failures; furthermore, maintained key stakeholders as being more important than size of the organization. In other words, if the Chief Executive Operator does not agree with the scope management strategy, the strategy is likely doomed (Doloi, 2013). DuRandt et al. acknowledged the need for more research to delineate unique factors between small and medium size organizations.

Legislation. Erdis (2012) maintained that legislation could detrimentally affect the effectiveness of scope management strategy, especially regarding prices of products and services as well as taxes. New and unforeseen taxes levied during the course of the project, and with loans in the commercial and industrial sectors of construction more difficult to obtain in the post-2008-Great Recession environment, detrimental effects to scope management strategy can occur (Erdis, 2012). Erdis recommended increased contingencies to offset the effects of scope management strategy; however, acknowledged the difficulty of client agreement with increased contingency fees. Gharaibeh (2013) acknowledged unknown legislation factors and taxes could negatively affect a project, especially within the power industry. If cost overruns were excessive,

then the scope management strategy was not effective (Gharaibeh, 2013). Both researchers acknowledged the need for more research to tie legislation changes to ineffective scope management strategy to project leaders.

Change management. Ionescu et al. (2014) maintained that change management is the largest driver of successful implementation of scope management strategy by project leaders. Holding to the golden triangle approach as a foundation, they believed change was necessary to any quality improvement process (Ionescu et al., 2014). For increased success, Ionescu et al. recommended that all aspects of the project require alignment the change management procedures in order to attain success within the organization. Heysegoms, Snoeck, Deene, Goderis, and Stumpe (2013) offered a similar approach to scope management strategy effectiveness through change management; however, they maintained requirements engineering was key to understanding scope management strategy through formal concept analysis. Initial findings through case study research offered promising guidance for further quantitative research for requirements engineering and scope management strategy with change management through formal concept analysis (Heysegoms et al., 2013).

Geographic location. Geographic location can be a major factor of scope management strategy due to the remoteness of the location and the readily and availableness of materials (Kolympiris & Kalaitazndonakes, 2013). Amplification of the geographic location affect exists for small businesses, such as the project leaders may promise to deliver a project on time, but the reality of the situation is geographic location

remoteness or congestion may negatively govern the schedule (Kolympiris & Kalaitazndonakes, 2013). Geographic location results in additional project waste of approximately 2.5% of the budget, with scope management strategy effectiveness detrimentally affected in some cases while at least challenged in others (Kolympiris & Kalaitazndonakes, 2013). Magnusson (2014) acknowledged geographic location as potentially being a detrimental factor to effective scope management strategy by project leaders; however, attributes time of production at the factories or limited supply of materials problems as factors as well. New markets, such as sustainability markets, tend to enhance the problem (Magnusson, 2014). Magnusson (2014) advocated for more research to study the effects of new markets, production, supply, geographic location, and scope management strategy by project leaders.

Key performance indicators. Oyedele (2013) utilized performance management as the major determinant to the effectiveness of scope management strategy by project leaders through the usage of key performance indicators with an aim at assisting private finance initiative for facility management. Oyedele indicated that scope management strategy by project leaders is more successful when established relationships exist between the stakeholders and project leader. Pretorious, Steyn, and Jordaan (2012) maintained a similar approach; however, attributed project success with increased project maturity of the organizations themselves with less of an emphasis on project leaders. When maturity of the project existed, stakeholder and project leaders deemed 46% of all projects successful; however, stakeholders and project leaders deemed only 30% of the

projects successful in the absence of project maturity (Pretorious et al., 2012). Oyedele

(2013) conceded further research to prove a linkage between performance management

key indicators, such as established relationships between stakeholders, the project leader,

and scope.

   Cultural factors. Teller (2013) concentrated on cultural portfolio risk

management with effects to scope management strategy with the goal of achieving

increased project success. Teller maintained that culture was a major factor for scope

management strategy effectiveness, such as project leaders of different cultural

backgrounds might approach the same problem in a completely different manner. The

need for additional research exists to link scope management strategy ineffectiveness to

the cultural backgrounds of project leaders (Teller, 2013). Todorovic, Mitrovic, and

Bjelica (2013) attributed partial blame to the cultural backgrounds of project leaders;

however, this was more than likely related to geographic location as well. In other

words, foreigners were more likely to experience ineffectiveness with scope management

strategy than natives (Todorovic et al., 2013). Todorovic et al. attributed more success

with scope management strategy by project leaders to project-oriented businesses.

Application to Business Practice

   Researchers and professional practitioners used scope management strategies in a

variety of applications and project. Stockton (2015) successfully implemented scope

management strategy for an airport project at Eugene Airport through the engagement of

stakeholders, contingency, and conservative scheduling for Transportation Security

Administration. Stockton acknowledged the stakeholders being exceptionally responsive
to the scope management strategy implemented by project leaders of his architecture and
engineering firm. Molenaar, Javerncik-Will, Bastias, Wardwell, and Saller (2013)
experienced good results for business practice through increased utilization of peer
reviews while emerging with increased effectiveness for scope management strategy
framework within the Army Corps of Engineers. Erdis (2012) barely maneuvered around
crippling potential legislation for some projects while experiencing difficulty with others;
however, the overall success of the scope management strategy by project leaders within
the construction company was positive when clarity was sought after by project leaders
from legislators for new laws effecting construction. Colmenar-Santos et al. (2015)
implemented cost, schedule, and quality measures to assist with scope management
strategy for a Department of Energy project. Their traditional approach in an agile
environment bogged them down regarding scope management strategy effectiveness;
however, obvious economic and operation benefits emerged from the setbacks for future
Department of Energy projects that will make the scope management strategy easier to
implement by project leaders (Colmenar-Santos et al., 2015). Uggla (2013) maintained
increased flexibility within scope management strategy within the engineering sector
through rule-leveraging for scope management strategy and tactical brand portfolio
advantages; furthermore, he increased the understanding of the marketplace signals to
increase the effectiveness of project leaders regarding scope management strategy.

Spalek (2013) was able to increase the effectiveness of scope management strategy by project leaders through the implementation of a project management office as well as increase performance management success and project success rates. Lech (2013) learned from his mistakes within the engineering sector when after the application of time, budget, and functionality constructs in order to increase the effectiveness of scope management strategy initially failed; however, an increased understanding of the process increased the scope management strategy project leadership effectiveness for future endeavors. Khamooshi and Golafshani (2014) utilized schedule monitoring and earned value management for the engineering sector with an agile approach; furthermore, increased the effectiveness of scope management strategy by project leaders with the finalized process being very effective at forecasting the project finish date. Basu (2014) increased the effectiveness of scope management strategy within the engineering sector through the utilization of agreed upon by the stakeholder's project success criteria on the front end; consequently, providing a target with increased effectiveness for project leaders of scope management strategy.

Transition and Summary

In Section 1, I introduced the problem to be addressed, the purpose of the study, the chosen research method and design, and significance of the research. I provided a review of the literature regarding various theories and concepts for the increased effectiveness of scope management strategy by engineering project leaders. I discussed the five tenets of scope management theory in relation to scope management strategy by

project leaders, along with alternative theories. I included a review of business

applications of scope management strategy within the engineering industry.

In Section 2, I discussed my role as the researcher, the chosen research

methodology and design, the sampling method for identifying participants, the sampling

method, and the sample size. I explained the proposed procedures to ensure maintaining

ethical standards, the informed consent process, the data collection process, and the data

analysis process. I described the actions and techniques proposed to ensure

dependability, credibility, confirmability, and transferability as well as attaining data

saturation.

In Section 3, I presented the findings of the study, the emergent themes from the

data collected, and recommendations for business applications. I provided

recommendations for further research, the implications for social change, and my

reflections from conducting the research study. I ended the Section 3 with a concluding

statement.

Section 2: The Project

Section 2 contains the purpose of the case study as well as the role of the researcher. I describe the participants and the selection process in detail along with the population and sampling method. I explain and justify the research method and design and the data organization and collection techniques. I explain how ethical considerations fit into the framework of the data collection process and the proposed plan to ensure credibility, confirmability, dependability, and data saturation.

Purpose Statement

The purpose of this qualitative single case study was to the explore scope management strategies used by some project leaders in the engineering field to improve project success rates. The targeted population was 10 project leaders in an engineering firm in Georgia, because they had implemented scope management strategies to improve project success rates. Civil engineers who successfully implement scope management strategies use sustainable resources, reduce material waste, and engage in water, energy, and natural resources conservation (Russell-Smith & Lepech, 2015; Zuchowski, 2015). People in communities potentially benefit from the findings of this study because of the increased use of sustainable materials, reduced use of water, energy, and natural resources, and an improved local environment. Community organizations might benefit from this study because of the reduced use of water and energy creating long-term cost savings.

Role of the Researcher

The role of the case study researcher is to gather, organize, produce, and evaluate information reasonably (Yin, 1994). In my role as the researcher, I was the primary collector, organizer, and evaluator of the data. The execution of the case study investigation by the researcher does not depend upon control of behavioral happenings, but rather focuses on current events within a contextual setting (Yin, 1994). I focused on collecting data regarding a current real-world phenomenon within a contextual setting. The case study researcher concentrates on asking participants probing, open-ended questions in an interview setting (Mariotto, Pinto Zanni, & De Moraes, 2014). I used probing open-ended questions to collect data from the participants during semistructured interviews.

No personnel or professional relationships existed between the participants and me beyond possible brief encounters at professional association meetings. I had no past or present affiliation with the engineering firm selected from which to recruit participants. The geographic region for the study is Georgia. I reside in Georgia, and have on rare occasion conducted engineering design and project management near the cite in Georgia in which I conducted the research. Scope management strategy implementation occurred at several of my work places, but I have remained open-minded to the phenomenon.

The role of the researcher is to mitigate bias while investigating (Ghosh & Dewanji, 2015). I accomplished this through elevated moral-stature that was paramount

to successful case study research (Ghosh & Dewanji, 2015). Researchers must

comprehend the rationale for conducting the research prior to commencement but not

allow themselves to waver from neutrality in the light of contrary data (Yin, 1994). I

maintained objectivity and neutrality throughout the research process. The researcher

should explain all outcomes of the study, regardless of whether the researcher agrees or

disagrees the findings (Yin, 1994). I objectively presented all the study outcomes and

findings regardless of any personal views. For interview-based case studies, increased

bias is mitigated when the interviewer avoids response bias, bad memory errors, poor

questions, and reflexivity (Yin, 1994). I avoided inserting personal opinions, response

bias, memory errors, ineffective questions, and reflexivity during the interviews. The

majority of researchers utilize the Belmont Protocol Report rules to ensure integrity and

maintain research ethics while following all Institutional Review Board (IRB) protocols

with respect to participant privacy (Adams & Miles, 2013). Adams and Miles (2013)

defined the Belmont Report as the rules for investigation that involves human participants

with respect to respect, kindness, and justice.

Case studies with interviews occur with a conversational make-up and typically

do not involve a very structured foundation of questioning (Yin, 1994). The interviewer

typically asks questions based on the flow of the interview that may change rapidly due

to the interviewer's ideas (Yin, 1994). I developed an interview protocol based on Yin's

(1994) interview protocol (see Appendix A). Researchers use an interview protocol for

consistency before, during, and after the interviews as well as to provide the researcher

with increased descriptions of the phenomena from the participants (Yin, 1994). The rationale for using an interview protocol was to maintain consistency before, during, and after all of the interviews. Researchers strengthen the credibility of the interview data using an interview protocol (Yin, 1994).

Participants

Participant eligibility requirements included experience as a project leader and civil engineer in Georgia. Engineering field project leaders include project managers, project engineers, functional managers, or any position responsible for project management. I did not know the participants. Rossetto (2014) stated none of the participants should be friends, family, or past coworkers for elimination of bias and conflicts of interest. Haahr (2014) found that contacting upper-level managers from a company improved the probability of participation approval and access to pertinent staff. I contacted the principle stockholder of the engineering firm, obtained a signed letter of cooperation and confidentiality agreement (see Appendix B), and sought permission to access project leaders within the company. Upon gaining access to the project leaders, I contacted potential participants through e-mail (see Appendix C) and in-person visits to build a working relationship, sharing the importance of the qualitative research for the engineering and project management sectors. The objective of this study was to gain meaningful descriptions of scope management strategy from engineering project leaders at a firm in Georgia.

The targeted population for the study included 10 engineering field project leaders at a firm in Georgia to which I gained access by contacting the principal stockholder, explaining the purpose of the study and obtaining a signed letter of cooperation and confidentiality agreement (see Appendix B). The participants had to have at least one year of project leadership experience in the engineering field to qualify. Rossetto (2014) explained that engineering industry project managers' experience increased exposure to the scope management strategy phenomenon. When potential participants experience increased exposure to the phenomenon under study, the researcher's ability to identify eligible participants improves (Rossetto, 2014). In this study, engineers contained a strong altruistic motivation for participation in the research. Researchers increase the probability of attaining data saturation using participants who possess the knowledge and experience necessary to answer the research question (Haahr, 2014).

Research Method and Design

Method

The three research methods are qualitative, quantitative, and mixed (Yardley et al., 2013). Qualitative researchers seek to discover the deeper meaning of a phenomenon through open dialog with participants (Kahlke, 2014). I selected the qualitative method to discover the deeper meaning of a contemporary phenomenon through open dialog with participants. Researchers obtain enhanced descriptions and explanations of phenomena through qualitative research using the open questioning format (Kahlke, 2014).

Quantitative researchers use statistical analysis of numeric data to test hypotheses regarding relationships between variables (Kahlke, 2014). Testing the significance of relationships and correlations is a process used by researchers conducting a quantitative research study (Grootel et al., 2017). Quantitative research is appropriate for the determination of trends (Gardner et al., 2017). I did not collect numeric data for statistical analysis to test hypotheses among variables or sought to expose the significance of relationship among variables; therefore, I rejected the quantitative method.

Mixed-methods research includes both a qualitative element and quantitative element (Kahlke, 2014). Mixed-methods research is not appropriate when there are no significant quantitative relationships present with the variables used (Sligo, Nairn, & McGee, 2018). With no empirical-conceptual linkages present, the mixed method is not a good choice of research approach (Tunarosa & Glynn, 2017). To answer the research question, I did not use the quantitative method in conjunction with the qualitative method; therefore, I rejected mixed method for this study.

Obtaining *how* and *why* descriptions of scope management strategy at an engineering firm in Georgia, was more suited for qualitative research because the firm represents an identified situation (Yin, 2014). For example, I sought to determine how and why scope management strategy issues occur at an engineering firm in the civil engineering industry and the strategies employed. An advantage exists for qualitative over quantitative analysis in this case because quantitative approaches occur with or

without statistical significance, whereas a case study offers an abundance of ways to

formulate and analyze the situation (Milojevic, Sugimoto, Lariviere, Thelwall, & Ding,

2014). I did not concentrate on specific variables or numeric data but on gaining rich

insight into a phenomenon through open dialog with participants.

Research Design

I considered four research designs: (a) phenomenology, (b) ethnography, (c)

narrative inquiry, and (d) case study. Case study researchers try to enhance the

descriptions of the phenomenon through the focus on the how and why; furthermore, case

studies contain boundaries unlike the seemingly limitlessness of phenomenological

research (Applebaum, 2012; Yin, 2014). I chose the case study design to explore a

phenomenon within the limited boundaries of an engineering firm.

Phenomenological researchers describe similarities and differences (Kumar,

2012). The investigators search within the broader phenomenon through the lived

experiences of participants (Kumar, 2012). Phenomenology was not appropriate because

I did not collect data regarding the lived experiences outside of the boundaries of the

specific engineering firm. Advantages for case study exist over phenomenological

qualitative research through a concentration on the how and why, as well as less

dependence on saturation (Moustakas, 1994).

Business researchers use ethnographic research to concentrate on cultural aspects

of the studied (Moustakas, 1994). An ethnographic design for the study was not

appropriate because I did not focus on the cultural aspects of engineering firms. Cultural

attributes worthy of study exist at the engineering firm; however, this was not the focus

of this study. I also did not choose a narrative inquiry design. A narrative design entails

spoken or written text or illustrations of participant's stories (Moustakas, 1994). There

were no written texts or illustrations present that were studied, and I did not focus on

participants' stories; therefore, a narrative inquiry was not appropriate.

Scope management strategy occurs in the business sector but remains rare with

engineering firms. Oftentimes, researchers choose a common single case design because

of the potential for producing enhancements to numerous phenomena not previously

considered (Teli, Bordin, Menendez Blanco, Orabona, & De Angeli, 2015). I excluded

the revelatory case because the situation does not represent a previously untapped

phenomenon inaccessible to qualitative or quantitative analysis (Yin, 2014). The extreme

case does not fit for the company chosen because the firm is not that far from the norm

(Johansson, 2015). The critical case was not appropriate because I did not set out to

prove or disprove any theory (Yin, 2014). Finally, I excluded a longitudinal case because

no expectation of changing of the situation over time existed (Yin, 2014).

Data saturation occurs when the participants share no new experiences (Yin,

2014). Data saturation can occur using as few as three participants (Yin, 2014). I

reached data saturation when I was not finding out anything new or unique in the

experiences shared by the engineering project leaders regarding scope management

strategy. Investigators and researchers achieve data saturation for reliable dependability,

credibility, and confirmability of the findings (Fusch & Ness, 2015; Tibben, 2015; Yin,

2014). Fusch and Ness (2015) believed that data saturation occurs when further

collection efforts during investigation yield no different information, themes, patterns,

codes, or craft to initiate an added characteristic interpretation. Yin (2014) stated that

research should stop when the saturation point occurs; that is, when no opportunity exists

to gather new data. I collected data until no new information, themes, patterns, codes, or

opportunities for additional interpretation appeared in the descriptions. Using a case

study design, investigators derive data saturation through participant interviews,

methodological triangulation, and member checking (Fusch & Ness, 2015; Yin, 2014). I

conducted 30–45 minute semistructured, face-to-face interviews, engaged the participants

in 20–30-minute member checking sessions, and asked follow-up questions as needed to

ensure I accurately understood the participants' responses and intent. The member

checking and follow-up questions were to confirm the interpreted summary of the

interview transcripts as well as to seek enhanced data and review corporate documents to

attain data saturation. I continued information gathering until further efforts resulted in

redundancy.

Population and Sample

The targeted population consisted of 10 project leaders within an engineering firm

in Georgia who implemented scope management strategies to improve project success

rates. Researchers use purposeful sampling to choose participants who meet specific

eligibility criteria and who possess the knowledge needed to answer the research question

(Palinkas et al., 2015). Purposeful sampling is means researchers use to narrow the larger

targeted population to the sample population (Wallace & Sheldon, 2015). Researchers use purposeful sampling to satisfy eligibility attributes of the participants more effectively in conjunction with experience parameters (Duan, Bhaumik, Palinkas, & Hoagwood, 2015). I used purposeful sampling to identify participants who met the eligibility criteria and possessed the knowledge needed to answer the research question. I purposefully selected participants, narrowing the targeted population to the sample population.

Researchers should avoid the use of census, snowball, or convenience sampling when the number of people in the targeted population exceeds the sample population, when maintaining confidentiality is a requirement, and when participants must meet specific eligibility criteria (Hamilton et al., 2018; Kavoura & Bitsani, 2014). Census sampling is the investigation of each participant within a population; therefore, not appropriate when the targeted population exceeds the number of people needed in the sample population (Wallace & Sheldon, 2015). In some cases, the use of census sampling requires going beyond the point of data saturation (Wallace & Sheldon, 2015). Researchers who use snowball sampling allow one or more participants to identify other participants; therefore, expose participants to a potential loss of confidentiality (Duan et al., 2015). Convenience sampling is not appropriate when participants must meet specific eligibility criteria for participation in a study (Hamilton et al., 2018). Therefore, I did not use census, snowball, or convenience sampling because the number of people in

the targeted population exceeded the sample population, maintaining confidentiality was a requirement, and the participants needed to meet specific inclusion criteria.

The sample size for this study was three participants from a targeted population of 10 project leaders in an engineering firm. Researchers justify a sample size through a review of comparative studies (Mirza et al., 2013). Mirza et al. (2013) conducted qualitative case study research using a sample size of three participants. Violante and Vezzetti (2014) conducted a multiple case study of three firms, collecting interview data from three project leaders at each firm. Basu (2014) studied the phenomenon of project management of project leaders within the engineering industry at one firm, using three participants as the sample size. Because my study was similar to the research conducted by Mirza et al., Violante and Vezzetti, and Basu, three participants was an appropriate sample size.

Fusch and Ness (2015) stated that data saturation occurs after subsequent information gathering by the investigator provides no new data, themes, patterns, codes, or function to investigate in additional data. Yin (2014) noted that investigating should stop when the data saturation threshold of no new information occurs. I gathered information until no new data, themes, patterns, codes, or situations for subsequent analysis occurred. Researchers using a qualitative case study approach attain data saturation through interviews, member checking, and a review of relevant documents (Fusch & Ness, 2015; Yin, 2014). I used 30-45 minute semistructured face-to-face interviews, asked follow-up questions during the interviews, engaged the participants in

20-30 minute sessions for member checking in order to verify the interpreted summary of the interview transcripts, and review company documents regarding improved project success rates because of scope management strategy implementation to attain data saturation.

The interviews and reviewing company documentation occurred at an engineering firm in Georgia. Conducting interviews onsite increased the likelihood of observing the actual phenomenon (Wallace & Sheldon, 2015). I obtained permission to conduct on-site interviews and access company records through the principle owner signing a letter of cooperation and confidentiality agreement (see Appendix B). Pretorius, Bailey, and Miles (2013) noted the need for alignment between the interview questions and the central research question, and the use of an interview protocol to maintain consistency throughout the data collection process. I used interview questions that aligned with the overarching research question for this study and used an interview protocol (see Appendix A).

Ethical Research

An informed consent form for each participant was ethically appropriate and was required for most research involving human subjects (Elger, Handtke, & Wangmo, 2015). I e-mailed the participants an invitation-to-participate using an e-mail script and attached a copy of the informed consent form. Participants provided informed consent through responding to an invitation-to-participate e-mail with the words *I consent* or by signing the informed consent form just prior to start of the interview. Each participant could have

withdrawn from the study at any time for any reason without having to contact me.

Participants received no incentives or compensation for participating; participation was

strictly voluntary. I provided a copy of the study to the participants via pdf format once

published. Researchers coded the names of participants and organizations to remove

personal and company identifiers for confidentiality purposes (Elger et al., 2015). I

addressed the need for confidentiality by protecting the names of the participants and

placing all study data and files in a locked case at my home for up to 5 years.

Researchers must protect the confidentiality of the participants as well as maintain all

data and files in a secure location (Caplan, Korn, Langdon, & Stebbins, 2012). I referred

to the engineering company as Company 1. I coded participants' names as P1A, P1B,

and P1C. I obtained approval to collect data from the Walden University prior to

engaging in any data collection efforts. The Walden University IRB approval number

was 04-23-18-0460014.

Data Collection Instruments

In this qualitative case study research study, I was the primary data collection

instrument. In conducting a qualitative research study, the researcher is the primary data

collection instrument (Pae, Freeman, & Wash, 2014). Researchers conducting case study

research often use semistructured interviews as a data collection instrument (Elger et al.,

2015; Pae et al., 2014; Yin, 2014). I used semistructured, face-to-face interviews as a

data collection instrument to explore the scope management strategies project leaders

used to improve project success rates. The use of an interview protocol occurred to ensure a consistent process before, during, and after the interviews (see Appendix A).

Researchers audio record interviews to enhance correct interpretations of the participants' responses (Pae et al., 2014). However, the main reason a researcher records the interviews is to be able to transcribe the participants' responses more accurately after the interview (Crozier & Cassell, 2016). Investigators enhance the accuracy of the transcription through audio recordings of the participants' responses to the interview questions (Elger et al., 2015). I audio recorded the interviews for the ability to accurately transcribe the participants' responses. Researchers transcribe the interviews for interpretation, analysis, and in preparation for creating an interpreted summary for member checking purposes (Bruce-Low et al., 2013; Pae et al., 2014). I transcribed the interviews verbatim from the audio recordings to create an interpreted summary of the participants' responses for member checking purposes.

Researchers using semistructured interviews improve the validity and reliability of the data collection instrument through member checking (Crozier & Cassell, 2016; Pae et al., 2014). In member checking, the researcher meets again with the participants for validation of the researcher's interpretations, and for the researcher to gather additional information (Elger et al., 2015). Researchers use member checking to increase the accuracy, credibility, dependability, and confirmability of the data (Crozier & Cassell, 2016). I met with the participants again for member checking in which they validated the

accuracy of my interpretations of their interview responses. I sought additional

information from the participants during the member checking sessions.

Researchers conducting a qualitative research study who seek to collect data from

multiple sources use company documentation or archived records as a data collection

instrument (Elger et al., 2015; Pae et al., 2014; Yin, 2014). I used document review as a

data collection instrument. I reviewed company documents, such as budget reports,

project completion reports, scope management implementation documents, and company

records regarding project success rates. I gained access to the company documents

through the principle stockholder signing a letter of cooperation and confidentiality

agreement (see Appendix B). Researchers use the review of documents to validate the

data collected from participants during interviews (Yin, 2014). I used the data collected

from document review to validate the interview data.

Data Collection Techniques

Researchers conducting a case study must collect data from multiple sources to

engage in methodological triangulation (Yin, 2014). Semistructured interviews and

document review are two data collection methods commonly used by researchers using a

case study design (Elger et al., 2015; Pae et al., 2014; Yin, 2014). I collected data

through semistructured, face-to-face interviews and a review of company documents. I

obtained approval from Walden University's IRB before commencing data collection.

The data collection techniques regarding the semistructured interviews begin with

following an interview protocol (see Appendix A). I met the owner of the engineering

firm in Georgia, explained the purpose of the study, and obtained permission to collect

data from the company through the owner signing a Letter of Cooperation and

Confidentiality Agreement (see Appendix B). I assessed the 10 project leaders within the

targeted population based on the eligibility criteria and used purposeful sampling to

narrow the targeted population to the sample size of three. I e-mailed the participants an

invitation-to-participate using an e-mail script and attach a copy of the informed consent

form. Participants provided informed consent through responding to an invitation-to-

participate e-mail with the words, *I consent,* or by signing the informed consent form just

prior to start of the interview. The interviews took place in a conference room at the

engineering firm's primary office or another mutually acceptable neutral location.

I greeted the participants before beginning the interview, ensured that I had their

informed consent, and notified them that I would be recording the interview. Researchers

audio record the participants' responses to interview questions for transcription,

interpretation, and analysis purposes (Crozier & Cassell, 2016; Pae et al., 2014; Yin,

2014). I reminded the participants that their names as well as the name of the company

remained confidential. Researchers must protect the confidentiality of the participants to

minimize the risks of participating in a research study (Caplan et al., 2012). I asked each

participant the same open-ended interview questions, took reflexive notes to document

observations and nonverbal communications, and asked probing, follow up questions for

additional clarification and information. I explained the member checking process and

scheduled a follow up meeting with each participant to verify the accuracy of an

interpreted summary of the interview responses. Researchers engage in member

checking to allow participants an opportunity to validate a summary of their interview

responses and to collect additional information in pursuit of data saturation (Fusch &

Ness, 2015; Pae et al., 2014; Tibben, 2015). I thanked participants for their time,

information, and contribution.

Company documents and records are a valuable source of data for researchers

conducting case study research (Elger et al., 2015; Pae et al., 2014; Yin, 2014). The data

collection techniques for document review begin with obtaining permission to access

company records. I gained access to the company documents through the principle

stockholder signing a letter of cooperation and confidentiality agreement (see Appendix

B). I reviewed company documents relevant to the successful implementation of scope

management strategies, such as budget reports, project completion reports, project

success reports, and scope management documents. The review of the company

documents took place in a conference room at the engineering firm's primary office.

The advantages of using a semistructured interview format is the researcher is

able to gather rich data through open dialog with participants, ask probing, follow up

questions, and discover the deeper meaning of a phenomenon (Fusch & Ness, 2015;

Kahlke, 2014; Yin, 2014). Researchers obtain enhanced descriptions and explanations of

phenomena from participants through using the semistructured interview format (Kahlke,

2014). Disadvantages of using semistructured interviews include the researcher's

reliance on the participants' knowledge for data instead of empirical facts, participants

might offer inaccurate or incomplete information, and the process is time consuming (Denscombe, 2014; Pae et al., 2014; Yin, 2014). Another disadvantage is a researcher might compromise the data collected through semistructured interviews through allowing personal biases to steer the participants' responses (Rowlands, Waddell, & Mckenna, 2015). Researchers mitigate biases through remaining neutral during the interviews, using an interview protocol, and using member checking to allow the participants an opportunity to validate their responses and provide additional information (Fusch & Ness, 2015; Rowlands et al., 2015; Yin, 2014).

The advantages of using document review include the researcher collects data from company records to validate or refute interview data, avoids a reliance on a single source of data, and improves the credibility of the findings (Elger et al., 2015; Pae et al., 2014; Yin, 2014). Another advantage of using document review is the process is inexpensive (Denscombe, 2014). Disadvantages of using document review are the company records might be incomplete or inaccurate, gaining access to specific documents needed might be difficult, and business owners might not allow a review of proprietary information (Denscombe, 2014; Rowlands et al., 2015; Yin, 2014).

Researchers use member checking to ensure the credibility and dependability of the data and the findings (Crozier & Cassell, 2016; Yin, 2014). In member checking, participants have the opportunity to confirm or dispute the researcher's description and interpretation of their interview responses (Pae et al., 2014). Bruce-Low et al. (2013) found that member checking was an excellent means to follow up with participants to

validate the researcher's interpretation as well as gain additional information. I engaged

the participants in member checking to improve the credibility and dependability of the

data and the findings. I transcribed the interview responses, created an interpreted

summary of each interview transcript, and met each participant again for member

checking. I asked the participants to validate the interpretation of their interview

responses and sought additional information from the participants to help attain data

saturation.

A pilot test is a small-scale study to validate the processes and procedures for a

subsequent, larger study (Yin, 2014). After IRB approval, no need existed to conduct a

pilot study for a limited scope case study (Bruce-Low et al., 2013). Because I

conducted a limited scope case study, I did not conduct a small-scale pilot study to test

the research procedures.

Data Organization Techniques

Researchers use Excel spreadsheets, journals, notes, and transcripts in order to

keep track of information gathering (Chowdhury, 2015). Chowdhury (2015) noted that

researchers use cataloging, labeling, coding, and sorting to increase the efficiency in

organizing data. Cataloging and labeling assist with efficient organization of the

qualitative data (Bruce-Low et al., 2013). Effective data coding occurs through the

double-checking of the audio recordings (Neal, VanDyke, & Kornbluh, 2015). I coded

the information gathered adequately through the double-checking of the audio interviews.

Chowdhury (2015) noted the importance of maintaining locked and secured storage of all

research files and documents. I maintained secured and locked storage of all

investigation data and documents. Researchers maintain a log to denote the times and

days when the research occurred (Chowbury, 2015). I kept a research log for the logging

of time and day when the data collection occurred. Reflective journals provided a way

for the researcher to describe the recorded data as well as any ideas or important aspects

drawn from the questioning (Chowbury, 2015). In addition to a reflective journal that I

kept, I will keep all data pertaining to the study in a locked case located in my home

office for up to 5 years to assure confidentiality. After 5 years, I will delete electronic

data files and shred paper copies of research files.

Data Analysis Technique

Yin (2014) noted that researchers increase the credibility and confirmability of the

date through methodological data triangulation. I collected data from multiple sources

and used methodological triangulation to demonstrate credibility and conformability.

Data sources for this study are semistructured interviews and a review of company

documents pertaining to the implementation of scope management strategies and project

success rates within the engineering firm.

Compiling Data

The use of multiple information sources increases the likelihood of a complete

understanding of the events or experiences (Carter, Bryant-Lukosius, DiCenso, Blythe, &

Neville, 2014). Researchers conducting a case study use participant interviews and

documentation, such as audio recordings, as primary sources of compiling data used for

triangulation (Carter et al., 2014; Frels, 2013). Yin (2014) recommended compiling data collected from participant interviews and relevant company documents prior to disassembly and analysis. I compiled the interview and company documentation data into folders in Excel and then into Nvivo 10 for theme categorization.

Disassembly, Reassembly, and Software Plan

Yin (2014) noted that interviewers should not ask questions contain predjucical statistics. Avoiding interview questions with biased data increases the credibility of the research (Zahay, Hajli, & Sihi, 2017). Therefore, I avoided asking interview questions that contain prejudicial statistics. The disassembly of the information gathered during the interview process enhances the effectiveness of depicting accurate data (Mello, Ventura, & Dantas, 2015). Furthermore, I disassembled the data collected from subject interviews and adequate company information.

The reassembly of the data assists with pinpointing mistakes or errors within the interview process (Efthymiou, Papadakis, Papastefanatos, Stefanidis, & Palpanas, 2017). Therefore, I reassembled the disassembled data while paying close attention to finding errors. The reassembly of the disassembled information results in enhanced insight of the descriptions gathered from the participants (Wang, Ho, Wu, & Cheng, 2014). Furthermore, I reassembled the information for increased insight into the descriptions procured from the participants. Reassembly of the data is paramount to the increased effectiveness of the interpretation process (Zahay et al., 2017). Consequently, I reassembled the information to increase the effectiveness of the data interpretation.

The only software planned on for the qualitative analysis is Excel and NVivo 10. First, I use NVivo10 software for coding, portrayal of subjects, idea-formulation, and organization for disassembly and reassembly (Yin, 2014). Then, Excel is used to increase objectivity through data organization, and newly discovered phenomena if found leads to further discussion (Sanders & Woodward, 2014). The structuring of information through NVivo 10 allows a framework from which researchers can perform adequate qualitative data analysis, confirm data saturation, and interpret the data (DeFranco & Laplante, 2017). Finally, software, such as Excel and Nvivo, increase the effectiveness of data organization (Lee & Stvilia, 2017). I utilized Excel and NVivo 10 for qualitative analysis for disassembly, reassembly, for increased data organization, as well as NVivo 10 for data analysis and the interpretation of the information gathered.

Interpreting Data and Key Themes

I compared emergent key themes from data analysis with the literature that includes the most current of studies since the beginning of the study. Yin (2014) utilized a similar approach for comparing literature to more modern frameworks. For example, Eller, Lev, and Feurer (2013) identify key components and identify possible correlations and relationships. Eller et al. utilized the documentation information primarily with some interviews to pinpoint the major themes. Neal et al. (2015) pointed out the possibility of new phenomena and relationships through the review of audio recordings. Researchers gain meaning and narrative derivatives from the grouping and sequencing of reassembled information (Eller et al., 2013). Therefore, I utilized grouping and numbering of the

reassembled data to gain meaning interpretation and narrative derivatives through the interviewing of the participants. Methodological triangulation utilization during information gathering and corporate documentation for interviews increase the effectiveness of descriptions from participants (Neal et al., 2015) Furthermore, I used methodical triangulation through the course of obtaining data and company documentation during the scope management strategy interviews to elevate the effectiveness of the descriptions provided by the participants.

Reliability and Validity

In qualitative research, researchers seek dependability, creditability, transferability, and confirmability with strength and flexibility instead of reliability and validity (Darawsheh, 2014). Darawsheh (2014) noted that researchers avoid subjectivity and improve the quality of their study by utilizing sound dependability, credibility, transferability, and confirmability constructs. I sought dependability, credibility, confirmability, and transferability through the measures that follow.

Dependability

Dependability is the ability of the researcher, reader, and future researchers to rely on the constructs of a study as well as the references and data sources (Amankwaa, 2016). Increased dependability occurs through enhanced reliability and validity measures (Amankwaa, 2016). Elevated dependability leads to increased trustworthiness by researchers (Amankwaa, 2016). Dependability is an important part of quality assessment, especially within a reliability and validity framework (Yin, 2014). Researcher conduct a

dependability assessment through the documentation of assessments by recording the

participants' background and experience and using proven interview techniques

(Hammoum, Bouzelha, Ait Aider, & Hannachi, 2014). Yin (2014) noted that the use of

proven interview techniques improves dependability of the data and the findings. I

conducted a dependability assessment through documentation of the participants'

knowledge and experience related to the research question, quality of data evaluation, and

procedures used throughout the data collection process. For instance, the project leaders

will have at least one year of experience as a project leader in the engineering field. I

used semistructured, face-to-face interviews to collect rich and dependability data.

Researchers conducting a case study use transcript reviews and member checking to

allow participants the opportunity to identify errors and inconsistencies and verify the

accuracy of the interpreted summary of the interview data (Hammoum et al., 2014). I

engaged the participants in 30-45-minute member checking sessions to ensure

dependability of the interview data.

Credibility

Credibility is the attribute of being trustworthy or dependable (Tibben, 2015).

Increased credibility occurs with enhancements in reliability, validity, dependability, and

trustworthiness (Tibben, 2015). Furthermore, elevated credibility occurs with the

inclusion of adequate data saturation by researchers for the studied phenomena (Tibben,

2015). Yin (2014) noted that credibility of the findings improves when participants

verify the accuracy of the collected and interpreted data. Researchers use member

checking to allow the participants to verify the accuracy and completeness of the interpreted interview data (Cronin, 2014). To ensure credibility, I used member checking to address the findings from the perspective of the participants. I prepared an interpreted summary of the transcribed interviews, met again with the participants, and sought validation of the accuracy and completeness of the interpreted summary.

Confirmability

Social scientists criticized qualitative research for not being as reliable as quantitative research; therefore, confirmability was paramount to the validity of the described experiences of the participants from interviews (Cope, 2014). Confirmability was the level to other researchers test the conclusions and results of a study (Amankwaa, 2016). Connelly (2016) stated that increased trustworthiness by researchers occurs through improved confirmability. Enhanced confirmability occurs when the researcher maintains meticulous notes, journals, transcripts, and recordings of the interview data, and engages the participants in member checking (Connelly, 2016). The researcher must adhere to strict ethical standards, such as maintaining the participants' privacy and confidentiality, otherwise reductions in trustworthiness occurs (Connelly, 2016). Verifying interview responses through methodological data triangulation is a recognized approach for demonstrating confirmability (Yin, 2014). For example, a researcher confirms interview responses with documentation (Houghton et al., 2013). I ensured confirmability of the result of the study through (a) meticulous maintenance of notes, journals, transcripts, and recordings; (b) maintaining participants' confidentiality; (c)

engaging participants in member checking to verify the interpreted summary of the interview transcripts; and (c) engaging in methodological triangulation to confirm the interview data with documentation, such as functional manager accounts, budget records, and project accounting records.

Transferability

Amankwaa (2016) defined transferability as the ability of another researcher to utilize the research for further investigation into the specific studied phenomenon. Transferability occurs through linkages to the readers and the possibilities of further investigation by future researchers (Yin, 2014). Welch and Piekkari (2017) stated that increased transferability occurs through enhancements in confirmability, dependability, and credibility. Houghton et al. (2013) noted that transferability of the findings improves when the researcher engages in meticulous documentation of the data collection processes, adheres to a strict interview protocol, and attains data saturation. I sought transferability of the findings by future researchers to other cases and settings through (a) ensuring credible and confirmable findings; (b) adherence to a strict interview protocol (see Appendix A); (c) meticulous documentation of each step of the data collection, interpretation, and analysis process; (d) engaging participants in member checking; and (e) attaining data saturation.

Data Saturation

Researchers conducting a qualitative case study must attain data saturation to ensure the dependability, credibility, and confirmability of the findings (Fusch & Ness,

2015; Tibben, 2015; Yin, 2014). Fusch and Ness (2015) noted that data saturation occurs when further data collection efforts by the researcher yields no new information, themes, patterns, codes, or ability to engage in additional data interpretation. Yin (2014) held that interviewing should cease when the saturation point occurs; furthermore, when no opportunity exists to gather new data. I collected data until no new information, themes, patterns, codes, or opportunities for additional interpretation existed. Using a case study design, researchers attain data saturation through participant interviews, member checking, and methodological triangulation (Fusch & Ness, 2015; Yin, 2014). Researchers seek additional information during member checking sessions to help attain data saturation (Tibben, 2015). I conducted semistructured face-to-face interviews, asked follow-up questions during the interviews, and engaged the participants in 30-45-minute member checking sessions to confirm the interpreted summary of the interview transcripts as well as to seek new information, and review company documents to attain data saturation. In the event that new data emerges from the third interviewee, I purposefully selected additional participants from the targeted population and continued interviews until reaching data saturation. I continued data collection until further efforts result in redundancy.

Transition and Summary

In Section 2, I restated the purpose of the case study, explained my role as the researcher, and described the participants and the selection process along with the population and sampling method. I explained and justified the research method and

design, the sample size, and the data organization and collection techniques. I discussed

how ethical considerations fit into the framework of the data collection process, the

proposed data analysis procedures, and the proposed plan to ensure credibility,

confirmability, dependability, and data saturation.

In Section 3, I present the findings of the study, provide several applications for

professional practices, and present the implications for social change. Section 3 also

contains several recommendations for action that emanate from the findings of this study,

recommendations for further research, my reflections of the research process, and a

concluding statement to finalize the study.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this qualitative single case study was to explore scope management strategies used by some project leaders in the engineering field to improve project success rates. To investigate effective scope management strategies by civil engineering project leaders that increase project success rates, I interviewed three civil engineering project leaders with at least one year of experience leading projects. I conducted semistructured in-person interviews. I obtained and reviewed supporting documents including a government drainage project proposal (SD1), a government peer review proposal (SD2), and a government proposal for third-party review (SD3). I linked the findings to Fayol's (1917) original scope management strategy theory. I identified three themes from the participants' responses to the interview questions. The three themes were client management strategy, schedule adherence strategy, and communication strategy. The three themes were the scope management strategies project leaders used to improve project success rates.

Presentation of the Findings

The purpose of the qualitative case study was to answer the overarching research question: What scope management strategies do some project leaders in the engineering field use to improve project success rates? I performed three interviews of civil engineering project leaders with at least one year of experience leading projects. All three of the participants agreed to audio recordings of the interviews and follow up

meetings for the member checking sessions. I transcribed the interviews, compared the transcriptions once again to the audio recordings, prepared an interpreted summary of the participants' responses, and met once again with the participants for member checking. All of the participants agreed to the accuracy of my interpretation. After the member checking session and the confirmation of the participants' responses using the supporting company documents, I noted a redundancy in the data and therefore determined that I had reached data saturation. I uploaded the transcriptions and my interpreted summary of the participants' responses to NVivo 11 to complete coding, data analysis, and the emergence of themes.

Three themes emerged as scope management strategies extensively utilized by all three project leaders to improve project success rates from the analysis of the participants' responses to the interview questions and the supporting documentation obtained from Company 1. They are:

- client management strategy used by the project leaders as a scope management strategy to improve project success rates,

- schedule adherence strategy used by project leaders throughout the project as a scope management strategy to increase endeavor success rates, and

- communication strategy used by the project leaders as a scope management strategy to raise project success rates.

Theme 1: Client Management Strategy

The first theme that emerged from the analysis of the data was that project leaders used a client management strategy to improve project success rates. Kula, Ouni, German, and Inoue (2018) pointed out the importance of successful client management for increased project success rates in the engineering field. This finding confirms the findings of Allen et al. (2014) in that project leaders use a client management strategy as a scope management strategy to improve stakeholder satisfaction and raise project success rates in the engineering profession. All participants noted that the strategic advantages of taking care of the clients were improved client satisfaction and increased project success rates. With the review of participant responses and supporting documents, client management strategy occurred through different approaches by the project leaders. Emergent subthemes of client management strategy were scope of work, client relationship, additional service fees, and timely response to inquiries by the client.

Scope of work. All three participants stated the importance of the scope of work within their client management strategy. I used company documents SD1, SD2, and SD3 to support the scope of work as a subtheme of client management strategy. The participants noted that the client receives, signs, and certifies these documents prior to commencement of work. The project leaders clearly defined the scope of work in SD1, SD2, and SD3. P1A discussed that client management strategy was the process of defining boundaries for the scope of work when writing a proposal for the client, with the clients' needs measured with the scope of work limits; however, the scope of work had to

be limited through the quality of work the client was willing to pay for. P1A stated, "The current scope of work formulators would do the organization and client justice by seeking out the opinion of the project leader conducting the day-to-day civil engineering work in regard to scope management strategy increasing project success rates." Beringer et al. (2013) noted a similar effect for the need to listen to engineering project leaders conducting the day-to-day work to maintain projects within budget, schedule, and project portfolio management constructs. Melian-Gonzalez and Bulchand-Gidumal (2017) noted the importance regarding client management of clearly defining the scope of work prior to commencement of a project.

P1B discussed that the scope of work was something that clients do not satisfactorily comprehend even when clients think they do; therefore, any ambiguity within the scope of work for scope management strategy to increase project success rates by the project leader will negatively affect the client management strategy. P1B stated, "It's paramount to begin with a clear and succinct scope of work after the client has issued a request for proposal." This finding confirms Thakurta (2013) in that project leaders who concentrate on the scope framework of a project improve their client management strategy. This finding confirms Koch and Salterio (2017) who noted a correlation between defining the scope of work and managing client expectations.

P1C noted the relationship between a client management strategy and scope of work with the firm's scope management strategy to elevate project success rates through project leaders engaging in a scope negotiation process with the client. P1C stated, "The

client will attempt to increase the engineering firm's liability through clauses in the scope

of work; however, the State of Georgia typically sides with the engineers on this issue

due to statutes protecting engineers in regard to indemnification." This finding confirms

Russell-Smith and Lepech (2015) who noted that scope management strategy by project

leaders for improved project success rates occurred through limiting liability through the

required government regulations in statutory form. However, some government entities

do not provide liability protections for professional civil engineers. Di Corato, Dosi, and

Moreto (2018) discussed that liability costs for engineering professionals continues to

rise, outpacing inflation. Di Corato et al. advocated for government entities limiting the

engineer's liability to the client for improved client management strategy and scope of

work efficiency.

     Service fees. Additional service fees emerged as a subtheme from all three

participants, as well as clauses included in documents SD1, SD2, and SD3 for additional

service fees. P1A advocated the need for additional service fees when the scope

management strategy by project leaders changed over the course of the project, and

typically affected the project by prolonging the schedule and increasing the budget. This

finding confirms Lech (2013) in that Lech examined a similar approach of additional

service fees being an important part of client management strategy but discussed

functionality of schedule and budget rather than scope management strategy by project

leaders. This finding also confirms Mazza and Azzali (2018) in that project leaders

deemed additional service fees to be an important part of client management strategy in the engineering field in terms of the scope of work.

P1B did not think additional service fees to be an important part of the client management strategy process as long as the scope of work was well written by the project leaders. P1B stated, "If the project leader moves away from a clear and well understood scope of work for client management strategy, additional service fees will then be a factor, when under normal circumstances they would not be." P1B also discussed how additional service fees decrease with a succinct scope management strategy and an accurate scope of work by the project leaders. This finding confirms Mazza and Azzali (2018), who noted that project leaders reduce the need for additional service fees when they write a scope of work that includes the most accurate of expected scenarios. This finding also confirms Thakurta (2013) in that a poorly developed scope management strategy by a project leader causing additional service fees could negatively affect the client management strategy and the project's budget and schedule.

P1C believed the additional service fees to be an important part of client maintenance through a well-constructed scope of work in the proposal. However, P1C was under the impression that Company 1's value-based contracts eliminated most scenarios where additional service fees could take place; however, P1C advocated keeping additional service fees in the contract framework for the client. This finding confirms Doloi (2013) in that cost overruns occurred because the additional service fees in contracts were an important part of the scope management strategy by the project

leader for the client and affected project success rates in a negative fashion. Lin, Mitra, and Hakjoon (2017) observed a similar situation in that reducing additional service fees through effective implementation of scope management strategies increased project success rates.

Timely response. Timely response to the client's needs arose as a subtheme for project leaders implementing scope management strategies for increased project success rates in the client management paradigm. All three participants discussed timely response as being an important factor of client management. I substantiated the subtheme of timely response with the supporting documentation of SD1, SD2, and SD3 for submissions and permits. P1A observed that response times improved with the use of *Simply File* in Outlook, which project leaders use as a means for automatic filing of incoming and outgoing e-mails to specific client files. A reduction of time the project leader spends filing occurred instead of dealing with situations that arose with the client. P1A stated that responding within 24–48 hours and meeting deadlines are very important. This finding confirms Khamooshi and Golafshani (2014) in that timely response to a client's needs was an important part of client management strategy, as well as performance and schedule management in the scope management strategy of project leaders to increase project success rates. A similar effect was identified by Dong, Robinson, and Xu (2017) for the timely response of a client's needs as part of client management in the scope management strategy during contract formulation and afterwards.

P1B thought timely response to a client's needs as a part of client management strategy was paramount to all things that a project leader does in the scope management strategy to improve project success rates. P1B stated, "Simply File within Outlook helps a great deal, but timely response to clients within 24–48 hours, if not the same day, or within a few hours, is valued more by the client whether it be answering e-mails, phone calls, and other forms of correspondence. Key challenges to implementing scope management strategy to improve project success rates were addressed through timely response to the client's needs at the very least within 24–48 hours. Taking a week to get back to somebody is unacceptable." This finding confirms Cao et al. (2013) in that timely response was an important attribute of a client management strategy in the scope management strategy for increased project success rates by project leaders. Pop et al. (2018) acknowledged that the use of technology assists tremendously with timely response to clients' needs in client management strategy and scope management strategy by the project leaders for improved project success rates. Furthermore, Pop et al. stated that project leaders used technology for improved timely response within smart energy grids controls featured in building projects. This finding indicates that civil engineering project leaders can utilize technology to assist with additional gains in timely response to clients, as well as other useful tasks that need time reduction. This extends the knowledge of the discipline and opens up areas for further research.

P1C held timely response as being a factor of client management strategy in the scope management strategy by project leaders phenomenon; however, P1C did not feel

that client management strategy was the most important factor for taking care of a client's needs. P1C noted that the scope of work and having a good contract in place were more important. This finding confirms Trejo (2014), who noted that a great deal of the scope management strategy problems lie within the contract or proposal, rather than with good client management strategy through timely response. The experience level of the project leader, as well as a well-written civil engineering proposal, elevated the project success rates (Conrad, 2017). However, Conrad (2017) stated timely response was just as important as a good proposal because client neglect negatively affects the success of the project.

Correlation to conceptual framework. Timely response, additional service fees, and the scope of work aligned with the client management strategy used by project leaders for increased project success rates. Fayol (1917), the originator of scope management theory, categorized a client management strategy as an integral component of an effective scope management strategy. Whereas Fayol deemed a client management strategy as a communication strategy, the participants in this study respected a client management strategy as separate from a communication strategy. Although the participants recognized the need for client communications, they noted a distinct difference between a client management strategy and a communication strategy to improve project success rates.

Theme 2: Schedule Adherence Strategy

The second theme that emerged from the analysis of the data was project leaders use a schedule adherence strategy to manage the scope of project and improve project success rates. Wang, Yu, and Chan (2012) used a schedule adherence strategy to assist with scope management strategy by project leaders to elevate project success rates. Li et al. (2017) exemplified schedule adherence management constructs by civil engineering project leaders for increased project success rates within scope management strategy. All participants in this study noted the necessity of a schedule adherence strategy by project leaders to increase project success rates. The participants discussed their schedule adherence strategy within scope management strategy for improved project success rates with both negative and positive attributes. With my analysis of the participants' responses and the review of supporting documents, I determined that a schedule adherence strategy occurred through different approaches by the project leaders. Emergent subthemes of the schedule adherence strategy were critical path, scope creep, and technology.

Critical path. All three participants mentioned critical path during their respective interviews. I used company documents SD1, SD2, and SD3 to support critical path as a subtheme of a schedule adherence strategy. The supporting documents contained schedules with terms and conditions. P1A discussed that critical path was intertwined with a schedule adherence strategy because mistakes on the critical path by project leaders have led to serious mistakes which caused schedule delays and changes to

the scope management strategy. This finding confirms Khamooshi and Golafshani (2014) who advocated for project leaders to pay attention to the critical path items because the schedule adherence strategy is important for the overall projects success. This finding confirmed Olivier et al. (2018) in that a schedule adherence strategy with increased focus on the critical path improved the project success rates.

P1B held the critical path as important to a schedule adherence strategy for improved project success rates, noting the significance of developing an accurate critical path before the project commences. P1B stated, "Accurately knowing the critical path is important to schedule adherence strategy when a project starts rather than later." This finding confirms Zareei (2018) in that when project leaders pay close attention to the critical path, schedule accuracy within the scope of work improves. A project's critical path governed the project leader's ability to make schedule changes and improved the schedule adherence strategy when handled successfully by project leaders (Khamooshi & Golafshani, 2014).

P1C discussed that critical path is important; however, if the project is a government project in lieu of a private sector project, the poor handling of the critical path by project leaders did not always lead to a project failure. P1C stated, "Critical path does not always mess up the schedule adherence, especially with government projects, because the city will push the schedule back to their convenience." Wang et al. (2012) discussed the critical path not being as much of a factor for government projects, and that project leaders can expect schedule delays with government projects. Project leaders

managing private sector projects must accurately plan the critical path schedule or risk costly schedule delays and unwarranted changes to the scope management of the project (Wang et al., 2012). Maxfield et al. (2017) acknowledged the importance of the project leader distinguishing from public or private projects and the anticipated effects of critical path disruption on the schedule adherence strategy, and that reduced effectiveness of critical path handling by the project leaders negatively affects scope management strategy.

  Scope creep. All three participants discussed scope creep, and the supporting documentation contained language regarding scope creep. Documents SD1, SD2, and SD3 contained clauses for scope creep, both expected and unexpected, which project leaders must heed for increased effectiveness of implementing their schedule adherence strategy. The findings confirms Mirza et al. (2013), who noted the importance of mitigating scope creep and accounting for scope creep within the contract documents to increase the effectiveness of project leaders' success rates and scope management strategy handling. Barton and Shan (2017) created a schedule adherence strategy process for project leaders to successfully mitigate the adverse effects of scope creep through prioritizing scope items within the proposal, reorganizing and reassigning scope items when necessary to other project leaders, and creating a team approach.

  P1A held scope creep as an issue within the schedule adherence strategy used by project leaders. P1A stated, "Scope management strategy can change after a project starts, as well as schedule changes can occur due to scope creep, so the project leaders

have to be on alert for that happening and scope creep can negatively affect project success rates." This finding confirms Thakurta (2013) in that scope creep negatively affects schedule adherence, causes scope management issues, schedule extensions, and decreases project success rates. This finding confirms Amoatey and Anson (2017) in that scope creep occurring with civil engineering projects caused project leaders to alter the schedule; therefore, creating the need for the scope management strategy to change in an attempt to complete the project on time.

P1C discussed how scope creep is the second part of the scope of work and used scope creep to describe exceptional project leadership. P1C stated, "The scope of work has to be broken into two parts which include scope and scope creep due to bad contractor changes. Scope creep is minimized through great project leadership when constant communication is kept with the client." This finding confirms Thakurta (2013) in that scope creep is a problem in schedule adherence strategy, but experienced project leaders minimize the detrimental effects of scope creep. Hassan, Ahmad, and Zuhaira (2018) stated that scope creep could be a nuisance for schedule adherence strategy; however, the experience level of the project leader typically determines the project's success.

Technology. All three participants discussed the use of technology within their schedule adherence strategy. I used documents SD1, SD2, and SD3 to confirm the use of technology by project leaders within the broader scope management strategy to improve project success rates. This finding confirms Botham, Arribere, Brubaker, and Beier

(2017), who noted that the use of technology within scope management strategy by project leaders elevated project success rates. This finding confirms Allen et al. (2014) in that increased effectiveness to scope management strategy by project leaders occurred for increased project success rates with technology software, such as Microsoft Excel and Word. P1A noted, in addition to using the Simply File feature in Outlook for filing and organizing of e-mails and other correspondence, the use of technology software regarding scheduling, scope of work, and contract compliance was a vital component of Company 1's success. This finding confirms Stanford et al. (2017) in that the use of technology speeds up the process of the project leader dealing with schedule adherence strategy through Outlook, Excel, and Word.

P1B discussed the use of technology within the schedule adherence strategy. P1B stated, "In addition to Simply File in Outlook, one should use additional technology strategy tools to take advantage of the advantages in tracking schedule." Allen et al. (2014) realized the potential for increased usage of technology strategies by project leaders within schedule adherence strategy; furthermore, believed that time could be eliminated from the schedule to finish a project earlier. Cuenca, Boza, and Ortiz (2018) viewed the use of technology strategy by project leaders for an enhanced schedule adherence strategy within scope management strategy to be a necessity in the engineering industry. Most engineering firms utilized a traditional approach to project management; therefore, resistance exists regarding adopting agile approaches using technology to solve engineering project scheduling dilemmas (Cuenca et al., 2018).

P1C relayed that the use of technology existed within Company 1. P1C noted that project leaders made extensive use of technology to track schedule and budget adherence within scope change efforts. P1C stated, "We have digital checklists (technology) that assist the project leaders with the schedule adherence strategy and the financials." Thakurta (2013) proclaimed the value of using digital checklists within scheduling efforts, and recommended the use of digital checklists to engineering project leaders. This finding confirms Cuenca et al. (2018), who advocated for the use of Microsoft Excel and Word digital checklists to maintain an effective schedule adherence strategy. Engineering project leaders face a variety of issues that cause schedule changes; therefore, need an effective means to track the schedule in an attempt to maintain the project's critical path (Cuenca et al., 2018).

Correlation to conceptual framework. Fayol (1917) acknowledged the importance of schedule adherence strategy within scope management strategy by project leaders for improved project success rates. The *Iron Triangle* of project management consists of budget, schedule, quality, and scope; each aspect of the Iron Triangle affects the other aspects (Drury-Grogan, 2014). Fayol also noted that schedule adherence strategy closely relates to all of the five pillars of project management: planning, baseline, reporting, change management, and closure.

Theme 3: Communication Strategy

The third theme that appeared from the analysis of the data was that project leaders who used an effective communication strategy within scope management efforts

improved project success rates. Austin et al. (2013) acknowledged that an effective communication strategy was an integral part of stakeholder satisfaction, and that when project leaders practiced engaged in good communications with all stakeholders, increase project success rates occurred. Koskela (2018) noted that the use effective internal and external communications by project leaders assisted with the scope management strategy, and conveyance of scope change to clients and other stakeholders. All participants discussed the use of a communication strategy by the project leaders within scope management strategy for improved project success rates, noting both negative and positive characteristics. In other words, poor communications with stakeholders reduced project success rates, while effective communications improved success rates. With the review of participant responses and supporting documents, I determined the implementation of a communication strategy occurred with different approaches by the project leaders. All three participants discussed their communication strategy in terms of the subthemes of scope and documentation.

Scope. All three participants discussed scope strategy and I used documents SD1, SD2, and SD3 to support scope as a subtheme and an integral part of the communication strategy. P1A stated, "We need to make sure any scope changes are communicated to the client within 24-48 hours, and I do a good job of that." Hora and Dutta (2013) stated that scope strategy by project leaders as part of an effective communication strategy effort, improved project success rates. Land, Parry, and Seymour (2017) confirmed this approach; however, cites situations in which the transparency needs to be limited.

P1B noted that scope strategy was effective in improving project success rates by the project leaders as a communication strategy effort and appeared to be more effective than other strategies. Communication is very important to the overall success of the project, both to clients, and coworkers; furthermore, when project leaders increased their communication and transparency even further, additional gains in scope management success occurred (Hora & Dutta, 2013). Feroli, Greenlaw, Hooper, Mishkin, and Sufi (2017) confirmed the importance of scope strategy as an effective communication strategy to all stakeholders by pointing out its effectiveness for government transactions by project leaders.

P1C held for good scope strategy reducing the liability of the civil engineering firm through an effective communication strategy by the project leaders to convey any changes to the scope strategy to the client. P1C stated, "The client will attempt to increase our liability with additional clauses in the contract, and we combat this with a well written scope and making sure we communicate to the client that there are State of Georgia statutes protecting us from those types of liability clauses, and if they need to, they can contact the ACEC (American Council for Engineering Companies) for guidance." Spalek (2014) noticed that improved accuracy of the project scope and the use of an effective communication strategy by the project leaders elevated the probability of project success. This finding confirms Cobb (2017), who confirmed the effective usage of scope strategy in conjunction with a communication strategy by project leaders increased the likelihood of project success.

Documentation. All three participants discussed a documentation strategy as a communication strategy with increased effectiveness for improving project success rates of the project leaders within scope management strategy. I used documents SD1, SD2, and SD3 to confirm the participants' responses because these documents are the contract documents for the project scope and are the official communication between the client and the civil engineering firm. P1A stated, "Documentation strategy tools, such as templates and check-lists, help a great deal with improving project success rates because the time used to put these together has already been done, so all we have to do is quickly fill the documents out and send the documents to the client." Allen et al. (2014) confirmed the use of a documentation strategy assisted with the communication strategy of the project leaders to change scope for increased project success rates. Miranda and Bertolino (2017) realized a documentation strategy increased project success rates for project leaders through a communication strategy; furthermore, improved the effectiveness of schedule and scope creep handling.

P1B stated that a documentation strategy was the most important aspect of communication strategy by project leaders to increase project success rates within the scope management realm. P1B noted, "Documentation strategy is as important as communication, for example, when sending an invoice to the client with photos to verify your claim, the client cannot deny the claim because you have documented the construction observation visit. The documentation strategy of taking photos helped a great deal because several months may go by, and by then nobody will remember every

little aspect of the project." Huysegoms et al. (2013) acknowledged that the use of a documentation strategy regarding project specifications and requirements by project leaders assisted with elevating project success rates within the communication strategy effort. Qu et al. (2018) mentioned that effective documentation within a communication strategy improves project success rates and improved transparency.

P1C held for the documentation strategy within communication strategy for budget tracking as improving the project success rate of the project leaders. P1C stated, "Documentation strategy improves the communication between the client and the consultants as well as increases the project leaders' endeavor success rates." Mirza et al. (2013) confirmed the importance of documentation strategy within communication; however, Mirza et al. believed the lack of understanding by the project leader as to the specific documentation needed negatively affected the project success rates. Weber (2018) explained that enhanced project success rates by project leaders resulted from the documentation strategy through communication strategy to all stakeholders for scope management improvements.

Correlation to conceptual framework. Fayol (2017) listed communication strategy as one of the tenets of scope management strategy. The need for effective communications occurs during every phase of a project (Allen et al., 2014). Planning, baseline, reporting, change management, and closure all contain documentation requirements strategy for communication strategy when dealing with the scope management strategy with the client (Fayol, 1917).

Applications to Professional Practice

Improved project success rates resulted from the increased effectiveness of scope

management strategies utilized by project leaders in the engineering field (Kula et al.,

2018). Project leaders used client management strategy to increase project success rates

through scope management strategy with a more accurate scope of work, paying attention

to additional service fees, and timely response to client correspondence and issues.

Project leaders in civil engineering could apply these findings to decrease liability

exposure and improve their scope management strategy with a well-written scope of

work to use a client management strategy to improve project success rates. Project

leaders increase the efficiency of a project through clearly defining the scope of work (Di

Corato et al., 2018). The findings of this study might benefit civil engineering project

leaders to increase project success rates using effective scope management strategies,

including the correct application of additional service fees to the proposal, as well as

increased accuracy of the scope of work. The application of these findings by project

leaders might improve the effectiveness of scope management strategies with the

implementation of a client management strategy through the timely response to clients'

issues and correspondence during the preparation of the contract and throughout the term

of the project.

The use of a schedule adherence strategy by engineering project leaders improved

project success rates through their careful attention to the critical path of the project and

scope creep, and the increased utilization of technological aids for project scheduling

(Olivieri et al., 2018). Engineering project leaders might apply the findings of this study to implement a schedule adherence strategy for improved control of critical path activities and increased project success rates. Engineering project leaders who paid close attention to scope creep over the course of a project increased the effectiveness of schedule adherence strategy within scope management strategy and elevated the project success rates with timely reorganization and the reassigning of scope items (Barton & Shan, 2017). The application of these findings by project leaders might improve the use of technology within a scheduling adherence strategy, including the use of software such as Microsoft Word, Excel, and Outlook to create digital checklists for the project schedule.

The use of a communication strategy by the engineering project leaders elevated project success rates through successful scope and documentation strategy usage. Project leaders improve project success rates through the effective implementation of a communication strategy (Land et al., 2017). Civil engineering project leaders might apply the findings of this study to implement an effective communication strategy within their broader scope management strategy to increase project success rates, keep all stakeholders appraised of the project developments, and provide the adequate amount of transparency. The application of these findings by project leaders might increase the use of documentation within their communication strategy to convey the scope of the work, schedule, and ongoing activities within the project to the stakeholders.

Implications for Social Change

The potential for increased use of sustainable-design strategies for energy, natural resources, and water conservation through effective implementation of scope management strategies by engineering project leaders is an implication for social change. Elevated use of scope management strategies by engineers to raise the effectiveness of sustainable practices occurred for desirable social change (Colmenar-Santos et al., 2015). Society might benefit from the findings of this study because of the increased use of sustainable materials, decreased use of water and energy, and a reduction of dependency on natural resources. The implementation of beneficial scope management strategies by project leaders remains a way to expose engineers to direction for improving social change efforts, which benefit society. The use of technological approaches for schedule improvements results in the increased consideration by project leaders for sustainable practices and social change efforts within a construction project (Russell-Smith & Lepech, 2015). Reducing scope creep, improving the scope of work documentation, and the inclusion of sustainable building materials improved social change efforts within affected communities (Zuchowski, 2015). Reducing the liability for engineers increased the likelihood that project leaders included sustainable practices within the scope management strategy (Russell-Smith & Lepech, 2015). Local government leaders use a scope management strategy to enhance the efficiencies for water and sewer departments, leading to reduced use of water (Zuchowski, 2015). Engineering project leaders might use the findings of this study to implement scope management strategies that result in

increased use of sustainable materials, reduced use of natural resources, and improved communities.

Recommendations for Action

The purpose of this qualitative single case study was to probe scope management strategies used by some project leaders in the engineering profession to increase project success rates. I recommend that project leaders use the findings of this study to recognize the benefits of implementing the scope management strategies of client management strategy, schedule adherence strategy, and communication strategy for increasing their project success rates. Civil project engineers lead endeavors with different and varying scopes, which requires effective strategy implementation for project success. I recommend that project leaders understand the importance of effective scope management strategies used by other project leaders to increase their project success rates.

My goal is to publish the outcomes of this study, and share the findings and results with other civil engineering project leaders. First, I will share the findings and results with the leaders of Company 1. Second, I intend to submit articles for publication in peer-reviewed journals, such as the *Journal of Construction Engineering & Management,* the *Journal of Engineering Education,* and the *International Journal of Project Management.* Finally, I will seek occasions to present the findings and results of the study at professional conferences for professional organizations, such as *American Society of Civil Engineers*, and the *Project Management Institute*.

Recommendations for Further Study

In this study, I focused on scope management strategies used by project leaders of an engineering firm in Georgia, that led to increased project success rates. The results of the study emanated from the data collected from project leaders and supporting documentation in one engineering firm. The need for additional research exists for a complete understanding of the scope management strategies that project leaders use to elevate project success rates.

A limitation of this study was the geographic region of Georgia. I recommend future researchers conduct qualitative research within engineering firms in other geographic regions. A future researcher could conduct a qualitative, multiple case study to gain a deeper understanding of scope management strategies through an increased diversity of data collected. A limitation of the study was that I relied on the honesty of the potential participants as well as the accuracy of the supporting documentation to identify leaders in the civil engineering industry whom had implemented successful strategies to improve project success rates. I recommend future researchers conduct quantitative research, using project management variables to determine scope management and project success, such as profit margin, critical ratio, earned value, scope, budget, schedule, and performance.

A limitation of this study was scope management is an underutilized strategy in the civil engineering industry. I recommend additional research regarding the benefits of implementing scope management strategies to provide civil engineers with greater

exposure to the concept of scope management. A limitation of this study was that the engineering industry tends to be very technical regarding project design, solving problems, and communicating with clients and stakeholders. I recommend future researchers conduct qualitative studies on the communication techniques used by engineers to improve transparency and conveyance of project information to the clients and the stakeholders.

The transferability of the findings to all engineers and other engineering disciplines was a limitation of this study. I recommend additional research within civil engineering firms and other types of engineering companies regarding scope management strategies to test the transferability of the findings of this qualitative, single case study. The participants stated that government leaders tend to less concerned with the critical path of a government project in comparison to private sector clients. Damoah and Kumi (2018) noted that politics is an interfering factor regarding project success as government projects are oftentimes over budget and behind schedule. I recommend future researchers conduct qualitative research on project leaders' comprehension of the importance of critical path and the differences between implementing scope management strategies for government projects versus private sector projects.

Reflections

I arrived at the realization during the doctoral study that a limited understanding for project leaders existed to elevate project success rates using scope management strategies. I did not realize until the study progressed that a variety of themes and

subthemes existed regarding scope management strategies. I have 20 years of experience

as a civil engineer and 13 years of experience in project management; therefore, I

expected client and communication strategy descriptions to occur, yet gained additional

insight from conducting the study regarding effective use of scope management strategies

to improve project success rates. The engineering industry continues to evolve from

traditional project management approaches to ones with more technological applications;

however, whether civil engineering leaders fully embrace an agile approach to scope and

project management remains an uncertainty.

I strived to retrieve information from the participants without bias, remaining

objective and neutral throughout the data collection and analysis process. I was able to

understand the literature on the scope management strategy theory, which led to the

formulation of interview questions, designed to illicit the maximum amount of data

regarding scope management strategies. In the course of completing the study, I became

improved investigator and researcher. I will use the knowledge gained from conducting

this study to become a better civil engineer and project manager through understanding

the scope management strategies that leaders can use to improve project success rates.

Conclusion

Civil engineering projects were more likely to fail without successful

implementation of scope management strategies by project leaders. Through the lens of

scope management theory, the purpose of this single case study was to explore scope

management strategies used by some project leaders in the engineering field to improve

project success rates. I collected data using semistructured, face-to-face interviews with three purposefully selected project leaders in Georgia and a review of project completion reports, budget reports, government proposals, and scope management documents. Data analysis occurred using Yin's 5-step process of compiling, disassembling, reassembling, interpreting, and concluding the data. The three emergent themes were client management strategy, schedule adherence strategy, and communication strategy.

The findings indicated that implementing the scope management strategies of client management, schedule adherence, and communication with all stakeholders are essential for improve engineering project success rates. The implications for social change include the potential to elevate the use of sustainable-design application through water, energy, and natural resource conservation by project leaders through scope management strategy implementation. People in communities potentially benefit from the findings of this study because of the increased use of sustainable materials, reduced use of water, energy, and natural resources, and an improved local environment. I recommend civil engineering project leaders use the recommendations and findings of this study to improve project success rates and make a significant contribution to society.

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Appendix A: Interview Protocol

Interview preparation. I identified an engineering firm in Georgia, which

employed engineering project leaders. I will meet with the owner, explain the purpose of

the study, and obtain permission to collect data from the company through the owner

signing a Letter of Cooperation and Confidentiality Agreement (see Appendix B). I will

identify 10 project leaders as potential participants. I will assess each project leader

based on the eligibility criteria and use purposeful sampling to narrow the population to

the sample size of three. I will meet each individually to discuss participation, explain

the informed consent process, and ascertain who meets the eligibility criteria. I explain to

them that their names, contact information, and company information remains

confidential. I will use an onsite conference room for interviews by obtaining permission

from the owner, or will allow participants to select a neutral location, such as the private

meeting room in a public library if they prefer.

Opening the interview. I plan on beginning each of the interviews by explaining

to each of the participants who I am, and that I am a Walden University Doctoral student

conducting a qualitative single case study on Company 1 for the purpose exploring scope

management strategies used by some project leaders in the engineering field to improve

project success rates. The possible benefits are the potential to elevate the utilization of

sustainable-design application through water, energy, and natural resource conservation

by project leaders through scope management strategy improvements.

I will greet the participants, ensure that I have their informed consent, and notify them that I will be recording the interview

Informed consent. I will obtain informed consent from each participant prior to the start of the interviews. I will explain all the aspects of providing informed consent, the potential risk, as well as the benefits of participating in the study. I also let the participants know that I will maintain all data and research records in a locked case inside my home or on a secure computer that is password protected inside my home.

Conducting the interview. I will ask open-ended questions during the interviews, and I will reiterate to each participant that the interviews are semistructured and the questions are open ended. Anything they feel is relevant can be discussed. I will follow up with probing questions after each interview question for clarification, if needed.

Follow up with probing questions. After completing the initial interview questioning, I will follow up with probing questions for clarity if I think further question will allow additional clarity.

Theme verification. I will explain to the participants that I will ask questions to develop major themes regarding scope management strategies.

Coding. I will refer to the engineering company as Company 1. I will code participants' names as P1A, P1B, and P1C.

Recording reflexive notes. I will explain to the participants that in addition to the recordings, I will take notes to document any reflexive thoughts during the interview

process, as well as afterwards, keep a journal of the events, which in addition to the audio

recordings, will be kept in a binder folder, in a locked case in my dwelling, or on a

password protected computer, within my place of residence, for increased confidentiality.

Ending the interview. I will explain to the participants that I will need to contact

them at a later date to verify the accuracy of the transcript and will engage in member

checking to obtain any additional information they might offer. Finally, I will thank them

for their time, information, and contribution.

Appendix B: Letter of Cooperation and Confidentiality Agreement

Date: ████████████

Name of Company: ████████

Name: ████████

Address: ████████████████████████████████ GA

E-mail: ████████████████

Telephone: ████████████████

Dear Participant 1A:

I am Kevin Ramage, a doctoral student at Walden University conducting a research study entitled "Scope Management Strategies Used by Some Engineering Project Leaders to Improve Project Success Rates." The purpose of this qualitative single case study is to explore strategies used by some project leaders in the engineering field to improve project success rates.

I identified your company as Company 1.

I am seeking to recruit participants who meet the following eligibility criteria to conduct 30-45 minutes face-to-face interviews and 20-30 minutes follow up meetings:

- Identified as a civil engineer

- A project leader for more than one year

- Currently managing an engineering project(s)

- Implemented scope management strategies to improve project success rates

In addition to conducting face-to-face interviews, I am requesting permission to review company documents and policies, as well as the proposal template, relative to Scope Management Strategy.

To protect the confidentiality of your name and the name of your company, I will not be disclosing any company, leader, owner, or participants' names in the published study or in any other subsequent publications using information from the final study. I will code participants' names as P1A, P1B, and P1C. Participation in this research study is voluntary. You may choose not to allow recruiting of participants to take place within your company or provide access to relevant company documents and policies. You may withdraw your company from participation at any time. Project leaders in your company meeting the stated eligibility criteria for participation in interviews may choose not to participate or may withdraw from participation at any time for any reason or for no reason.

I am requesting that you provide access to leaders within your company who meet the stated eligibility criteria by providing their name and contact information. You will not be asked to provide any supervision during the interviews.

All I require at this time is a template of a proposal and a list of potential participants.

Participants will be e-mailed an informed consent form to review prior to the interviews. Providing informed consent occurs through replying to the e-mail with "I consent" or by signing the informed consent form just prior to start of the interview.

As you are the official authority from your company to grant permission to release company documents, I am requesting release of documents subject to the following conditions:

1. I will use all company documents released to me exclusively for my research and not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter, or destroy any confidential information, except as authorized by you as the official company representative.
3. I will not discuss confidential information where others can overhear the conversation.
4. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
5. I will not make any unauthorized transmissions, inquiries, modifications, or purging of confidential information.
6. I agree that my obligations under this agreement will continue in perpetuity after the completion of this study.
7. I understand that any violation of this agreement may have legal implications.
8. I will only access documents I am officially authorized to access and I will not disclose any trade secrets, proprietary information, or any other protected intellectual property to any unauthorized individuals or entities.
   If the terms and conditions within this letter of cooperation and confidentiality

agreement are acceptable, please print and sign your name, provide your title and the date

your signature below.

Printed name: _____

Signature: _____

Title: _____

Date: _____

By signing this document, I as the authorized representative for the company,

acknowledge that I have read the agreement and that I agree to comply with all the terms

and conditions stated above. I understand that the student will not be naming our organization in the doctoral project report that is published in Proquest database or any other subsequent publications. I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies. I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University Institutional Review Board.

If you have additional questions, please feel free to contact me by telephone at

████████████████████████████████████

Sincerely,

Kevin Ramage,

Doctoral Candidate
Doctor of Business Administration Program
Walden University

Appendix C: E-mail and Telephone Script

Hello, my name is Kevin Ramage. I am a doctoral student at Walden University conducting a study on the scope management strategies project leaders in the engineering field use to improve project success rates. I identified you as a potential participant in my study because of your role as a project leader in an engineering firm. To participate, you need to have implemented scope management strategies that resulted in improved project success rates. I will be reviewing company documentation obtained from the principle stockholder of your company by signed permission to evaluate your eligibility to participate in this study. If you meet the eligibility criteria, would you be willing to participate?