INCREASING THE SUCCESS RATE FOR CAPITAL

PROJECTS: SERVANT LEADERSHIP

TO THE RESCUE?

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DEDICATION

I dedicate this writing to my wife Brittany, my mother Bonnie, my village, and in memory of my

stepfather Charles.

ABSTRACT

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Abstract

Given the demand for capital projects, such as the need to replace the aging infrastructure in the US, there will be an increase in the number of capital projects in the near future. Currently, capital projects are challenged by the high percentage of failures and the drastic impact associated with these unsuccessful projects, both monetarily and through public criticism. Project management is a complex science that relies on the interactions of the individuals who are considered the integral resources within the project. Therefore, it is very important for a project manager to support the project goals and serve as a team leader. The purpose of this study was to quantitatively evaluate the project manager's use of servant leadership principles in the capital project setting. In other words, is there a positive relationship between top management support and capital project success that is moderated by the project manager's traits of a servant leader? A survey-based research design was used to evaluate these relationships. The results from 84 project managers revealed that both Top Management Support - Communication and Top Management Support - Resources had a significant, positive influence on perceived Capital Project Success

(Outcome, Effectiveness and Utilization). However, Servant Leadership was not found to moderate this relationship. Practical and theoretical implications are discussed and recommendations for future research are provided.

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CHAPTER 1

INTRODUCTION

1.1 Introduction to the Problem

Project management is a complex science that relies on the interactions of the individuals who are considered integral resources within the project (Lee, 2002). Project management covers many industries, from Engineering Procurement Construction (EPC) and Information Technology to Healthcare (PMBOK, 2013). Therefore, project management is an important discipline within the field of management because it takes concepts from the conceptual stages of ideas to a realized product(s) or service(s) (PMBOK, 2013). However, the term 'management' in project management is used loosely because the characteristics that are necessary to lead a team effectively are more closely related to 'leadership' than 'management' (Yukl, 1989; Zaleznik, 1977).

The use of project management by businesses has grown tremendously over the last few decades (Project Management Institute, 2017; Turner & Keegan, 1999). Such growth is due to its positive results, which lead to successful implementations that help sustain and achieve organizational goals, while maintaining budgetary and timing requirements (Caldas & Gupta, 2017; Wang et al., 2017). In addition to projects assisting in meeting the organizational requirements, projects help develop new products and keep organizations competitive in unpredictable environments (Ika, 2009; Mahaney & Lederer, 2010). Indeed, the enhancing capabilities and functions of projects suggest that every company should implement project management elements as the solution to every challenge, yet the success rates have only recently

started to increase over the last few years (Project Management Institute, 2017). Projects are simply an avenue to facilitate the completion of complex, cross-functional, integrated tasks (PMI, 2013, 2017). For the purpose of this research, project management is defined according to the Project Management Institute (PMI) as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (PMI, 2013, p. 4).

The individual who leads the project is called the project manager. As the Project Management Institute (PMI) states, "the project manager plays a critical role in the leadership of a project team in order to achieve the project's objectives" (PMI, 2017, p. 51). Given the importance of the role of a project manager and the responsibility to lead the team, one should consider the project manager's leadership skills in determining the outcome of the project.

 Despite the urgent need for such leadership skills, the significance of leadership styles and skills have just come into focus over the last two decades (Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014; PMI, 2017; Turner & Müller, 2005). Indeed, the importance of leadership styles and skills has reached new heights as PMI's most recent edition of Project Management Book Of Knowledge (PMBOK) detailed (PMI, 2017). In fact, Turner and Müller (2005) conducted a review of the project management literature and noticed the lack of research identifying leadership style as a key competence for project managers, thus suggesting a gap in the literature.

Since Turner's and Müller's (2005) research, several studies have researched the need for a leadership-focused project manager and suggested the significance of leadership to the role of a project manager (DuBois et al., 2015; Hodgkinson, 2009; Müller & Turner, 2010; Tuuli et al., 2012). For instance, Tuuli et al. (2012) examined the impact of leadership styles and team

context and found person-oriented leadership is best accomplished with management of interrelationships and empathy. Given the various leadership types in the literature, the use of servant leadership principles as a project manger should positively improve the likelihood of success for projects. Due to their complexity and large number of stakeholders, this quantitative study will examine the use of servant leadership as a leadership style in capital projects.

1.2 Purpose

In a project team, multiple members work together with varying subject member expertise. However, the project team is solely focused on achieving the overarching goal: successful project completion. The team must balance project constraints, manage demanding schedules, and execute their respective subject matter expertise flawlessly for the benefit of project performance and the greater good of the project. Despite having a common goal of completing the project, project teams often deal with competing demands of the members' personal time and discipline-specific related demands juxtaposed to the overall project goals (PMI, 2013). Therefore, it is vital that the project manager, who leads the team, understands how to challenge its members to complete the discipline-specific goals, while achieving the project goals. It is imperative that the project manager communicates to the team and uses varying leadership styles to motivate the project members so that the project remains on schedule, on budget, and meets the expectations of its stakeholders (PMI, 2013).

Therefore, a project manager must be capable of managing both the project goals and serving as a team leader and coordinator. Despite the limited mention of leadership in the PMI's 5th edition of the PMBOK (PMI, 2013), a text used as the basis for certifying project management professionals, PMI's viewpoint has recently changed to exemplify the need for

project managers to understand leadership. The sixth edition of the PMBOK offers more content on leadership styles, yet allows the project manager to select his or her own leadership style based on the project being executed (PMI, 2017).

Servant Leadership principles overlay well with the characteristics of a project manager for capital projects (Caldas & Gupta, 2016; Tommelein et al., 2003), as it is paramount for the leaders of capital projects to find a way to seek alignment of the team and stakeholder, both internally and externally to the project. Additionally, capital project managers must develop trust and working relationships among all project stakeholders (Caldas & Gupta, 2017). Finally, communication is fundamental for capital projects to be successful (Caldas & Gupta, 2016; Dyett, 2011; Tommelein et al., 2003). Communication entails both talking and listening, and the role of a servant leader requires the leader to focus on both the said and unsaid (PMI, 2017; Van Dierendonck, 2011).

The purpose of this quantitative study is to evaluate the use of servant leadership principles in the capital project setting. Given the demand and the aging infrastructure in the United States, there will be an increase in the number of capital projects in the near future. Currently, capital projects are challenged by the high percentage of failures and the drastic impact associated with unsuccessful projects, both monetarily and through public criticism.

1.3 Research Question

The research question for this paper hypothesizes a positive relationship between top management support and success in capital projects being moderated by servant leadership principles. The results will contribute to the backing needed by top management and the

advancement of operationalizing servant leadership, whose principles are conducive to the successful completion of capital projects. The contributions from this paper will offer empirical evidence on the relationship between the effects of servant leadership principles, top management support, and success in capital projects. Finally, the paper will evaluate top management support as a critical success factor on capital projects. The following research question guides this study:

Do servant leadership principles impact the likelihood of capital project success?

1.4 Summary

Chapter 2 includes a review of the project management literature specifically related to capital projects, as well as a literature review on servant leadership, culminating in the development of the hypotheses to be tested in this research. Chapter 3 describes the methodology used in the study, including the selection process of participants, data collection techniques, instruments, statistical analysis, and testing the hypotheses. Chapter 4 will evaluate the results of this research. Chapter 5 will provide further discussion, implications, and recommendations gained from this research.

CHAPTER 2

LITERATURE REVIEW

2.1 Formation of Project Management

The concept of project management is not new; it has been in existence since at least the

Egyptian Era (Kwak, 2005). Despite the presence of project management, there was not a

formalized systematic approach to project management across the project's life cycle until the

20th century (Stretton, 2007). Project management is also commonly referred to as the science of

managing a project. PMI's growth has been rapid over recent decades, causing an increase in the

number of companies using skills and techniques commonly referred to as the 'project

management toolbox' (Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014; Sydow, 2004). Use

of project management practices and processes is important for effective project management

and is considered critical to project success (Ofori, 2013). However, even though the leadership

characteristics of the project manager are arguably just as important, such attributes are

overlooked when assessing the success of projects (Müller & Turner, 2007; Turner & Müller,

2005; Zimmerer & Yasin, 1998). Practitioners and researchers understand the importance of

leadership and some have even suggested ideal leadership styles for project managers (Boykins

et al., 2013; Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014).

2.1.1 Importance of project management given current challenges

The 2017 publication of Pulse of the Profession from the Project Management Institute,

(PMI) states, "For the first time in five years, more projects are meeting original goals and

business intent and being completed within budget. There has also been a significant decline in

dollars lost: Organizations are wasting an average of $97 million for every $1 billion invested, due to poor project performance—that's a 20 percent decline from one year ago" (Project Management Institute, 2017, p. 2). Although the number of projects that are now meeting the original goals has increased, there remains an approximate 10% loss, which is sizable for any organization (Project Management Institute, 2017). In 2012, Benoit Hardy-Vallee (2012, p. 1), an author for Gallup.com, wrote these words: "Projects often fail because organizations put more emphasis on rational factors (process) than on employees' psychological engagement – and the cost to the organization is enormous." The premise of this statement does not suggest that the process is not important; it simply highlights the imbalance between the two factors (process and people).

2.1.2 What is a project?

The discussion of the relationship between people and process has been on-going for many years, and there are supportive arguments for both sides (Eaton, 2010). The challenge is how to balance the relationship between the two competing demands when you have a team focused on a project. Consider the meaning of a project: "a temporary endeavor undertaken to create a unique product, service, or result" (PMI, 2017, p. 542). Given the PMI definition and the temporary nature of a project, there must be a well-defined balancing act linking people and process. This balancing act requires the project manager to be capable of managing competing project demands and leading people to ensure both process and people are working synchronously, similar to a conductor of an orchestra. Indeed, the choreography changes for a

project, and instead of music as the expected outcome, it is a product, service, or a result for an organization.

2.1.3 Definition of a Capital Project

This research focuses on capital projects (CPs). There are varying characterizations of capital projects as the term relates uniquely to an industry where projects that are undertaken require an intensive amount of capital and contain multiple phases within the project, including but not limited to, engineering, planning, procurement, and construction (Hobday, 2000; PriceWaterhouseCooper LLP, 2018). Caldas and Gupta describe mega projects, which are the largest delineation of capital projects, to contain "complexity, uncertainty, ambiguity, dynamic interfaces, significant political or external influences" (2017, p. 920). The monetary value of capital projects varies across industries, ranging from as low as $10,000 to billions of dollars (Caldas & Gupta, 2017; Hobday, 2000; Oregon, 2018; Tommelein et al., 2003). Additionally, the best way to describe a capital project is to evaluate the word "capital" from an accounting perspective, which requires a depreciation of the asset (Investopedia, 2018). The challenge with capital projects is the high levels of complexities and dynamic interfaces between people, processes, and methods. It is this complexity that makes it important to have a project manager skilled in leadership.

2.1.4 Utilization of Capital Projects in Industries

Capital projects are commonly used in organizations (PriceWaterhouseCooper LLP, 2018) to complete complex projects that meet the requirements of organizations. Capital projects

cross almost all industries as they are used for infrastructure projects, power projects, information technology implementation, governmental investments, manufacturing, construction, and many more uses and industries (Investopedia, 2018). Some capital projects have their own knowledge base, which resides in the Supply Chain Management arena, known as Capital Project Supply Chain Management (Tommelein et al., 2003). Additionally, certain industries are known for completing these types of projects, such as the Engineering, Procurement and Construction Industry (EPC) (Turner & Keegan, 1999). The EPC industry specializes in completing complex projects for clients who require detailed planning to ensure the design, purchase, and construction are completed on-time and within budget requirements (Tommelein et al., 2003). Irrespective of the industry, the magnitude of leadership on capital projects remains vital (PMI, 2017; Turner & Keegan, 1999; Turner & Müller, 2005).

2.1.5 Leadership in Capital Projects

An important element in project management is leadership—the ability to organize the team for the completion of a common goal. In the most recent edition of the PMBOK, the importance of a project manager's leadership ability is highlighted as well as the different schools of leadership (PMI, 2017). More specifically, the guide mentions the following as one of the competencies for project managers: "Leadership – the knowledge, skills, and behaviors needed to guide, motivate, and direct a team, to help an organization achieve its business goal" (PMI, 2017, p. 57). In addition to the value of leadership as a key skill, the PMI uses leadership as one of the key components for the talent triangle, which is also the mechanism used to ensure continuing education requirements for the certifications offered through the organization, further

illustrating the redefined importance of leadership (PMI, 2017). The focus on leadership illustrates the recent change in the industry. Prior to this change, multiple scholarly articles suggested the significance of the project manger's leadership skills, (Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014; Müller & Turner, 2010; Sunindijo et al., 2007; Turner & Müller, 2005).

Sunindijo, Hadikusumo, & Ogunlana, (2007) express the value of a project manager's leadership style in the construction industry and performed research related to the emotional intelligence capability of the project manager. Additional advocates of the significance of the project manager's leadership are Korrapati and Kocherla, (2010), who suggest the role of the project manager is significant in project execution and leadership style impacts the project outcome. Turner and Muller (2005) found in their research, which was commissioned by PMI, numerous studies which relate to the importance of leadership of the project manager (Wirth, 1992; Cleland, 1995; Day, 1998; Thamhain, 1999; Thite, 1999; Weiss and Anderson, 2003; Christensen and Walker, 2004; Keegan and Den Hartog, 2004; Leban and Zalauf, 2004). However, in all this research there is no definitive leadership style for managing different project types. This study seeks to determine if servant principles might serve as a single prevalent leadership value for capital projects.

2.1.6 Capital Project Outcomes

The outcome of capital projects can drastically impact one or more organizations as these are handled through a capital project supply chain management process (Tommelein et al., 2003). The creation of supply chains may be for one project or several projects (Caldas & Gupta,

2016, 2017; Ebrahimy et al., 2011). Due to the large impact of these projects, it is important that project managers communicate effectively with the project team, and therefore trust must be established (Caldas & Gupta, 2017). Indeed, the complexity associated with capital projects and the tentacles which branch into other organizations suggest the importance of them being successful.

2.2 Project Outcomes

Projects have been on-going for centuries (Kwak, 2005; Stretton, 2007); however, the empirical research regarding the factors of success has only been researched over the past several decades (Caldas & Gupta, 2016; Müller & Jugdev, 2012; Ofori, 2013; Pinto & Slevin, 1987, 1988a; Scott-Young & Samson, 2008). The challenge with being able to determine a concise explanation for project success is represented in the words of Freeman and Beale (1992, p. 8):

> "Success means different things to different people. An architect may consider success in terms of aesthetic appearance, an engineer in terms of technical competence, an accountant in terms of dollars spent under budget, a human resources manager in terms of employee satisfaction. Chief executive officers rate their success in the stock market."

Indeed, project success does mean different things to people. However, project success has a genesis from as early as the 1980's with works by Jeffery Pinto, Dennis Slevin and John Prescott (Müller & Jugdev, 2012). Two key components describe project success throughout the literature:

"(1) Project success factors, which are the elements of a project

which, when influenced, increase the likelihood of success; these

are the independent variables that make success more likely.

(2) Project success criteria, which are the measures used to judge

on the success or failure of a project; these are the dependent

variables that measure success." (Müller & Turner, 2007, p. 758)

The concept of critical success factors comes from the work of Boynton and Zmud (1984), who

evaluated the use of management information systems planning and requirement analysis.

Jeffery Pinto (1986), referenced as one of the seminal authors of project success (Müller

& Jugdev, 2012), developed an empirically tested approach to define project success. The

traditional definition utilizes the project constraints time, cost, and scope. Time references the

scheduled timeframe for a project and being able to complete a project within the necessary

timeframe provided; cost references the budget requirements for the project; and scope

references the agreed upon detailed description and expected outcomes of the project (PMI,

2017). However, these factors alone don't account for many of the other attributes affecting the

success of a project (Ahmed et al., 2016; Caldas & Gupta, 2016; Müller & Jugdev, 2012;

Radujković & Sjekavica, 2017; Scott-Young & Samson, 2008). Pinto (1986) and Pinto & Slevin

(1988c) described the other attributes affecting project success as performance criteria, which is

viewed through the lens of technical validity, organizational validity, and organizational

effectiveness. Technical validity refers to the project being technically sound and meeting the

minimum performance criteria. Organizational validity refers to the acceptance of the project by

the project team and the client, ensuring the project will be used by the organization as intended.

Organizational effectiveness refers to the extended use of the project outcome to improve the effectiveness of the intended organization.

As an extension of the literature multiple authors developed success criteria such as Pinto and Slevin (1987) tested their newly defined project success criteria via the use of ten critical success factors defined in the table below from Slevin and Pinto (1986) :

Table 1: Critical Success Factors - Slevin and Pinto (1986)

Critical Success Factor	Definition
Project Mission	Initial clarity of goals and general directions
Top Management Support	Willingness of top management to provide the necessary resources and authority/power for project success
Project Schedule/Plan	A detailed specification of the individual action steps required for project implementation
Client Consultation	Communication, consultation, and active listening to all impacted parties
Personnel	Recruitment, selection and training of the necessary personnel for the project team
Technical Tasks	Availability of the required technology and technical steps to accomplish the specific technical action steps
Client Acceptance	The act of "selling" the final project to its ultimate intended users
Monitoring and Feedback	Timely provision of comprehensive control information at each stage in the implementation process
Communication	The provision of an appropriate network and necessary data to all key actors in the project implementation
Troubleshooting	Ability to handle unexpected crises and deviations from plan

Excerpt from (Slevin & Pinto, 1986, pp. 57–58)

From these initial critical success factors, others have developed additional viewpoints and factors that affect project success. Such factors have been included in the below table based on a detailed literature review from Ofori (2013, p. 19).

Table 2: Critical Success Factors Ofori (2013)

Critical Success Factors	Pinto & Slevin (1987, 1989)	Kerzner (1992, 2001, 2003)	Yeo (2002)	Boyd (2001)	Anderson et al. (2002)	Hyvaro (2006)	Turner & Muller (2005, 2007)	Khang & Moe (2008)	Frese & Sauter (2003)
Clear Project Management Objectives	✓	✗	✓	✓	✓	✗	✗	✓	✓
Top Management Support	✓	✗	✓	✓	✓	✓	✓	✓	✓
Information/Communication	✓	✗	✗	✗	✓	✓	✗	✗	✓
Client Involvement	✓	✓	✗	✗	✓	✓	✗	✓	✗
Comptent Project Team	✓	✗	✗	✗	✗	✓	✓	✓	✗
Authority of the Project Manager/Leader	✓	✗	✗	✗	✓	✗	✗	✗	✗
Realistic Cost and Time Estimates	✓	✓	✓	✓	✗	✗	✗	✗	✗
Adequate Project Control	✓	✗	✗	✗	✓	✗	✗	✗	✓
Problem Solving Abilities	✓	✗	✗	✗	✗	✓	✗	✗	✗
Project Performance and Quality	✗	✓	✗	✓	✗	✗	✗	✗	✗
Adequate Resources	✓	✓	✗	✗	✓	✓	✗	✓	✗
Planning/Controlling	✓	✓	✓	✗	✓	✗	✓	✓	✓
Monitoring performance and feedback	✗	✗	✓	✓	✗	✓	✓	✗	✗
Project Mission/common goals	✓	✗	✗	✗	✓	✓	✗	✗	✗
Project Ownership	✓	✓	✗	✗	✗	✗	✓	✓	✓

(Adopted from Ofori, 2013, p.19)

Shenhar, et al. (2001) performed a qualitative study of the various critical success factors and their viewpoint from project teams and developed four dimensions represented in Table 3 below.

Table 3: Critical Success Factors - Shenhar et al. (2001)

Success Dimension	Measure
Project Efficiency	Meeting schedule goal
	Meeting budget goal
Impact on the customer	Meeting functional performance
	Meeting technical specifications
	Fulfilling customer needs
	Solving a customer's problem
	The customer is using the product
	Customer satisfaction
Business Success	Commercial success
	Creating a large market share
Preparing for the future	Creating a new market
	Creating a new product line
	Developing a new technology

(Shenhar et al., 2001, p. 712)

As shown to the reader there are many attributes to project success and not a clear census from any of the authors, therefore, creating additional complexity for which attributes describe project success. The complexity of capital projects requires success over various factors aforementioned (Ofori, 2013; Pinto & Prescott, 1988; Shenhar et al., 2001), and these projects require a manager capable of leading a well-rounded team (Boykins et al., 2013; Scott-Young & Samson, 2008). Indeed, without the guidance of a capable project manager, project success may remain incapable of being achieved (Anantatmula, 2010).

2.2.1 Project Success

In addition to the project success factors success there is one important attribute, the achievement of project success requires the project manager to be an effective leader. Cleland (1995) studied the connections linking project managers and leadership from other non-project management areas, such as manufacturing operations, and found that project managers utilize

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many of the same leadership skills as general managers. Additionally, Rodney, Turner, Müller, and Dulewicz (2009) compared the leadership styles of project managers with functional managers and determined there are certain leadership characteristics contained within both; however, they suggested that project managers should improve on their communication to followers. Projects that had a successful alignment among the stakeholders were more successful (Caldas & Gupta, 2016). Additionally, the PMBOK suggests communication is vital for a project to be successful, and the person responsible for such communication is the project manager (PMI, 2017). Perhaps Müller & Turner's (2010) research provides the most impactful example of how project success is connected to the leadership style of the project manager with the use of additional communication.

2.2.2 Project Failure

The focus on projects is typically placed on the success of a project; however, lessons can be learned from projects that have failed. Lessons learned provides an organization the opportunity to limit the possibility of having a repeat failure for the same reason (PMI, 2013). Additionally, generally failed projects can and should discuss their successful elements and what could have been improved, incorporating changes into the organization's fabric for present and future projects (PMI, 2017). One major reason for project failure is the lack of comprehension from the project stakeholders and project team (Kerzner, 2006). Kerzner discovered a failure of projects was related to project teams not working toward the same specifications. Zimmerer and Yasin's (1998) studies found the lack of leadership to be another reason for project failure. Additionally, lack of project team alignment also leads to failure (Caldas & Gupta, 2016, 2017). Two key persons are responsible for ensuring the team is aligned: the project manager during the

integration stage of the project, and the project sponsor throughout the whole project to ensure it is aligned with the charter and organization goals (PMI, 2017). The leadership of the project manager can impact both failure and success. Therefore, leadership styles for projects managers have significance.

2.3 Top Management Support

The term top management support is best described by Pinto and Slevin (1987, p. 23) as the "top or divisional management support for the project that has been conveyed to all concerned parties." It can also be defined as:

> "The highest-ranking executives (with titles such as chairman/chairwoman, chief executive officer, managing director, president, executive directors, executive vice-presidents, etc.) responsible for the entire enterprise. Top management translates the policy (formulated by the board-of-directors) into goals, objectives, and strategies, and projects a shared-vision of the future. It makes decisions that affect everyone in the organization and is held entirely responsible for the success or failure of the enterprise." (BusinessDictionary.com, 2019)

Given the meaning, it is clear top management support is vital as they are responsible for providing the vision for the future of the enterprise, and the reinforcement offered will both ensure alignment to an organization's goals and objectives and convey the project's message through clear communication to all concerned parties.

Young and Jordan (2008) further the concept of top management support by researching top management support in the IS industry. They determined that one of the challenges faced by members of the top management team was the inability to easily recognize good advice.

Additionally, they hypothesized that the top management team should be focused on the realized

benefits, a concept lacking in the research. However, Ahmed et al. (2016) further expanded this

idea, taking top management from being viewed as a single dimensional construct to a

multidimensional construct.

Ahmed et al. (2016) researched top management as a multidimensional construct based

on the various views of key attributes to the construct from authors such as Boonstra (2013) and

Pinto & Prescott (1988), shown in Table 4 below:

Table 4: Top Management Key Attributes Pinto & Prescott (1988)

Key attributes of top management
Provide resource support
Provide authority
Provide power
Provide autonomy
Provide vision
Provide feedback/ monitoring
Support in crisis
Share responsibility
Support in decision making
Attend project meetings
Involvement/ participation
Ensure commitment
Project championship
Create awareness
Give priority

From these key attributes, five dimensions were developed: provide resources, structural

arrangements, communication, expertise, and power (R. Ahmed et al., 2016). Provide resources

referenced the ability to provide additional personnel as needed to assist the project. Structural

arrangements referenced the processes, procedures, and contractual structure to achieve the

project objective (Boonstra, 2013). Communication referenced the sharing of vision, motivation of the team, and collaboration with stakeholders (Boonstra, 2013). Expertise referenced experience needed to focus on strategic planning, commitments throughout the project life cycle, and soft skills for personality identification (R. Ahmed et al., 2016). Finally, power referenced the ability to endorse / protect the project team, facilitate systematic changes as needed, and assist with the needs of the project stakeholders (Boonstra, 2013). Several of the dimensions champion the needs of capital projects, which are unique to the higher level of complexity (Liu et al., 2015).

The role of top management support is often described as the project sponsor within the project management literature (PMI, 2017). The position is generally filled by top managers within the respective companies involved in the project, "assigned by the performing organization to achieve the project objectives" (PMI, 2013, p. 555). Specifically related to capital projects, success is also critical to the sponsors as these projects have capability of collapsing corporations or government due to the large amount of capital involved (Merrow, 1988). Project sponsors with the assistance of project managers are key for the top management team, as they are responsible for the attributes listed in the aforementioned list and final outcome of the project. Ahmed et al.'s (2016) multidimension construct furthered the meaning of top management teams in capital projects to provide the necessary resources, communicate to the stakeholders, and utilize power in substantiation of the team. There is limited literature on top management support, and the literature is further limited in the arena of project management literature, specifically capital projects.

2.4 Servant Leadership

Servant leadership is just one of the many styles of leadership which have been evaluated over time (Bass, 1990; Bass & Bass, 2008; Parris & Peachey, 2013). The formation of servant leadership as an organizational leadership style is based on three seminal essays by Robert K. Greenleaf, who is considered the originator of servant leadership theory. The underlying principle of Greenleaf's essays is service to others. However, the concept of serving others is not new, as it can be traced back to religious teachings and the actions of notable leaders such as Mother Theresa, Harriet Tubman, Dr. Martin Luther King, Lao-tzu, and Confucius (Keith, 2008). Several scholars suggest the ultimate example of a servant leader is Jesus Christ (Ebener and O'Connell, 2010; Lanctot and Irving, 2010; Winston, 2004). A juxtaposition of the foundational principles of servant leadership against other leadership styles illustrates the challenge of defining servant leadership; while other styles define what the leader does, servant leadership is defined by the leader's character and commitment to others (Parris & Peachey, 2013). This definition creates a core challenge for theorists: to construct a model that expresses the theoretical message of Greenleaf, which is "servanthood-through-leadership-through-practice" (Proser 2010, p. 28). Such a theoretical message cannot be superficial, it must be substantiated deep within a person, and it must also serve as a call for the greater good to help others (Greenleaf 1970).

2.4.1 Servant Leadership Defined

It is the depth of an individual's internal motivation which serves as a principal challenge for defining servant leadership. Indeed, Greenleaf predicted the challenge of attempting to

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define servant leadership in 1977, when he advised the problematic nature of being able to apply and operationalize servant leadership. Some scholars suggest this was by design as Greenleaf challenged readers to ponder, reflect, and grow (Frick, 2004; Spears, 1995). Certainly, Greenleaf's design was successful as this paper explores the use of servant leadership in project settings. His meaning of servant leadership is commonly used and expresses its core values:

> "The Servant-Leader is servant first. . .. It begins with the natural feeling that one wants to serve, to serve first. Then conscious choice brings one to aspire to lead . . .. The best test, and difficult to administer is this: Do those served grow as persons? Do they, while being served, become healthier, wiser, freer, more autonomous, and more likely themselves to become servants? And what is the effect on the least privileged in society? Will they benefit, or at least not further be harmed?" (Greenleaf, 1977: 7)

Despite this explanation , there is not a formally agreed upon definition by scholars, yet the classification provided best describes the Greenleaf's original intentions when he established the construct of servant leadership (Parris & Peachey, 2013).

2.4.2 Characteristics of servant leadership

Additionally, Greenleaf did not have an empirically testable scale developed prior to his passing in 1990 (Van Dierendonck, 2011). However, Greenleaf left behind numerous writings that were yet to be published (Spears, 2017). Larry Spears, who worked alongside Greenleaf for approximately ten years (Spears, 2017), was one of the initial and most influential people to develop a model from the characteristics of Greenleaf's writings. Spears also published edited

volumes based directly or indirectly on writings of Greenleaf (Van Dierendonck, 2011) and distilled ten characteristics of the servant leader from Greenleaf's writings:

(1) Listening: suggesting the leader needs to listen intently to others to hear what is being said and what is not being said; the leader needs listening coupled with periods of reflection;

(2) Empathy: understanding others and empathizing with others; the leader needs to become a skilled empathetic listener;

(3) Healing: the ability to make those you come in contact with whole, by understanding their search for wholeness;

(4) Awareness: self-awareness, awareness of ethics and values, being capable of viewing situations from an integrated perspective, while having one's own inner serenity;

(5) Persuasion: the use of influence rather than the use of positional authority, having the ability to create a consensus within group(s);

(6) Conceptualization: the ability to look beyond the present challenge and daily operations to respond with both a short-term and long-term solution;

(7) Foresight: to understand lessons learned, the current situation, and potential consequences before making a decision, as well as having an intuitive mind;

(8) Stewardship: holding something in trust for the greater good for society;

(9) Commitment to the growth of people: understanding the importance of one's intrinsic value, not just their work obligations, and working to ensure they receive the necessities for growth personally, professionally and spiritually;

(10) Building Community: understanding the significance of the local community and

seeking to build the community amongst those who work together.

Despite these characteristics defining the initial attributes of servant leadership, numerous authors attempted to define their own perspectives due to the lack empirically derived definitions. Over the last 30 plus years, there have been multiple models, the eight different models shown on Table 5 has more than 200 testable constructs, as each attribute has a minimum of 3 constructs.

Table 5: Testable Constructs

Authors	Spears & Greenleaf (1995)	Laub (1999)	Russell & Stone (2002) Functional	Russell & Stone (2002) Additional	Patterson (2003)	Liden et al. (2008)	Vin Dierendonck (2011)	Liden et al. (2015) (used in study)
Servant Leadership Attributes	Listening	Develops People	Vision	Communication	Agapao	Emotional Healing	Empower and Develop People	Emotional Healing
	Empathy	Shares Leadership	Honesty	Credibility	Love	Creating Value for the Community	Show Humility	Creating Value for the Community
	Healing	Displays Authenticity	Intergrity	Competence	Humility	Conceptal Skills	Authentic	Conceptal Skills
	Awareness	Values People	Trust	Stewardship	Altruism	Empowering	Accept people for who they are	Empowering
	Persuasion	Providing Leadership	Service	Visibility	Vision	Helping Subordinates Grow and Succeed	Provide Direction	Helping Subordinates Grow and Succeed
	Conceptalization	Builds Community	Modeling	Influence	Trust	Putting Subordinates First	Stewards who work for the good of the whole	Putting Subordinates First
	Foresight		Pioneering	Persuasion	Empowerment	Behaving Ethically		Behaving Ethically
	Stewardship		Apperication of Others	Listening	Service			
	Commitment to Grow People		Empowerment	Encouragement				
	Building Community			Teaching & Delegation				

Reminiscent of the designation of servant leadership, there is no agreed upon measure; however, there are several measures which have met the requirements of confirmatory factor analysis, such as the seven dimension Liden, Wayne, Zhao, & Henderson scale (2008), the six dimensions from Sendjaya, Sarros, and Santora (2008), and the eight dimensions from Van Dierendonck and Nuijten (2011). Sendjaya et al.'s (2008) instrument contains 22 characteristics split across six core dimensions of servant leaders with a total of 35 items representing the 22 characteristics.

The six dimensions are (1) Transforming Influence; (2) Voluntary Subordination; (3) Authentic Self; (4) Transcendental Spirituality; (5) Covenantal Relationship; and (6) Responsible Morality. Van Dierendonck and Nuijten (2011) developed an instrument with eight dimensions across 30 items: (1) Empowerment; (2) Humility; (3) Standing Back; (4) Authenticity; (5) Forgiveness; (6) Courage; (7) Accountability; and (8) Stewardship. Finally, Liden et al., (2008) created seven dimensions measured by 28 items. The seven dimensions are (1) Emotional Healing; (2) Creating Value for the Community; (3) Conceptual Skills; (4) Empowering; (5) Helping Subordinates Grow and Succeed; (6) Putting Subordinates First; and (7) Behaving Ethically. For the purpose of this paper, the seven dimensions of the Liden et al., (2008) will be used to measure servant leadership.

The Liden et al. (2008) dimensions are further detailed below as they will serve as the basis of measure for servant leadership in this paper. The premise for these dimensions is based on the interpretations of Liden et al (2015) and existing taxonomies of servant leadership from authors such as Barbuto & Wheeler, (2006); Page & Wong, (2000); and Spears & Lawrence, (2002):

> "1. Emotional healing—the act of showing sensitivity to others' personal
> concerns
> 2. Creating value for the community—a conscious, genuine concern for
> helping the community
> 3. Conceptual skills—possessing the knowledge of the organization and
> tasks at hand so as to be in a position to effectively support and assist
> others, especially immediate followers

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4. Empowering—encouraging and facilitating others, especially

immediate followers, in identifying and solving problems, as well as

determining when and how to complete work tasks

5. Helping subordinates grow and succeed—demonstrating genuine

concern for others' career growth and development by providing support

and mentoring

6. Putting subordinates first—using actions and words to make it clear to

others (especially immediate followers) that satisfying their work needs is

a priority (Supervisors who practice this principle will often break from

their own work to assist subordinates with problems they are facing with

their assigned duties.)

7. Behaving ethically—interacting openly, fairly, and honestly with

others." (Liden et al., 2008)

2.4.3 Servant leadership theory

Parris and Peachey (2013) performed a systematic leadership review of servant

leadership and determined three streams of research: (a) Conceptual Stream, which contains the

works of Spears, (1998); Laub, (1999) and Patterson, (2011); (b) Measurement Stream, which

contains the works of Page and Wong, (2000); Wong and Page, (2003); Ehrhart, (2004); Barbuto

and Wheeler, (2006); Dennis and Bocarnea, (2005); Liden et al. (2008); Sendjaya et al., (2008);

Van Dierendonck and Nuijte, (2011); and (c) Model Development Stream, which contains the

works of Russell and Stone, (2002); Van Dierendonck, (2011); Liden et al., (2015). These three

streams, along with Greenleaf's seminal essays, serve as the underpinning for servant leadership theory. The basis of the theory is a flipped organization chart, where the employees are the priority of the business, with managers serving the employees.

2.4.4 Similarities between servant leadership and other leadership theories

Servant leadership theory overlaps with five other theoretical lenses of leadership: ethical leadership, transformational leadership, authentic leadership, spiritual leadership, and positive leadership (Sendjaya et al., 2008; van Dierendonck, 2011; Grandy & Sliwa, 2015).

Ethical leadership can be defined as "the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement and decision-making" (Brown, Trevino & Harrison, 2005: 120). At the center of ethical leadership is the importance of suitable behavior within an organization (Avolio et al., 2009). The similar characteristics amongst servant leadership and ethical leadership are trust, integrity, moral values, motivation, respect, awareness, empathy, fairness, relationship management, and self-management (Lumpkin, 2018).

Transformational leadership is best described by Bernard Bass (1990, p. 21): "leaders broaden and elevate the interests of their employees, when they generate awareness and acceptance of the purposes and mission of the group, and when they stir their employees to look beyond their own self-interest for the good of the group." The qualities shared amid transformational leadership and servant leadership are the focus on the growth of the follower, intellectual stimulus, and the support offered to the individual (Bass, 1990).

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Authentic leadership is defined as "individuals who are deeply aware of how they think and behave and are perceived by others as being aware of their own and others' values/moral perspective, knowledge, and strengths; aware of the context in which they operate; and who are confident, hopeful, optimistic, resilient, and high on moral character" (Avolio, Luthans, & Walumbwa, 2004, p. 4). Servant leadership and authentic leadership share the desire to maintain transparency in interpersonal relationships, self-awareness, and the desire to encourage followers to have high level of authenticity: being one's true self (Avolio & Gardner, 2005).

Spiritual Leadership "is inclusive of the religions, ethics, and values-based approaches to leadership" (Fry, 2003, p. 693) and is comprised of "the values, attitudes, and behaviors that are necessary to intrinsically motivate one's self and others so that they have a sense of spiritual survival through calling and membership" (Fry, 2003, p. 711). Reave (2005, p. 663) describes spiritual leadership as "occurring when a person in a leadership position embodies spiritual values such as integrity, honesty, and humility, creating the self as an example of someone who can be trusted, relied upon, and admired. Spiritual leadership also is demonstrated through behavior, whether in individual reflective practice or in the ethical, compassionate, and respectful treatment of others." Servant leadership and spiritual leadership (in the workplace) share characteristics of setting goals, building the followers, and making work meaningful (Pawar, 2014).

Paralleling the comparison to Spiritual Leadership, there is also a similarity associating servant leadership to positive leadership, which can be defined by three key components:

"(1) Facilitation of extraordinarily positive performance—that is,

positively deviant performance. This means outcomes that dramatically

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exceed common or expected performance (2) An affirmative bias or a

focus on strengths and capabilities and on affirming human potential. (3)

Facilitating the best of the human condition, or on fostering virtuousness.

In summary positive leadership can be defined as 'emphasis on what

elevates individuals and organizations (in addition to what challenges

them), what goes right in organizations (in addition to what goes wrong),

what is life-giving (in addition to what is problematic or life-depleting),

what is experienced as good (in addition to what is objectionable), what is

extraordinary (in addition to what is merely effective), and what is

inspiring (in addition to what is difficult or arduous)." (Cameron, 2012,

pp. 2–4)

Servant leadership and Positive leadership share characteristics of engaging and developing

people, valuing people, and developing others, (Van Dierendonck, 2011). Despite these

similarities, there are unique difference and a few of these are illustrated along with the

similarities in Table 6.

Table 6: Leadership compare / contrast

Leadership Style	Similar Characteristics	Unique Differences	Source
Ethical Leadership	Trust, integrity, moral values, motivation, respect, awareness, empathy, fairness, relationship management, and self-management	Focus on moral management and ethical standards; do the right thing	Lumpkin, 2018
Transformational Leadership	Focus of the grow of the follower, intellectual stimulus and the support offered to the individual	Focus on the organization and organization objectives rather than the follower, ultimate success for the organization	Bass, 1990
Authentic Leadership	To maintain transparency in interpersonal relationships, self-awareness, and the desire to encourage their followers to have high level of authenticity: being one's true self	Focus on the development of self-awarness and self-regulated positive behaviors, thereby fosteting self-development	Avolio & Gardner, 2005
Spiritual Leadership	Setting goals, building the followers, and making work meaningful	Focus on creating a vision within followers, through a calling, to develop a sense of purpose / meaning	Pawar, 2014
Positive Leadership	Engaging and developing people, valuing people, and developing others	Focus on the exceeding the normal through fostering virtuousness; strategies to provide strengths to the organization	Cameron, 2012

Parris and Peachey (2013) performed a systematic leadership review to synthesize the literature conducted on servant leadership, and their results confirm no consensus of a definition like the conclusion of Anderson's (2009) and Van Dierendonck's (2011).   Notwithstanding the challenge of not having a consensus on the meaning of servant leadership, there is an expanding need for such leadership due to the demands of the business environment for leaders who value ethics, morality, and virtues (Graham, 1991; Lanctot and Irving, 2010; Parolini et al., 2009; Russell, 2001; Whetstone, 2002).

2.4.5 Importance of servant leadership to project management

Indeed, there are various similarities between servant leadership and other leadership theories, yet the one linkage which expresses the importance of servant leadership to project management is the need for the project management to develop a working relationship with the team which comes from various functional departments and how that relationship is defined (Boykins et al., 2013; PMI, 2017). Servant leadership as a relation-oriented leadership style along with the focus on the follower and the follower's growth helps to better develop the rapport needed to facility relationships among the project team. Whereas, transformational leadership focuses on the follower it does so through the lens of helping the organization gain the overall goals (Bass & Bass, 2008).   The approach and the characteristics of servant leadership as described Liden et al. (2008) along with the necessity of leadership skills (S. F. Ahmed, 2011), such as building relationships and communication, resolving conflict, leading the project team, and the adaptability to change blend well with project manager's responsibility. It is the blending of these attributes which requires the project manager to have a bond with the team members beyond the organizational goals as projects have a unique expected outcome based on the client needs and other dynamics associated with the project scope, these attributes are described as the component based on team level effectiveness (Parris & Peachey, 2013).

2.4.6 Servant leadership criticisms

Despite the exemplary ideas and constructs for servant leadership, some authors critique the "way of life" concept developed by Greenleaf (1977) as a management technique (Parris &

Peachey, 2013; Van Dierendonck, 2011). These authors criticize the conceptualization as a way of life rather than a management movement, which in turn has limited the acceptance of servant leadership as a theory among academia, due to there being no way to empirically test a way of life (Parris & Peachey, 2013; Van Dierendonck, 2011). Another criticism is the lack of agreement on one definition of servant leadership (Andersen, 2009; Dennis, 1999; Parris & Peachey, 2013; Van Dierendonck, 2011). Additional criticism relates to the lack of not having one unified and synchronized model or a measurement instrument to empirically test servant leadership (Liden et al., 2008; Parris & Peachey, 2013; Van Dierendonck, 2011). As this paper illustrates, there are numerous suggested characteristics, due to the lack of Greenleaf defining these characteristics in his essays. Perhaps the lack of defining servant leadership and creating a scale was by design (Greenleaf, 1977). Critics view the focus on the follower without any consideration to the needs of the organization as potentially problematic if the needs of the follower do not align with those of the organization (Andersen, 2009; Van Dierendonck, 2011). These criticisms are a few of those relating specifically to project management.

2.5 Hypothesis Development

A major challenge faced by today's project managers is completing projects within the triple constraints of time, cost (budget) and scope , which are the areas key to project success (R. Ahmed et al., 2016; Müller & Jugdev, 2012; Pinto & Slevin, 1988b). According to the literature review performed in this research, other attributes must be considered when evaluating project success, previously expounded on within section 2.2 Project Outcomes. Before examining project success, however, we must first consider the relationship between project success and Top Management Support (TMS).

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Top Management is key to any business as they solidify the strategic direction for the business and provide guidance to meet the shareholder expectations (Porter, 1996). As Porter mentioned, their strategic value resides in "defining and communicating the company's unique position, making trade-offs, and forging fit among activities" (Porter, 1996, p. 77). The supporting responsibilities of Top Management previously evaluated in Section 2.3 Top Management Support.

Another key role in determining project success or project failure is the project manager. Müller & Turner, (2010) discuss the substance of being agile and having the capacity to change one's leadership style based on the project requirements. Sometimes within an organization, opportunities arise that cause projects to deviate from their planned tasks. These deviations require the project manager(s) to evaluate the current situation and make decisions in the best interest of their team (Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014). Multiple academic and practice-based studies relate to the preferred leadership style for project managers (Boykins et al., 2013; Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014; Tuuli et al., 2012). Many of these writings suggest that there is no one preferred leadership style (Boykins et al., 2013; Dubois et al., 2015; Galvin, T., Gibbs, M., Sullivan, J., & Williams, 2014; Hodgkinson, 2009; Ochieng & Price, 2010) but instead a combination of leaderships styles contingent upon the situation (Lee-Kelley , 2002; Hodgkinson, 2009). Despite these suggestions, key attributes in servant leadership cross multiple leadership theories, as shown within this paper. Given the significance of being able to create team alignment and stakeholder alignment due to the complexity of capital projects, perhaps servant leadership principles are good leadership principles for a project manager.

Given the existing findings in literature and the establishment of the prominence of the

role of top management and the role of the project manager, this research suggests the following

hypotheses:

$H1_A$: Top management support – communication has a positive correlation

to project success.

$H1_B$: Top management support – resource has a positive correlation to

project success.

$H2_A$: The relationship between top management support – communication

and project success are positively moderated by servant leadership

principles.

$H2_B$: The relationship between top management support – resource and

project success are positively moderated by servant leadership principles.

2.5.1 Conceptual Model of Hypothesis

Figure 1: Conceptual Model of Hypothesis
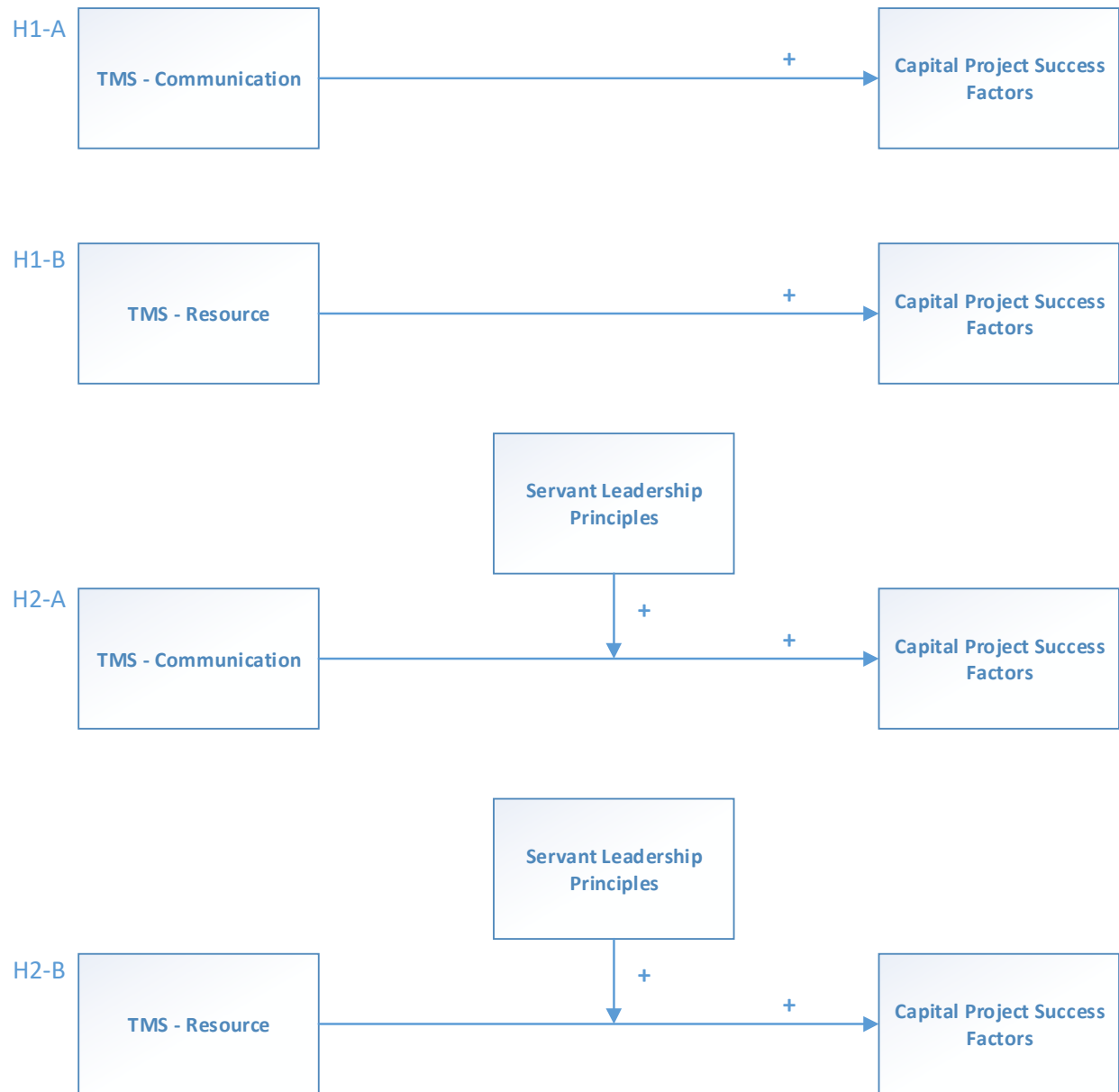
2.6 SUMMARY

In summary Chapter 2 reviewed the hypothesis development, provided insights into factors present in projects which have been deemed success as well as lesson learned from projects that have failed. Introduced the connection between project manager and top management support attributes. Additionally, the chapter provided a literature review which supports and defines Servant Leadership, through a review of the characteristics, theory, similarities with other leadership theories and mentions a few critics of Servant Leadership. In addition, the chapter includes a discussion on the formation of project management to include the following topics: importance given current challenges, defines a project, defines a capital project, explains how capital projects are used in industry, leadership on capital projects and outcomes associated with capital projects. The chapter concludes with the research hypotheses. Chapter 3 describes the methodology used in the study, including the selection process of participants, data collection techniques, instruments, and statistical analysis. Chapter 4 will evaluate the results of this research. Chapter 5 will provide further discussion, implication, and recommendations gained from this research.

CHAPTER 3

METHODOLOGY

3.1 Design

This research explored the hypothesized relationships between capital project success and top management support with servant leadership expected to moderate the relationship. The research strategy used herein was a field study, utilizing a web survey as the method of data collection. The data collection strategy allowed the researcher to collect data from the participants based on their experience in the real-world environment, therefore maximizing the level of contextual realism and providing meaningful examination of leadership of project managers.

3.2 Research Methodology

A survey was used to collect data from individuals across multiple companies and industries who have experience working on capital projects. Participants were asked to answer all the selected measures based on their interactions and experience with their most recent capital project. The chosen methodology sought to understand if servant leadership was a factor capable of increasing success in capital projects.

3.3 Sample Population / Data Collection

The population for the collection of this data was project managers. Surveys were sent to several project management professional organization groups that include individuals who are

either project managers or members of project teams. Additionally, a link to the survey was

posted on social media to garner additional respondents who are project management

professionals across various locations. The data crossed multiple industries in an attempt to

increase the generalizability of the information associated with capital projects regardless of a

specific industry. The intentions behind the selection of the target population were to capture the

perception of the project team on Capital Project Success, Top Management Support (resources

and communication), and servant leadership.

3.4 Procedure

The procedure used to collect data did not commence until an Institutional Review Board

(IRB) application was approved. Once the IRB application was approved, an email with a

survey link was sent to several popular LinkedIn project management pages, a large Engineering,

Procurement and Construction (EPC) firm headquartered in Texas and a Project Management

Institute Chapter located in a large city in Texas. The link took the participants to the survey,

where they were first asked to complete a consent form, and then the survey commenced

allowing the participants to complete the selected measures. The data was analyzed using IBM's

SPSS software.

3.5 Key Constructs

Table 6 shows a list of each of the constructs being measured in this study along

with the measurement choice, measurement tool, level of rigor, and data type. Each of these

variables is further examined below along with any potential measures.

Table 6: Constructs

Construct	Measurement Choice	Level of Analysis	Scale Type	Number of Items
Top Management Support (TMS) - Communication (IV)	Self-report	Individual	Interval	6
Top Management Support (TMS) - Resources (IV)	Self-report	Individual	Interval	5
Capital Project Success (CPS) (DV)	Self-report	Individual	Interval	12
Servant Leadership (SL) (MV)	Social report	Individual	Interval	7

Table of Constructs with Methodological Components

3.5.1 Dependent Variable – Capital Project Success

Capital Project Success was measured by the defined success criteria from Pinto and Slevin (1987, 1988b). The scale was developed to measure project success. The scale contains 12 items, which account for multiple critical success factors and provide a good overview of project success with scale items such as "this project has/will come in on schedule" and "this project will have a positive impact on those who make use of it" on a 5-point Likert scale ranging from 1 strongly disagree to 5 strongly agree.

3.5.2 Independent Variable – Top Management Support

Top Management Support was measured using Ahmed et al.'s (2016) scale, which has two TMS dimensions important to project management: communication and resources. Seven of the scale items measure the communication facets of TMS with scale items such as "top management often communicated to sell the project with the rest of the organization" and "top

management effectively communicated with the stakeholders to enhance organizational efficiency." The other five scale items measure the allocation of resources with regard to TMS and include scale items such as "top management provided adequate resources for successful implementation of the project" and "top management ensured availability of necessary resources to support the project team during crises." To be consistent, we modified our survey to use a 5-point Likert scale for each item ranging from 1 strongly disagree to 5 strongly agree to align with our capital project success scale.

3.5.3 Moderating Variable – Servant Leadership

To measure servant leadership, we used the Liden et al. (2015) scale. The scale was developed as an abbreviated version of the researchers' original 28-item scale. The purpose of using the abbreviated scale was to evaluate servant leadership more globally rather than at the dimension level. Also, this short form scale was selected herein to limit the time necessary for survey participants to complete the survey given the target population's senior experience, and therefore, limited time to complete surveys. Like previously, we modified our survey to use a 5-point Likert scale for each item ranging from 1 strongly disagree to 5 strongly agree to align with our capital project success scale.

3.6 Ethical Considerations

Each of the measures mentioned in the key variables section of the paper were included in the required documentation for the IRB approval. Each participant was provided the consent form as the first step in the survey. So, participants were aware of the research being conducted,

and they had the freedom to exit the survey at any time. Additionally, participants were informed that there was minimal risk associated with the collection of the data. Lastly, participants were informed that no individual data would be shared with anyone outside of the research team and all results would be reported in aggregate. A gift card was awarded to two randomly selected individuals who completed the survey in its entirety.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter provides the results of this research. The sections of this chapter include the data collection process, descriptive statistics, regression analysis, and the outcomes from the hypothesis testing. The chapter concludes with a summary.

4.2 Data Collection

The purpose of this research was to empirically assess the relationship between top management support and capital project success, and to evaluate if servant leadership moderated the relationship between these two constructs. The data was collected through the survey research method from four populations. All groups were contacted through various media (i.e., social media, email, and distribution through project management organizations) and provided a hyperlink to the survey. All survey data were collected via Qualtrics®, an online survey platform. The data collection process started in December of 2020 and ended in April of 2021.

The sample was comprised of responses from several popular LinkedIn project management pages (93 participants), emails sent to a large Engineering, Procurement and Construction (EPC) firm headquartered in Texas (19 participants), a large Project Management Institute Chapter located in Texas (42 participants), and project management associates of the researcher (26 participants). These four populations produced 180 responses. However, 20

respondents did not agree to the consent form, therefore they were removed from the sample. In addition, 71 respondents, did not complete the entire survey, and they too, were removed. Lastly, 4 respondents took over an hour to complete the survey, and were removed, as well. So, the final sample included 85 respondents.

4.2.1 Data Preparation

To prepare the data for analysis, all responses were scrubbed to remove any personal identifying information including their email address, which was collected only for the survey participants interested in being eligible for the prize drawing. As mentioned in the previous section, any surveys with incomplete responses were excluded from the sample entirely.

4.2.2 Outliers

With a Cook's Distance of .08 (below the threshold of 1.0), there were not any major outliers in the data (Field, 2013). Additionally, Mahalanobis Distance was used to perform a multivariant analysis, (Hair et al., 2018). One outlier was found and was excluded from the analysis reducing the sample to 84.

4.3 Sample Characteristics

The survey captured the following industry and demographic variables of the respondents: industry, years of capital project experience, number of projects serving in the

capacity of project manager, specialized training or certification, number of employees in the organization, and number of employees involved in the project being reviewed for this research.

The industry responses indicate that the data was collected across 14 industries. The largest industry categories were construction (16%), healthcare (14%) and social assistance (14%). With regard to the number of years of experience with capital projects, 50% of the respondents had over 10 years of experience. (See Table 7). In addition, 37.7% of the sample have been the project manager on 20 or more capital projects (see Table 12). Sixty percent of the sample worked on a project team of twenty or more people for the project discussed in their survey and sixty percent of the sample work for large organizations of a thousand or more employees. Almost all (96%) of the respondents had a college degree, of which 52.9% earned a graduate degree (See Table 8), and 74% had a project management certification or specialized training (See Table 13). Lastly, with regard to gender, 52% of the sample was male and 46% was female (See Table 9).

Table 7: Capital Project Experience

How many year(s) of capital project experience do you have?	
1 - 2 years	11.8%
3 - 5 years	24.7%
6 - 10 years	14.1%
11 - 14 years	14.1%
15 - 19 years	17.6%
20+ years	17.6%

Table 8: Level of Education

Level of Education		
	Sample	US Population [1]
High School	4%	32%
Some College	2%	20%
College Degree	41%	35%
Grad Work	53%	12%
[1] - 2019 Census.gov		

Table 9: Gender of participant

Gender		
	Sample	US Population [1]
Female	46%	51%
Male	52%	49%
Missing	2%	N/A
[1] - 2019 Census.gov		

Table 10: Employees in organization

How many employees work at your organization?	
1-4	4%
5-9	1%
10-19	4%
20-49	7%
50-99	7%
100-249	6%
250-499	5%
500-999	7%
1000 or more	60%

Table 11: Project employees

How many employees work on or are currently working on the project?	
1-4	8%
5-9	18%
10-19	14%
20-49	24%
50-99	7%
100-249	11%
250-499	5%
1000 or more	13%
Missing Data	1%

Table 12: Number of projects served as PM

In your career, approximately how many projects have you served as project manager?	
1	7%
2-5	20%
6-10	20%
11-15	9%
16-20	2%
21 or more	38%
Missing Data	4%

Table 13: Additional training / certification

Do you have a project management certification or specialized training?	
Yes	74%
No	26%

4.3.1 Scale Reliability

Reliability is the degree to which consistency or stability form between different measures of a construct (Ahire & Devaraj, 2001). In this research, scale reliability was evaluated by calculating the Cronbach alpha for each scale. Additionally, scale reliability was tested by evaluating the loadings of the constructs via Factor Analysis. The next two sections provide the results of each of these tests.

4.3.1.1 Cronbach alpha

Cronbach alpha is widely used to evaluate the internal consistency of scale items (Ahire & Devaraj, 2001). Researchers typically use .70 for established scales as the threshold for acceptable reliability (Ramamurthy, 1995). The Table 14 below shows the Cronbach alpha for each of the measures used in this research.

Table 14: Cronbach alpha

Variable	# SI	Cronbach's alpha
CPS – Outcome	2	0.811
CPS – Effectiveness	5	0.807
CPS – Utilization	4	0.702
TMS – Resources	5	0.896
TMS – Communication	6	0.900
Servant Leadership	4	0.809

4.3.2 Construct validity

Validity is a measure of the fidelity of the scale used and the extent to which the scale items measure the intended construct. In this research two types of validity were assessed: convergent and discriminant validity.

4.3.2.1 Convergent validity

To test convergent validity, a principal components factor analysis with varimax rotation was performed, and the factor loadings were assessed as shown in Table 15 (Hair et al., 2018). As the results indicate, several of the survey scale items loaded on unexpected factors. Due to multicollinearity concerns (with Variance Inflation Factors greater than 10), the following scale items were removed: Servant Leadership scale items 1, 6, and 7. In addition, Capital Project Success scale item 8 was removed because of a lack of convergent validity. Lastly, the Capital Project Success scale was split into three factors based on their factor loadings. Due to similar themes, these factors were labelled herein as CPS – Outcome, CPS – Effectiveness, and CPS – Utilization.

Table 15: Rotated component matrix

Component						

Communication (C)

C1	**0.770**	0.277	0.126	0.126	0.122	0.227
C2	**0.696**	0.206	-0.019	0.113	0.188	-0.170
C3	**0.713**	0.204	0.178	0.265	0.300	-0.020
C4	**0.744**	0.185	0.269	0.120	0.073	0.088
C5	**0.805**	0.188	0.051	0.104	-0.020	0.216
C6	**0.688**	0.217	0.178	0.312	0.154	0.307

Resources (R)

R1	0.296	**0.758**	0.073	0.142	0.134	0.099
R2	0.277	**0.730**	0.292	0.075	-0.088	-0.032
R3	0.281	**0.766**	0.205	0.117	-0.182	0.080
R4	0.260	**0.807**	0.144	0.063	0.123	0.263
R5	0.086	**0.817**	-0.108	0.088	0.297	0.121

Capital Project Success - Effectiveness
(CPS_E)

PS-5	0.091	0.150	**0.786**	-0.044	0.174	0.001
PS-6	0.095	0.061	**0.637**	0.107	0.299	0.336
PS-7	0.199	0.092	**0.625**	0.098	0.422	0.040
PS-10	0.056	0.128	**0.800**	0.022	0.006	0.089
PS-12	0.152	0.076	**0.590**	0.227	0.177	-0.050

Servant Leadership (SL)

S2	0.189	0.033	-0.045	**0.803**	0.048	-0.128
S3	0.200	-0.023	0.052	**0.789**	0.092	0.090
S4	0.064	0.186	0.168	**0.778**	-0.082	0.026
S5	0.144	0.152	0.101	**0.711**	0.148	0.126

Capital Project Success - Utilization (CPS_U)

PS-3	0.083	-0.041	0.358	-0.006	**0.677**	0.043
PS-4	0.299	0.198	0.130	0.157	**0.777**	0.084
PS-9	0.076	0.413	0.253	-0.027	**0.453**	0.380
PS-11	0.137	0.018	0.429	0.099	**0.561**	0.056

Capital Project Success - Outcome (CPS_O)

PS-1	0.216	0.187	-0.045	0.030	0.126	**0.809**
PS-2	0.072	0.127	0.180	0.048	0.016	**0.878**

4.3.2.2 Discriminant validity

To test for discriminant validity, a heterotrait-monotrait ratio of correlations (HTMT) was used. Henseler et al. (2014) introduced the HTMT measure for discriminative validity and the established threshold is .85. As shown below, the HTMT scores for these variables are below the threshold resulting in discriminant validity.

Table 16: HTMT Results

HTMT Results						
Communication						
Resources	0.635					
Servant Leadership	0.507	0.333				
CPS-O	0.388	0.403	0.152			
CPS-E	0.471	0.400	0.297	0.315		
CPS-U	0.580	0.464	0.300	0.407	0.827	
	Communication	Resources	Servant	CPS-O	CPS-E	CPS-U

4.4 Descriptive Statistics

The descriptive statistics calculated for the sample were the mean, standard deviation, skewness, and kurtosis. These statistics are captured in Table 17 shown below.

Table 17: Descriptive Statistics

Variable	# SI	Mean	SD	Skewness[1]	Kurtosis[2]
CPS – Outcome (CPS$_O$)	2	3.676	1.345	-0.819	-0.515
CPS – Effectiveness (CPS$_E$)	5	4.447	0.594	-1.122	1.305
CPS – Utilization (CPS$_U$)	4	4.488	0.552	-1.446	2.406
TMS – Resources (R)	5	3.972	0.901	-0.951	0.416
TMS – Communication (C)	6	3.986	0.839	-0.71	-0.328
Servant Leadership (SL)	4	3.691	0.94	-0.744	0.161

SI: Scale Items SD: Standard Deviation; N = 84

As listed in Table 18, the mean for CPS-Outcome was lower than the means for CPS-

Effectiveness and CPS-Utilization and had a higher standard deviation indicating more variance

with regard to this scale. All scales had acceptable skewness (between -3 and +3) and kurtosis (between -10 and +10).

Given the three new dependent constructs (CPS-Outcome, CPS-Effectiveness, CPS-Utilization), the original hypotheses were modified. The modified hypotheses are shown below:

H1-A$_O$: TMS – Communication should have a positive relationship with Capital Project Success – Outcome.

H1-A$_E$: TMS – Communication should have a positive relationship with Capital Project Success – Effectiveness.

H1-A$_U$: TMS – Communication should have a positive relationship with Capital Project Success – Utilization.

H2-A$_O$: The relationship between TMS – Communication and Capital Project Success – Outcome should be positively moderated by Servant Leadership Principles.

H2-A$_E$: The relationship between TMS – Communication and Capital Project Success – Effectiveness should be positively moderated by Servant Leadership Principles.

H2-A$_U$: The relationship between TMS – Communication and Capital Project Success – Utilization should be positively moderated by Servant Leadership Principles.

H1-B$_O$: TMS – Resources should have a positive relationship with Capital Project Success – Outcome.

H1-B$_E$: TMS – Resources should have a positive relationship with Capital Project Success – Effectiveness.

H1-B$_U$: TMS – Resources should have a positive relationship with Capital Project Success – Utilization.

H2-B$_O$: The relationship between TMS – Resources and Capital Project Success – Outcome should be positively moderated by Servant Leadership Principles.

H2-B$_E$: The relationship between TMS – Resources and Capital Project Success – Effectiveness should be positively moderated by Servant Leadership Principles.

H2-B$_U$: The relationship between TMS – Resources and Capital Project Success – Utilization should be positively moderated by Servant Leadership Principles.

The revised model is shown below in Figure 2.

Figure 2: Revised model
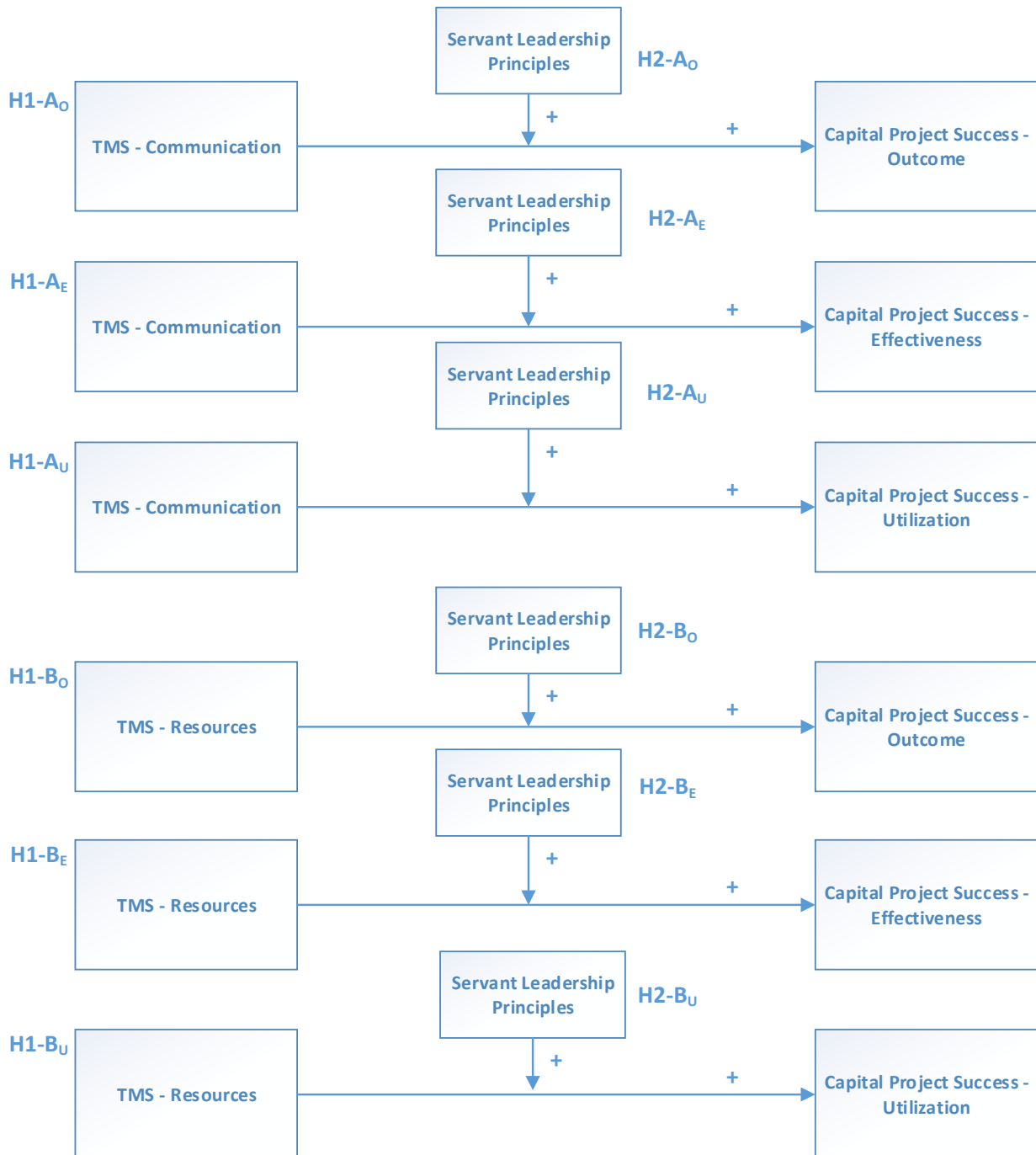
4.5 Hierarchical Multiple Regression (HMR)

Hierarchical Multiple Regression (HMR) was chosen as the statistical tool to evaluate the model because it allows the statistics to build as well as evaluate a moderating relationship. HMR has been used by many previous researchers, including use in TMS research (R. Ahmed et al., 2016; Evans, 1985; Hayes, 2013; Leung et al., 2004). The results for the hypothesis testing are provided below.

To test Hypothesis H1-A$_O$ and determine if there was a relationship between TMS – Communication and Capital Project Success – Outcome, a Hierarchical Multiple Regression (HMR) was run. Overall, Model 1 was significant (F=9.546, p=.003) with an adjusted R^2= .093. With ß=.323, TMS – Communication was found to positively influence Capital Project Success – Outcome. Thus, there is moderate support for Hypothesis H1-A$_O$ (Hair, et al, 2016).

Hypothesis H2-A$_O$ determined if servant leadership moderated the relationship between TMS – Communication and Capital Project Success – Outcome. In the second model, Servant Leadership was added as an independent variable. In the third model, the interaction between TMS – Communication and Servant Leadership was added. In both cases, neither servant leadership nor the interaction term were significant at (p< .05). Thus, there is no support for Hypothesis H2-A$_O$. See Table 18 for all the HMR results.

Table 18: Results - Hypothesis: TMS – (C) on CPS - Outcome

Model 1

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	F	Sig.
TMS - Communication (C)	**0.323**	3.090	**0.003**	0.104	0.093	0.000	9.546	0.003

Model 2

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**0.334**	2.918	**0.005**					
Servant Leadership (S)	**-0.028**	-0.244	**0.808**	0.105	0.083	0.001	0.060	0.011

Model 3

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**0.408**	0.928	**0.356**					
Servant Leadership (S)	**0.065**	0.119	**0.906**					
C x S	**-0.141**	-0.174	**0.862**	0.105	0.072	0.000	0.030	0.030

To test Hypothesis H1-A$_E$ and determine if there was a relationship between TMS – Communication and Capital Project Success – Effectiveness, a Hierarchical Multiple Regression (HMR) was run. Overall, Model 1 was significant (F=13.989, p=.000) with an adjusted R^2=.135. With ß=.382, TMS – Communication was found to positively influence Capital Project Success – Effectiveness. Thus, there is moderate support for Hypothesis H1-A$_E$.

To test Hypothesis H2-A$_E$ and determine if servant leadership moderated the relationship between TMS – Communication and Capital Project Success – Effectiveness. In the second model, servant leadership was added as an independent variable. In the third model, the interaction between TMS – Communication and servant leadership was added. In both cases,

neither servant leadership nor the interaction term were significant at (p< .05). Thus, there is no

support for Hypothesis H2-A$_E$. See Table 19 for all of the HMR results.

Table 19: Results - Hypothesis: TMS - (C) on CPS - Effectiveness

Model 1

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	F	Sig.
TMS - Communication (C)	**0.382**	3.740	**0.000**	0.146	0.135	0.000	13.989	0.000

Model 2

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**0.351**	3.148	**0.002**					
Servant Leadership (S)	**0.078**	0.698	**0.487**	0.151	0.130	0.005	0.487	0.001

Model 3

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**1.038**	2.468	**0.016**					
Servant Leadership (S)	**0.942**	1.803	**0.075**					
C x S	**-1.310**	-1.693	**0.094**	0.180	0.149	0.029	2.865	0.001

To test Hypothesis H1-A$_U$ and determine if there was a relationship between TMS –

Communication and Capital Project Success – Utilization, a Hierarchical Multiple Regression

(HMR) was run. Overall, Model 1 was significant (F=21.741, p=.000) with an adjusted R^2=.200.

With ß=.458, TMS – Communication was found to positively influence Capital Project Success

– Utilization. Thus, there is support for Hypothesis H1-A$_U$.

To test Hypothesis H2-A$_U$ and determine if servant leadership moderated the

relationship between TMS – Communication and Capital Project Success – Utilization. In the

second model, servant leadership was added as an independent variable. In the third model, the

interaction between TMS – Communication and servant leadership was added. In both cases,

neither servant leadership nor the interaction term were significant at (p< .05). Thus, there is no

support for Hypothesis H2-A$_U$. See Table 20 for all of the HMR results.

Table 20: Results - Hypothesis: TMS - (C) on CPS - Utilization

Model 1

Predictor Measure	β	t	t - Sig.	R^2	$Adj.\ R^2$	ΔR^2	F	Sig.
TMS - Communication (C)	**0.458**	4.663	**0.000**	0.210	0.200	0.000	21.741	0.000

Model 2

Predictor Measure	β	t	t - Sig.	R^2	$Adj.\ R^2$	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**0.451**	4.191	**0.000**					
Servant Leadership (S)	**0.018**	0.166	**0.868**	0.210	0.190	0.000	0.028	0.000

Model 3

Predictor Measure	β	t	t - Sig.	R^2	$Adj.\ R^2$	ΔR^2	ΔF	Sig.
TMS - Communication (C)	**0.677**	1.644	**0.104**					
Servant Leadership (S)	**0.303**	0.592	**0.555**					
C x S	**-0.432**	-0.570	**0.570**	0.213	0.184	0.003	0.325	0.000

To test Hypothesis H1-B$_O$ and determine if there was a relationship between TMS -

Resources and Capital Project Success – Outcome, a Hierarchical Multiple Regression (HMR)

was run. Overall, Model 1 was significant (F=10.333, p=.002) with an adjusted R^2=.101. With

ß=.335, TMS - Resources was found to positively influence Capital Project Success – Outcome.

Thus, there is weak support for Hypothesis H1-B$_O$.

To test Hypothesis H2-B$_O$ and determine if servant leadership moderated the relationship

between TMS – Resources and Capital Project Success – Outcome. In the second model, servant

leadership was added as an independent variable. In the third model, the interaction between

TMS – Resources and Servant Leadership was added. In both cases, neither Servant Leadership

nor the interaction term were significant at (p< .05). Thus, there is no support for Hypothesis

H2-B$_O$. See Table 21 for all of the HMR results.

Table 21: Results - Hypothesis: TMS – (R) on CPS - Outcome

Model 1

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	F	Sig.
TMS - Resources (R)	**0.335**	3.214	**0.002**	0.112	0.101	0.000	10.333	0.002

Model 2

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.329**	3.045	**0.003**					
Servant Leadership (S)	**0.024**	0.223	**0.824**	0.112	0.091	0.000	0.050	0.008

Model 3

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.385**	0.694	**0.490**					
Servant Leadership (S)	**0.081**	0.144	**0.886**					
R x S	**-0.090**	-0.103	**0.918**	0.113	0.079	0.000	0.011	0.022

To test Hypothesis H1-B$_E$ and determine if there was a relationship between TMS –

Resources and Capital Project Success – Effectiveness, a Hierarchical Multiple Regression

(HMR) was run. Overall, Model 1 was significant (F=9.443, p=.003) with an adjusted R^2=.092.

With ß=.321, TMS – Resources was found to positively influence Capital Project Success –

Effectiveness. Thus, there is weak support for Hypothesis H1-B$_E$.

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To test Hypothesis H2-B$_E$ and determine if servant leadership moderated the relationship between TMS – Resources and Capital Project Success – Effectiveness. In the second model, servant leadership was added as an independent variable. In the third model, the interaction between TMS – Resources and servant leadership was added. In both cases, neither servant leadership nor the interaction term were significant at (p< .05). Thus, there is no support for Hypothesis H2-B$_E$. See Table 22 for all of the HMR results.

Table 22: Results - Hypothesis: TMS – (R) on CPS - Effectiveness

Model 1

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	F	Sig.
TMS - Resources (R)	**0.321**	3.073	**0.003**	0.103	0.092	0.000	9.443	0.003

Model 2

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.285**	2.661	**0.009**					
Servant Leadership (S)	**0.147**	1.371	**0.174**	0.124	0.102	0.020	1.880	0.005

Model 3

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.981**	1.799	**0.076**					
Servant Leadership (S)	**0.854**	1.542	**0.127**					
R x S	**-1.114**	-1.031	**0.197**	0.142	0.110	0.018	1.692	0.006

To test Hypothesis H1-B$_U$ and determine if there was a relationship between TMS – Resources and Capital Project Success – Utilization, a Hierarchical Multiple Regression (HMR) was run. Overall, Model 1 was significant (F=14.333, p=.000) with an adjusted R^2-=.138. With

ß=.386, TMS – Resources was found to positively influence Capital Project Success –

Utilization. Thus, there is support for Hypothesis H1-B$_U$.

To test Hypothesis H2-B$_U$ and determine if servant leadership moderated the relationship

between TMS – Resources and Capital Project Success – Utilization. In the second model,

servant leadership was added as an independent variable. In the third model, the interaction

between TMS – Resources and Servant Leadership was added. In both cases, neither Servant

Leadership nor the interaction term were significant at (p< .05). Thus, there is no support for

Hypothesis H2-B$_U$. See Table 23 for all of the HMR results.

Table 23: Results - Hypothesis: TMS – (R) on CPS - Utilization

Model 1

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	F	Sig.
TMS - Resources (R)	**0.386**	3.786	**0.000**	0.149	0.138	0.000	14.333	0.000

Model 2

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.359**	3.420	**0.001**					
Servant Leadership (S)	**0.109**	1.034	**0.304**	0.161	0.139	0.011	1.069	0.001

Model 3

Predictor Measure	β	t	t - Sig.	R^2	Adj. R^2	ΔR^2	ΔF	Sig.
TMS - Resources (R)	**0.546**	1.013	**0.314**					
Servant Leadership (S)	**0.298**	0.545	**0.587**					
R x S	**-0.299**	-0.353	**0.725**	0.161	0.130	0.001	0.125	0.003

4.6 Regression Assumptions

4.6.1 Normality

A statistical method of evaluating normality is the use of a P-P Plot for expected and actual residuals, shown in Figure 3 below. The P-P Plot shows the data approaches a similar slope to the 45-degree line representing a normal distribution (Field, 2013).

Figure 3: P-Plot – dependent variable
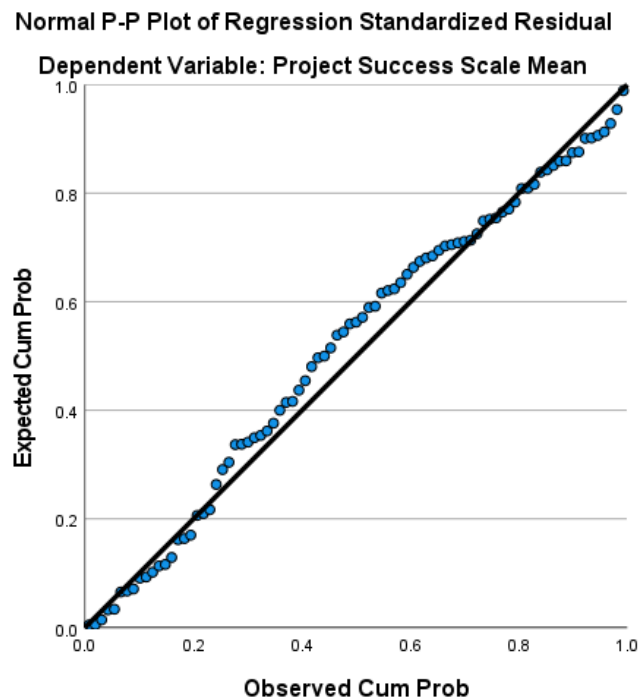
4.6.2 Homoscedasticity

Homoscedasticity is an evaluation of the variance between the predictor variable and the residual in comparison to the consistency of the regression line for the model (Field, 2013). The below chart (figure 4) shows the relationship between the residual and predictive variable with

the fitness of the linear relationship between the dependent variable and independent variable. The data shows that homoscedasticity is present within the data as illustrated by how close the residuals and predictive values are.

Figure 4: Scatterplot standardized residuals
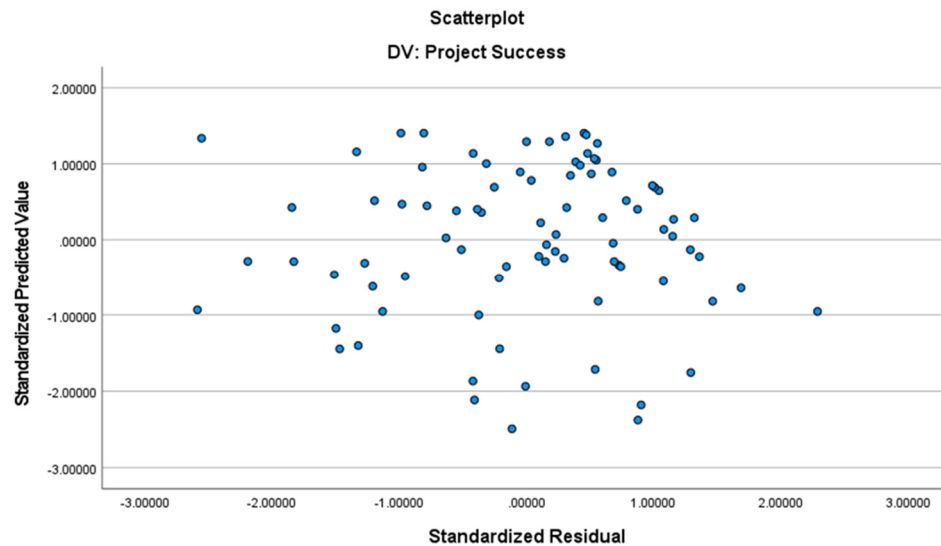
4.6.3 Independence

Independence occurs when the residuals are normally distributed and independent (Field, 2013). A test to evaluate if the residuals are normally distributed is the Durbin-Watson score, which is a test of the correlation between errors. As previously shown in Figure 4.2, the residuals are normally distributed, and the Durbin-Watson value is 1.708, indicating no error correlation (King & Harris, 1995).

4.6.4 Multicollinearity

Collinearity is the correlation between the independent and dependent variables, which express a linear relationship in regression analysis (Field, 2013). Multicollinearity is the

correlation between the independent variables within a regression model and can be measured by the collinearity tolerance value, if less than .10, or the Variance Inflation Factor (VIF), if greater than 10 (Field, 2013). As previously mentioned, the Servant Leadership scale items were removed due to a high VIF. After the removal of those items from the SL and CPS scales, the values for this data meet these requirements as the collinearity tolerance is .843 and the VIF is 1.186 for the TMS-C models and the collinearity tolerance is .921 and the VIF is 1.085 for the TMS-R models.

4.6.5 Common Method Variance (CMV)

Common Method Variance is an evaluation of the measurement error due to respondents rating multiple constructs (Chang et al., 2010). In this research, CMV was evaluated using Hermann's Single Factor test. The percentage of the sum of squares loading variance is 31.9%, which is below the threshold of 50% (Podsakoff et al., 2003).
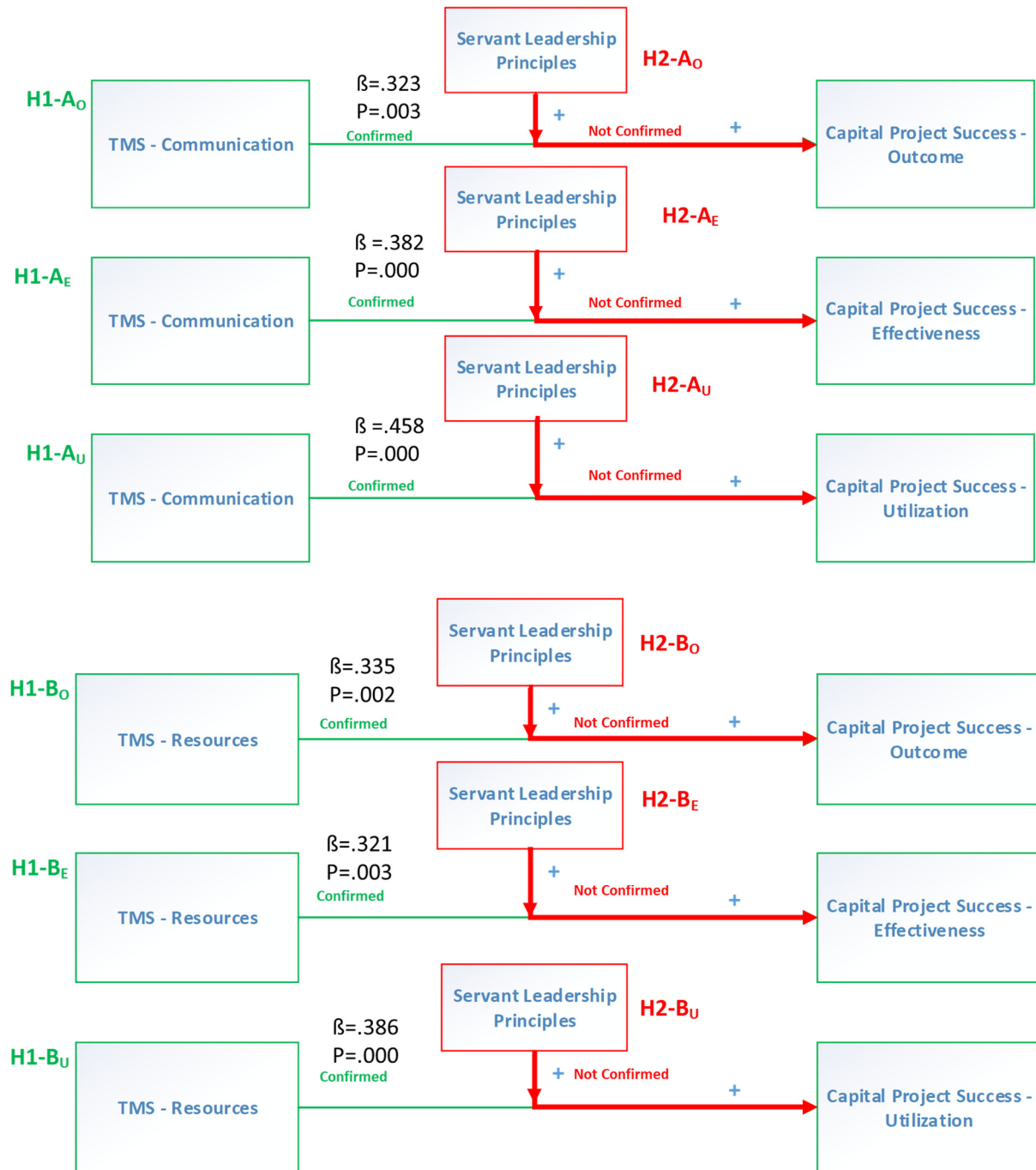
4.7 Results Table

The below Table 24 is a summary of the results shared within this chapter.

Table 24: Summary Results

Hypothesis	Result
H1-A$_O$: TMS – Communication should have a positive relationship with Capital Project Success – Outcome.	**Confirmed**
H1-A$_E$: TMS – Communication should have a positive relationship with Capital Project Success – Effectiveness.	**Confirmed**
H1-A$_U$: TMS – Communication should have a positive relationship with Capital Project Success – Utilization.	**Confirmed**
H2-A$_O$: The relationship between TMS – Communication and Capital Project Success – Outcome should be positively moderated by Servant Leadership Principles.	**Not Confirmed**
H2-A$_E$: The relationship between TMS – Communication and Capital Project Success – Effectiveness should be positively moderated by Servant Leadership Principles.	**Not Confirmed**
H2-A$_U$: The relationship between TMS – Communication and Capital Project Success – Utilization should be positively moderated by Servant Leadership Principles.	**Not Confirmed**
H1-B$_O$: TMS – Resources should have a positive relationship with Capital Project Success – Outcome.	**Confirmed**
H1-B$_E$: TMS – Resources should have a positive relationship with Capital Project Success – Effectiveness.	**Confirmed**
H1-B$_U$: TMS – Resources should have a positive relationship with Capital Project Success – Utilization.	**Confirmed**
H2-B$_O$: The relationship between TMS – Resources and Capital Project Success – Outcome should be positively moderated by Servant Leadership Principles.	**Not Confirmed**
H2-B$_E$: The relationship between TMS – Resources and Capital Project Success – Effectiveness should be positively moderated by Servant Leadership Principles.	**Not Confirmed**
H2-B$_U$: The relationship between TMS – Resources and Capital Project Success – Utilization should be positively moderated by Servant Leadership Principles.	**Not Confirmed**

Figure 5: Results on Revised Model

Servant Leadership Principles — H2-A$_O$

H1-A$_O$

TMS - Communication
ß=.323
P=.003
Confirmed
+
Not Confirmed
+
Capital Project Success - Outcome

Servant Leadership Principles — H2-A$_E$

H1-A$_E$

TMS - Communication
ß =.382
P=.000
Confirmed
+
Not Confirmed
+
Capital Project Success - Effectiveness

Servant Leadership Principles — H2-A$_U$

H1-A$_U$

TMS - Communication
ß =.458
P=.000
Confirmed
+
Not Confirmed
+
Capital Project Success - Utilization

Servant Leadership Principles — H2-B$_O$

H1-B$_O$

TMS - Resources
ß=.335
P=.002
Confirmed
+
Not Confirmed
+
Capital Project Success - Outcome

Servant Leadership Principles — H2-B$_E$

H1-B$_E$

TMS - Resources
ß=.321
P=.003
Confirmed
+
Not Confirmed
+
Capital Project Success - Effectiveness

Servant Leadership Principles — H2-B$_U$

H1-B$_U$

TMS - Resources
ß=.386
P=.000
Confirmed
+
Not Confirmed
+
Capital Project Success - Utilization

4.8 Summary

This chapter presented the results of the study. The first sections reviewed the data collection, data cleaning, and sample parameters. The next sections reviewed the sample characteristics and descriptive statistics and provided a revised model for the research. The last two sections reviewed the HMR analyses as well as the regression assumptions for the research.

CHAPTER 5

DISCUSSION, LIMITATIONS AND FUTURE RESEARCH

5.1 Introduction

In this chapter, the results of the study will be discussed. In addition, the implications for practice and theory will be outlined. As with any research, limitations exist, and these limitations will be discussed herein. Given the results and limitations, opportunities for future research will be provided. Lastly, the chapter will close with a conclusion summarizing the chapter, as well as the overall research completed.

5.2 Discussion of Results

Based on the results from this study, the findings support the positive relationship between the Top Management Support (TMS) components of communication and resources and capital project success. These results confirm the relationship put forth by Ahmed et al. (2016), and that this relationship exists within the capital projects industry. Both TMS communication and resources had a statistically significant positive effect on Capital Project Success (CPS). Additionally, the results herein illustrate a significant, positive relationship between servant leadership and capital project success. However, servant leadership was not found to moderate the relationship between TMS communication and resources and Capital Project Success as was hypothesized.

Perhaps with large multi-million and multi-billion-dollar capital projects, project managers focus on the resources and communication they need to finish on time and on budget

and servant leadership principles are less important. Moreover, our respondents might have confounded top management support and leadership when working on a capital project. That is, project managers are probably just looking for management to "have their back" as they say, supporting the project manager at all stages of the project. Of course, having a small and specialized sample and administering the survey during the COVID-19 global pandemic may have affected our results, and these limitations will be discussed in more detail in an upcoming section.

Another possible explanation for the lack of support for the moderating effect of servant leadership is that servant leadership could be an antecedent to Top Management Support, based on the statically analyses of the data. In practice, project managers on capital projects typically lead through influence because many firms utilize a matrix-based organizational structure. In a matrix-based structure, the actual human resources are contained within designated business groups or functions, and the project is composed of a variety of disciplines and groups working together for the common goal of completing the project scope. In other words, project managers may be exerting leadership characteristics, but their team is not seeing these as servant leadership characteristics. In addition, perhaps the Top Management Support factors (i.e., communication and resources) are a form of servant leadership, as a number of the scale items in the TMS and servant leadership scales were similar.

The Capital Project Success scale was broken into three distinct sub-scales or factors in this research. This was not expected based on the previous academic literature, in which Pinto and Slevin's, (1988) scale had been used a number of times as one factor. However, in practice, project managers often view capital project success in terms of outcomes, effectiveness and

utilization. Project managers will tell you if a project is on-time and under budget, meeting two

of the triple constraints, then the outcome of the project would be a success, (Project

Management Institute, 2017). Secondly, the effectiveness of capital projects is also a vital

component, as these attributes can have a positive or negative effect on the overall project, and

the potential to impact the project cost or schedule. Lastly, meeting the expectations for intended

use for the project is key to the end user and the possibility of repeat business.

5.3 Implications

The findings of this research have theoretical and practical implications. The

implications listed below are not intended to be mutually exclusive nor limited by the details,

which are shared below. As with all constructs, further study/investigation should be completed

to verify these implications.

5.3.1 Implications for theory

One of the major implications for theory from this study's results concerns the ability to

predict capital project success. A number of factors can impact a project's success, yet based on

the results of this research, the TMS attributes of communication and resources provide two key

focal points for researchers to further examine, given their positive influence on project success.

For example, Caldas and Gupta (2016) discussed the importance of increasing the probability of

success on capital projects, and the research herein has advanced this agenda to some extent.

Due to their financial, community, and societal impacts, it is important that capital

projects are successful. The negative factors that occur when capital projects are not successful

can impact the stakeholders, and the community in which they are executed. Caldas and Gupta (2017) discussed the importance of stakeholder communication and adequate project team staffing. My research adds to the literature by further emphasizing the importance of effective communication and resource allocation as keys to capital project success.

Despite attempts to make all projects successful, the simple fact is that some projects are not successful, as illustrated in the PMI project success percentages. These failed projects also provide important insights into possible ways to prevent or reduce the possibility for future failures. The significant influence of TMS communication in this study extends the literature from Turner et al. (2009). That is, clear communication can reduce the possibility of repeat failures when information is shared with the top management team and other stakeholders.

The final implication for theory from this research relates to leadership skills.   Cleland (1995) advocated for more leadership skills to be included in the PMBOK, which did not include leadership topics until the 6th edition in 2017. As indicated in this study's results, servant leadership was found to have a positive, significant influence on capital project success even though it did not moderate the relationship between TMS communication or resources and capital project success. Indeed, the leadership of the project manager based on the results provided suggests that servant leadership principles help determine project success in the capital project industry. Given the limited research in this area, more research should be conducted to further examine this concept.

5.3.2 Implications for practice

This study contains implications for business and managerial practice. One concept commonly used in both project management, and business in general, is the use of "lessons learned" from a previously executed project as suggested in the PMBOK (PMI, 2017). Based on the results of this research and the importance of communication, perhaps one implication for practice would to be to ensure the "lessons learned" are communicated to the top management and project team. Additionally, the "lessons learned" should be discussed before the next project begins or at least early on in the project to help facilitate communication.

Secondly, the results herein suggest that TMS is important for capital project success, more specifically, management's ability to communicate and provide resources to the capital project. While there is considerable research which supports these results, this study confirms the importance of communication and resources, which deserve more attention from the management team. These results should encourage firms to measure top management's performance with regard to their communication and their ability to supply resources to the project.

Lastly, the results herein illustrate that there is a positive relationship between SL and project success. Indeed, SL is being used in several industries including the capital project industry. Therefore, understanding how SL can be better applied within the capital project industry is a very practical implication. The results of this study suggest positive outcomes for companies who are SL-focused on their leadership style, specifically for lesser experienced personnel within the capital projects industry. I suggest, based on my 15- plus years of

experience in the capital project industry, that SL has the potential to help close the age/experience gap. Doing so could create a sense of community within the project team furthering buy-in with regard to the project outcomes.

5.4 Limitations to the Study

In this section, the limitations of this research will be discussed. There are three major limitations to this research. The first limitation is the sample size, despite the author's attempt to get additional responses. This research was seeking survey respondents with experience in capital projects, thus mass "email blasts" were not an option. Instead, potential respondents were personally contacted and encouraged to take the survey. Thus, only 85 participants completed the survey in its entirety, thereby limiting the ability to perform more detailed statistical analyses on the results.

In addition, while the respondents represented multiple industries, there were not enough responses from any one industry to draw any industry-specific results. The author would have liked to perform a comparison of the various industries to determine if the results remained the same or varied by industry. While there are many attributes within business that remain the same across industries, there are also some attributes which are viewed differently, and the comparison would have highlighted those attributes.

The third major limitation was the timing of the survey. The survey was administered while the world was experiencing Covid-19, which caused shutdowns/lockdowns within the USA and across the world. These lockdowns created a slowdown in the economy and high levels of unemployment. Therefore, it is important to mention that these results may have been

impacted by Maslow's hierarchy of needs, which suggests that employees focus on physiological needs (e.g., food, water, etc.) and safety needs (e.g., mortgage) before seeking those higher on the pyramid (Maslow, 1943). Research collected during the pandemic had its challenges as this was not considered a normal period for anyone in the world.

5.5 Future Research

Research in capital project management has seen significant growth in recent years due to the large impact these projects have on the world. Similarly, servant leadership and project leadership have been studied extensively over the years. Yet, many avenues for further research lie ahead. There are three areas where future research can contribute to this study.

The first area of suggested future research is a larger sample size. Moreover, the sample size should be more representative of the global environmental, as capital projects are executed in many countries. To perform this future research, the survey should be conducted in various languages to ensure respondents interrupt the questions similarly regardless of their language differences. Additionally, the culture norms of each respondent will have to be captured for comparison.

The second area for future research is to collect data from various industries to allow a comparison of the industries. One might suggest capital projects which happen in one industry may have a different approach to leadership than another industry despite both being capital projects. Furthermore, once the data is collected, their maybe additional inferences, based on the results.

The third area for future research is collecting data in a non-Covid-19 environment. The effects of Covid in the world has changed the way business has been conducted the last two years. In particular, corporations have had to continually react to the changing virus, which has affected leadership styles and desired outcomes. This author experienced these changes while working on a capital project during Covid. The project saw fluctuations of hundreds of project employees during different parts of the Covid cycle.

5.6 Researcher Plans for Future Research

This author plans to further research the capital projects arena by conducting research in three key areas. The first area is a comparison of a non-servant leadership project to a servant leadership project. To conduct this research, all other major project characteristics should be considered similar including the country and industry of the two projects. The second area of research is the impact of experience on servant leadership principles. Based on the limited review of the results of this study, the research herein may suggest that experience may influence the practice of servant leadership principles, suggesting that those who have more experience view the effects of servant leadership differently than those with less experience. The final area of future research that this author would like to conduct is to analyze attributes that serve as leading indicators for project success. Two areas the author believes warrant additional research are the leadership style of the project manager and the factors of project success that clients believe are most valuable. An example of a leading indicator from the client perspective is the safety rate of capital projects. While coming in on time and within budget are very important, they cannot come at the expense of workplace safety.

These areas provide insights into the plans for future research and the suggested contributions the author plans to provide in the future. These research areas may lead to additional discoveries and even more suggestions for future research. As the project management industry continues to grow, the research within the industry should also continue to grow. This study serves as a starting point for the author to continue further research in the capital project industry.

5.7 Conclusion

The demand for capital projects will continue to grow over the coming decade. These projects are typically complex in nature and require a highly skilled project manager. The literature review shows limited use of TMS within the project success literature. Furthermore, the relationship between TMS and capital projects is an even smaller subset of the literature. Given the limited research, this paper illustrates that there is a positive relationship between top management support and capital project success. Despite this research not confirming the moderating relationship of servant leadership, further research should be conducted to evaluate the relationship between servant leadership and capital project success. The findings of this research add to the knowledge base for capital projects and suggests additional opportunities to further the potential of project success. Additionally, future research should be conducted to confirm the findings herein.

Capital projects must be carefully managed with millions, and sometimes, billions of dollars at stake. Yet, few have looked at capital project success factors. This research supported the importance of top management support for capital projects success. With little research on

the importance of leadership in project management, this research demonstrates the need for

more work to be done in this important area.

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APPENDIX A

SURVEY

Participation and Consent
You are invited to participate in a web-based online survey study exploring the project management with capital projects. This survey is being conducted by Joe Carson from the University of Dallas.

Purpose: Joe Carson is interested in getting your feedback on project management leadership within capital projects.

Description of Procedures: This research study will take place in an online survey and it is estimated to take about 6 minutes of your time. Your responses will be confidential.

Potential Risks: There will be minimal to no foreseeable risks involved in participating in this survey. If participation in this survey causes emotional discomfort, you may withdraw at any time. Your participation in this survey is voluntary, and you have the right to stop participation at any point.

Potential Benefits: You will receive no direct benefits from participating in this research study. However, information derived from this survey may help optimize the Project Management Leadership.

Confidentiality: Your survey answers will be sent to a link at Qualtrics.com where data collected is password protected. No one, other than the researcher and the sponsor professors, will have access to the collected data. Your records will be kept confidential.

Voluntary Participation: Your decision to take part in this survey is entirely voluntary. You may withdraw from the survey at any time without any penalty.

Contact Information: If you have any questions or concerns about this research, you may contact Joe Carson at jcarson@udallas.edu.

Consent: Clicking on the "Next" below indicates that you acknowledge you have read and understood this consent form, and agree to voluntarily participate in this research. You may print a copy of this consent form for your records.

Random Drawing: If you complete the survey in its entirety by April 14, 2021, you will be eligible for a prize drawing where two lucky winners will win a $50 Amazon gift card. Only the winner will be contacted, and your email address will remain confidential.

○ Next

Q1 Please provide the name of the most recent project in which you can recall the communication, resources, project manager, and project outcome (or intended outcome) for the project. The project name is confidential and can be Project X or whatever nickname you would like.

_____

Q2 When was the project completed or is it expected to be completed?

○ Expected to be completed within 3 years

○ Completed less than 3 years ago

○ Completed greater than 3 years ago

Q3 Describe the resource situation on the _____ project.

Top management...

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
provided adequate resources for successful implementation of the project.	○	○	○	○	○
provided sufficient resources for instituting organizational change to facilitate effective system implementation.	○	○	○	○	○
provided adequate resources to facilitate system adaptations in the organizational setting.	○	○	○	○	○
provided adequate resources to encourage a supportive stakeholder environment for successful project completion.	○	○	○	○	○

| ensured availability of necessary resources to support the project team during crises. | ○ | ○ | ○ | ○ | ○ |

Q4 Describe your **Project Manager** on the _____ project.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
My Project Manager can tell if something work-related is going wrong.	○	○	○	○	○
My Project Manager makes my career development a priority.	○	○	○	○	○
I would seek help from my Project Manager if I had a personal problem.	○	○	○	○	○
My Project Manager emphasizes the importance of giving back to the community.	○	○	○	○	○
My Project Manager puts my best interests ahead of his/her own.	○	○	○	○	○

My Project Manager gives me the freedom to handle difficult situations in the way that I feel is best.	○	○	○	○	○
My Project Manager would NOT compromise ethical principles in order to achieve success.	○	○	○	○	○

Q5 Describe the communication situation on the _____ project.

Top management ...

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
established frequent communication with project team members for successful implementation of the project.	○	○	○	○	○
often communicated to sell the project with the rest of the organization.	○	○	○	○	○
regularly communicated and explained the organizational changes and implications linked with system implementation.	○	○	○	○	○
frequently communicated and discussed potential system changes with those involved in the implementation process.	○	○	○	○	○

continuously communicated and discussed implications of the project with various groups of stakeholders.	○	○	○	○	○
effectively communicated with the stakeholders to enhance organizational efficiency.	○	○	○	○	○

Q6 Describe the **project outcome** (or **intended outcome**) on the
_____ project.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
This project has / will come in on schedule.	○	○	○	○	○
This project has / will come in on budget.	○	○	○	○	○
The project that has been developed works, (or if still being developed, looks as if it will work).	○	○	○	○	○
The project will be / is used by it intended clients.	○	○	○	○	○
This project has / will directly benefit the intended users: either through increasing efficiency or employee effectiveness.	○	○	○	○	○

Given the problem for which it was developed, this project seems to do the best job of solving that problem, i.e. it was the best choice among the set of alternatives.	○	○	○	○	○
Important clients, directly affected by this project, will make use of it.	○	○	○	○	○
I am / was satisfied with the process by which this project is being / was completed.	○	○	○	○	○
We are confident that nontechnical start-up problems will be minimal, because the project will be readily accepted by its intended users.	○	○	○	○	○

Use of this project has led / will lead directly to improved or more effective decision making or performance for the clients.	○	○	○	○	○
This project will have a positive impact on those who make use of it.	○	○	○	○	○
The results of this project represent a definite improvement in performance over the way the client used to perform their activities.	○	○	○	○	○

Q7 What is the highest level of school you have completed or the highest degree you have received?

○ Less than high school degree

○ High school graduate (high school diploma or equivalent including GED)

○ Some college but no degree

○ Associate degree in college (2-year)

○ Bachelor's degree in college (4-year)

○ Master's degree

○ Doctoral degree

○ Professional degree (JD, MD)

Q8 What is your sex?

○ Male

○ Female

Q9 How many employees work at your organization?

○ 1-4

○ 5-9

○ 10-19

○ 20-49

○ 50-99

○ 100-249

○ 250-499

○ 500-999

○ 1000 or more

Q10 How many employees work on or are currently working on the _____ project?

- ○ 1-4

- ○ 5-9

- ○ 10-19

- ○ 20-49

- ○ 50-99

- ○ 100-249

- ○ 250-499

- ○ 500-999

- ○ 1000 or more

Q11 Which of the following industries most closely matches the one in which you are employed?

○ Forestry, fishing, hunting or agriculture support

○ Real estate or rental and leasing

○ Mining

○ Professional, scientific or technical services

○ Utilities

○ Management of companies or enterprises

○ Construction

○ Admin, support, waste management or remediation services

○ Manufacturing

○ Educational services

○ Wholesale trade

○ Health care or social assistance

○ Retail trade

○ Arts, entertainment or recreation

○ Transportation or warehousing

○ Accommodation or food services

○ Information

○ Other services (except public administration)

○ Finance or insurance

○ Unclassified establishments

Q12 How many year(s) of work experience do you have?

○ 1 - 2 years

○ 3 - 5 years

○ 6 - 10 years

○ 11 - 14 years

○ 15 - 19 years

○ 20+ years

Q13 How many year(s) of **capital project** experience do you have?

○ 1 - 2 years

○ 3 - 5 years

○ 6 - 10 years

○ 11 - 14 years

○ 15 - 19 years

○ 20+ years

Q14 In your career, approximately how many projects have you served as project manager?

○ 1

○ 2-5

○ 6-10

○ 11-15

○ 16-20

○ 21 or more

Q15 Do you have a project management certification or specialized training?

○ Yes

○ No

Q16 Please provide your project management certification and/or specialized training.

_____

Q17 If you are interested in being part of the random drawing for completing the survey please provide your email below.