A CORRELATIONAL STUDY OF PROJECT MANAGEMENT CRITICAL SUCCESS FACTORS AND PROJECT MANAGEMENT SUCCESS IN THE PUBLIC DOMAIN

by

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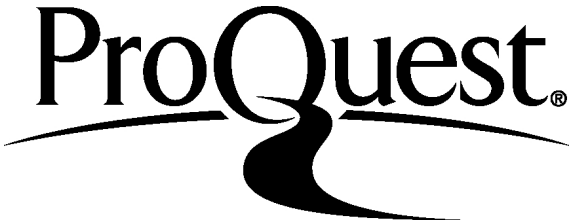

Abstract

A core expectation of any project that is undertaken by an organization is that it will be managed successfully. However, research has shown that in 2004, the project management failure rate was 71%. Furthermore industry associations reported that as few as one-third of new projects meet their objectives and that about 17% are totally dropped because of lack of success. Finally, while exact numbers are not available on project management failure rates in the public domain, several examples such as the $2 billion loss of the Internal Revenue Service's Business System Modernization project in 1995, and the $1.2 billion loss of the Department of Defense's Kinetic Energy Interceptor project in 2009, confirm problems commensurate with those identified in the private sector. Such persistent problems have led to calls for specific research on project management success and project management critical success factors focused on the public domain. This research collected perceptions of 101 project management personnel in the public domain, specifically in the law enforcement sector, regarding project management success and project management critical success factors in deployment of information technology related systems. Results of an ordinal regression of project management critical success factors indicated positive significant relationships between independent variables of project schedules and plans, technical tasks, and monitoring and feedback and the dependent variable of project management success. These findings are significant to practitioners of project management in the public domain, specifically in the law enforcement sector, as there has been little empirical research as to what factors are related to project management success in that domain. Additionally, the findings are theoretically significant as they add empirical evidence that project management critical

success factors maintain a positive relationship across both private and public domains, thus supporting the generalizability of the identified project management critical success factors.

Dedication

I dedicate this dissertation to my Lord and Savior, without whom there would be no knowledge or understanding. For the mercy He has shown me exceeds all human conception and His grace is without comprehension. May He take this work in its simple human form, prone to error and imperfection and use it to help His creation better understand the wonderful plans He has for us.

> Instruct the wise and they will be wiser still; teach the righteous and they will add to their learning. The fear of the LORD is the beginning of wisdom, and knowledge of the Holy One is understanding. For through wisdom your days will be many, and years will be added to your life.
>
> — Proverbs 9:9-11

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While the ultimate responsibility of this research was borne by the author, it would be naïve to consider that a portion of the burden was not shared by others. It is with tremendous gratitude that I acknowledge the invaluable support of my wife Christy who, on occasions too numerous to count, cleared the decks so dad could "work," and still continued to love me. It is also with tremendous gratitude that I acknowledge the understanding, beyond their years, of my two daughters, Caroline and Katie Beth, who seemingly understood that daddy had to go off and needed quiet to write. I am also indebted to my father and mother whose prayerful persistence encouraged me to keep plugging on. Finally, I acknowledge my mentor, Dr. Charlie McClain and committee members, Dr. Randy House and Dr. Rhonda Chicone for their expertise and willingness to guide me to new and better ways of research.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

Since the turn of the 21st century, many organizations have migrated to a project-based organizational structure (Sydow, Lindkvist, & DeFillippi, 2004). This organizational structure presents many attractive attributes such as flexibility and competitiveness (Project Management Institute, 2013). Common among these project-based organizations is the expectation of successful project management. The project management literature has long explored a set of project management critical success factors that lead to project management success. Since the 1980's the work of Slevin and Pinto (1986) and research that followed such as Tishler, Dvir, Shenhar, and Lipovetsky (1996) and Belout (1998) in the 1990's and even current research such as McLeod, Doolin, and MacDonnell (2012) and Davis (2013), all focused on project management critical success factors. However, during this same time period, and to the dismay of many organizations, the Standish Group (2005) reported that, in the period ending in 2004, the project management failure rate was 71%. Moreover, in 2012 the Project Management Institute (2013) reported that "fewer than two-thirds of projects meet their goals and business intent (success rates have been falling since 2008), and about 17% fail outright" (p.2). These trends are not limited to the private sector. While exact numbers are not available on project management failure rates in the public domain, several high profile examples such as the Internal Revenue Service's Business System Modernization project $2 billion loss in 1995 (Varon, 2004), and the Department of Defense's Kinetic Energy Interceptor project $1.2 billion loss in 2009 (McCaney, 2009), confirm project management problems commensurate with those published in the private sector.

Background of the Study

The paradox of increased research on project management success and success rates that continue to fall has confounded many in the academic and project management communities. While researchers saw the empirical evidence that successful project-based organizations were more flexible, competitive, and thus profitable, many could not describe why some project-based organizations did not realize the same results. Some researchers pointed to critical success factors identified by Slevin and Pinto (1986) which presented, in their estimation, core factors for successful management of projects which were inadequate (Cicmil & Hodgson, 2006) while other researchers posited that project management critical success factors are less generalizable than previously thought and more specific to the domain (McPhee, 2008). Those who pointed to the inadequacy of the critical success factors spurred much of the research of project management knowledge areas in the 1990s, that culminated in works by researchers such as Dragan Milosevic (Patanakul, Lewwoncharoen, Milosevic, 2010) identifying the same areas, or factors, as those presented 20 years earlier by Slevin and Pinto. As such, it bears to reason that modern research on the topic of the paradox between project management success and project management critical success factors be focused on the area of domain specific variables.

In their seminal work on project management critical success factors called the Project Implementation Profile, Slevin and Pinto (1986) developed a ten factor model which identified a broad set of factors that must be considered by project managers to realize project management success regardless of exogenous variables. These ten project management critical success factors have been tested throughout the literature by authors

such as Belout and Gauvreau (2004) who proposed that the PIP only represented a core of research. They asserted that it should be explored in many different ways including their emphasis which was human resource management. In a similar ways, Prabhakar (2008) explored the PIP from the leadership perspective, and Davis (2013), explored it from the stakeholder perspective, while Savolainen, Ahonen, and Richardson (2012) explored it from the supplier perspective. Ika (2009) explored the impact that strategy had on the ten factor model proposed by Slevin and Pinto (1986).

While there is much debate in the literature over the definition of a successful project management, the concept of the Iron Triangle has seemed to emerge as the de facto, measure for project management success and has been used in project management research since the early 1960's when it was first mentioned in the seminal project management literature of the United States Navy to modern research on project management success such as in Muller and Jugdev (2012), Savolainen, Ahonen, and Richardson (2012), McLeod, Doolin, and MacDonell (2012), and Davis (2013). The Iron Triangle concept asserts that project management can be considered a successful if it meets the expectations of time, budget, and quality. The existing research assumes that time, budget, and quality are objectives of each project, and that the project personnel have control over each.

Critical to the significance of this research is the concept of differentiation between project management in the private domain, and project management in the public domain. While there are several themes that arise from the literature, including those themes of organization structure, behavioral theory, and political science models, the theme that is generally accepted in the business research considers the level of

government control. Campbell, McDonald, and Sethibe (2009) asserted that "private and public organizations can be defined by the level of government or market influence on ownership and control" (p. 6). This level of control is critical to the Public Value Theory and its position that the governmental control in the public domain presents additional constraints or variables to the operating environment, and these additional constraints influence the way managers and project personnel should make decisions.

As researchers such as Davis (2013), Muller and Jugdev (2012), and Nagadevara (2012) have begun to explore in various domains and through various methods, this research will consider a relationship between project management success and project management critical success factors in the public domain. As called for in the literature by authors such as Lodge and Gill (2011) and Borman and Janssen (2013), the existence and strength of that relationship may help to further identify why organizations continue to experience high project management failure rates in light of identified project management critical success factors.

Purpose of the Study

The purpose of this quantitative survey research is to generalize about the relationship between project management critical success factors and information system project management success in the public domain by testing the relationship between the project management critical success factors and project management success. While there has been much research on project management critical success factors, few have been specific to a domain such as the public domain, and based on an extensive review of the literature, none has been conducted in the law enforcement sector of the public domain. This type of research is commensurate with other research efforts in

contemporary research on the falling success rates of project based organizations (Rosacker & Rosacker, 2010; McLeod, Doolin, & MacDonell, 2012; Borman & Janssen, 2013). This study will first explore the literature on the original ten project management critical success factors which were originally defined by Slevin and Pinto (1986) and further tested by Tishler, Dvir, Shenhar, and Lipovetsky (1996), Belout (1998), McLeod, Doolin, and MacDonnell (2012) and Davis (2013), focusing specifically on the three top factors identified by Rosacker and Olson (2008): Scheduling and planning, technical tasks, and monitoring and feedback which will be tested against the dependent variable of information system project management success.

The research then turns attention to the literature that defines project management success and the complications of measuring the different concepts of project success and project management success as well as the specific factors of the public domain. The research is operationalized in a survey that collects data about the relationship between project success and project management critical success factors in the public domain as called for by Rosacker and Olson (2008).

Significance of the Study

As has been illustrated, there is a precedent and a call for research on project management success in specific domains; however the real significance of this research lies in its application to the practitioner. This research is significant because it provides generalized evidence that can be used by practitioner information system project personnel in the public domain regarding allocation of their time and resources through project management critical success factors for successful project deployment. Secondly, this research is significant because it adds additional empirical evidence of the

relationship between the project management critical success factors and project management success to the research body of knowledge. Both of these areas contribute to the practice and research in the field of organizational management by supporting the effective and efficient use of resources through project management critical success factors in projects and the research that supports those practices.

Theoretical Framework

This research is founded on the original models proposed by Slevin and Pinto (1986) and later expanded on by Rosacker and Olson (2008) who asserted that there are differences in the perceived importance of project management critical success factors between private sector organizations where Slevin and Pinto were focused, and public sector organizations. Building on the work of Rosacker and Olson (2008) this research will investigate whether another sector of the public domain, law enforcement, differs from the earlier work of Slevin and Pinto (1986) in the private sector, as well as the work of Rosacker and Olson (2008) in public sector information system projects.

Grounded in project management practice, the problems and questions revolve around the contribution that specific critical success factors can make towards project management success (project management critical success factors) as perceived by the practicing public domain information system project personnel, rather than the ambiguous measurement of project success. Therefore, this research employees a survey design that allows the researcher to capture quantitative data on project management critical success factors from a sample of public domain information system project personnel, which can then be used to generalize about the population. The generalizations will assist the practicing public domain information system project

personnel in the public sector, specifically in law enforcement, to focus efforts on the project management critical success factors that were perceived to be the most important in order to achieve project management success.

CHAPTER 2. LITERATURE REVIEW

To fully examine the extent to which project management critical success factors can predict project management success in the public domain, it is necessary to review both the seminal and contemporary literature on the subjects. The review first considers the origins of Public Value Theory, specifically the literature that addressed the implications Public Value Theory has for project management in the public domain. Second, seminal project management theories, including Slevin and Pinto's (1986) Project Implementation Profile and the Iron Triangle of Success, are examined, followed by analysis of the literature that addressed the theoretical implications for measuring and predicting project management success. Finally, this review examines the current research regarding project management in the public domain.

Public Value Theory

Theories of management and strategy abound in the private sector research literature. While theories of systems, quality, behavior, and contingency abound in private sector organizations, the public sector has had only limited theoretical research on management (Provan & Lemaire, 2012). One initial theory which took hold in the early 1990's was called New Public Management. The New Public Management Theory asserted, at its core, that what was good for private sector organizations should be good for public sector organizations. The theory asserted that if government, like private sector organizations, could focus on output, via costing and pricing strategies, that success in government operations would be realized much the same way it was realized in private organizations (Christensen & Laegreid, 2011). This theory made headway into many government programs particularly in New Zealand, the United Kingdom, and to

some extent the United States. However, in the late 1990's much of the New Public Management Theory fell out of favor due to the inability to define specific outputs and costs associated with the public domain (Levesque, 2013). Moore and Khagram (2004) posited that such inability to define output and costs forced government managers to "construct measures of value other than the revenues earned by the sale of goods and services" (p. 7). Still others asserted that the downfall of New Public Management was its inability to effectively separate the policy making and service delivery functions of public organizations (Pollitt & Bouckaert, 2011). Regardless of the reason, the lessons learned in New Public Management fueled the evolution of new theories which accounted for the shortcomings of their predecessor.

Alford and O'Flynn (2009) asserted that the Public Value theory was instantiated in what was known as the "Kennedy Project" (p. 172) at Harvard University's Kennedy School of Government. Faculty and staff at the Kennedy School of Government were tasked with developing a strategic model for public organizations that would bridge the gaps of the New Public Management Theory. The results of the project were published by Mark Moore in 1995 in his book *Creating Public Value: Strategic Management in Government*. Moore (1995) represents the seminal work in Public Value Theory, later described by Constable, Passmore, and Coats (2008) as "a comprehensive approach to thinking about public management and about continuous improvement in public services" (p. 9).

The key tenant of the Public Value Theory is the strategic triangle. From Moore (1995), the strategic triangle, presented in Illustration 3- Strategic Triangle and adapted from Moore and Khagram (2004), described the operational environment for public

organizations as a balance of the strategy of the organization through the value it provides, with the authorizing environment, and the operational capability. This triangle "both facilitates and constrains the pursuit of public value" (Williams & Shearer, 2011) speaking specifically to the shortfalls of the New Public Management Theory by asserting that public organizations operate in a different environment and must account for those differences in both strategy and operation, rather than emulating each other. This key concept of differentiating between public and private sector strategies is the basis for this research on Project Management Critical Success Factors in the public domain, in that research of seminal researchers, as well as much of the contemporary research, focused on private sector organizations, or a hybrid of private and public sector organizations, and the environments in which they operated. This research, based on the Public Value Theory, will investigate project management critical success factors solely within the public sector, adding to the Public Value Theory that public organizations must adjust their strategy and operations to fit the balance of public value, the authorizing environment, and operational capability including the strategies and operations of project management.

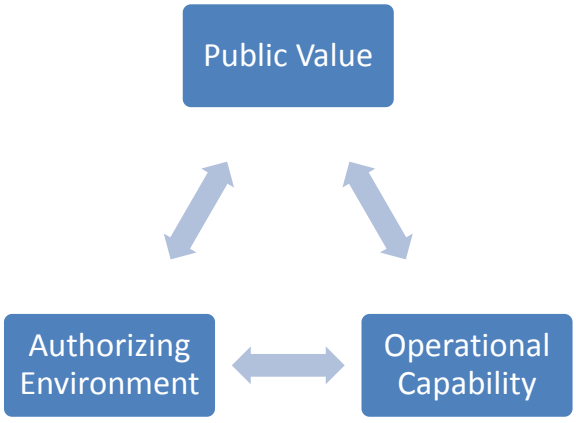

Figure 1- Moore's Strategic Triangle

Public Value

Moore and Khagram's (2004) strategic triangle first identified the concerns of public value, which the authors suggested is "what he or she should be trying to produce and what results he or she should feel accountable for achieving" (p. 9). This is probably one of the most controversial topics in the Public Value Theory in that the general sense of value is based at the individual level and not necessarily at a societal level, thus making the scope of what is valued very diverse. Rutgers (2014) called the issue a "Pantheon of Public Values" (p. 2) asserting that "the focus on public values results in the introduction of almost all conceivable disciplinary and philosophical issues" (p. 11), but also asserted that rather than axiomatically tackling the definition, the concept that emerges from the literature is that value represents a relationship where individuals are willing to give up something in return for something else. It is this relationship which Moore (1995) says should drive everything that is done by the public manager. It is not enough to say that public managers create results that are valued; they must be able to show that the results obtained are worth the cost of private consumption and unrestrained liberty foregone to produce the desirable results. Only then can we be sure that some public value has been created (p. 29).

Authorizing environment

Unaddressed by the New Public Management theory is the concept that public organizations must operate in a contentious environment where the previously mentioned values all compete for resources. While this environment is not unique to public organizations, Dahl and Soss (2014) asserted that fallout from the political value prioritization process is unique, and often falls to the public manager to sort out and

organize into some model to meet the expectation that was assigned. It is this environment where many public managers have found that they must broaden their reach through networking and collaboration to achieve outcomes for the public good. In other words public managers generally do not have sufficient support or authority to accomplish the assigned tasks and must actively seek out support and authority in the environment in order to succeed. The limitation of power is well established in the roots of the public domain. Alford and Hughes (2008) asserted that

> Just as we are concerned about how much of our income is taken in taxes by the state to spend on collective purposes, we are also vigilant about how much of our personal freedom to act is taken away by the state in the name of such purposes" (p. 132).

While the need to garner support and develop collaboration is not unique to the public domain, the concept of accomplishing tasks with deliberately limited power is unique to the public domain and thus represents a substantive difference in the strategy of public organizations as compared to private organizations.

Operational capabilities

It could be explained in simple terms that if public value is the 'What' of public organizations, and the collaborative authorizing environment is the 'Who' of those results, then the operational capabilities are 'How' the results are accomplished. From a more strategic perspective, the operational capabilities represent the means of accomplishing public value to include the allocation of resources and assets entrusted to the public good. While the operational capabilities are common to previous strategic models such as New Public Management, Fisher and Grant (2012) asserted that the

influence of public value and the authorizing environment cause the capabilities to be considered differently. For example, Moore (1995) proposed an example of a librarian who is dealing with a problem of unsupervised 'latch-key children' in the library after school. Previous models may have encouraged the librarian to focus solely on the additional costs the children were adding to the operation of the library. However, under a public value perspective the librarian may consider that the operational capabilities of the library could be shifted to increase the public value for the community possibly by creating or expanding library services offered to the children. It is in this sense, argued Fisher and Grant (2012), the operational capabilities of pubic value become more of an entrepreneurial tool rather than an asset to be managed and minimized.

Public Value Theory in Project Management

In their book *Unlocking Public Value*, Cole and Parston (2006) identified several examples of public organizations that have adopted the concepts and perspectives of the Public Value theory. The authors identified healthcare organizations in Canada and social welfare systems in Europe that have seemingly been able to leverage the authorizing environment and operational capabilities to create public value. A key theme of many of the examples, and the link to this research, is the existence of flexible information communication technology (ICT) systems. Cordella and Bonina (2102) explored the role that ICT has on public reforms, especially those that are focused on creating public value. The authors asserted that "public sector ICT policies needs to look not only at efficiency but also at the broader impacts regarding public value" (p. 517) indicating that ICT system design and project requirements should not only focus on efficiently providing the requested service but also must consider the public value. This

implication dramatically affects project management focus and critical success factors for ICT deployments in the public domain. Crawford and Helms (2009) echoed this point in their research that examined the impact of project management under differing governance models. The authors concluded that "project management supports public-sector governance but also provided evidence of the trend toward public value" (p. 85). Such empirical evidence supports the need to further research the differences between project management in public and private domain.

Project Management

Authors such as Soderlund and Lenfle (2013) posited that formal project management has it beginnings in the early 1950's defense industries including engineering, construction, and aerospace where there was increased focus on complex projects that required extensive scheduling, testing, and control. The need for scheduling, testing, and control of complex systems has seen a dramatic increase since the 1950's (Roehrich & Lewis, 2014), and has given way to formal, standardized, project management practices which continue to evolve today. In the United States, associations such as the Project Management Institute (PMI) act as repositories for project management knowledge. PMI's book, *A Guide to the Project Management Book of Knowledge* (2008) asserted that project management is in general "knowledge, skills, tools, and techniques to project activities to meet project requirements" (p. 6). This concept of a generalizable set of knowledge, skills, and tools is echoed throughout the literature in the form of project management theories and models, and is based in the idea that while each project is unique to its specific domain, there are knowledge, skills, and tools that are consistently used. This literature review will focus on two particular

theories where generalized knowledge, skills and tools are used to define critical project management success factors and project management success.

Project Management Critical Success Factors

Among the previously mentioned generalizable knowledge of project management is the concept of the project management critical success factor. Davis (2013) posited that the project management literature on critical success factors is founded on the differentiation between project success and project management success. The author, and others in the body of literature (de Witt, 1988; Milosevic & Patanakul, 2005; Fortune & White, 2006; Thomas & Fernandez; 2008; McLeod, Doolin, & MacDonnell, 2012), contrasted "project success (measured against the overall objectives of the project) and project management success (measured against the widespread and traditional measures of performance against cost, time, and quality)" (p. 185). This differentiation is key to researchers who are attempting to break down concepts into as few variables as possible and is the environment that has fostered much of the seminal theory for project success and project management success such as the work of Jeffery Pinto and Dennis Slevin in their Project Implementation Profile.

Project Implementation Profile

In response to a call for analysis of factors for project management success, Slevin and Pinto (1986) developed a ten factor model and "diagnostic instrument" (p. 57) called the Project Implementation Profile. This profile identified the factors of project mission, top management support, project schedule/plan, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, and trouble-

shooting for improving project management success. These factors have been used and tested throughout the project management literature regarding areas such as human resource management (Creasy & Anantatmula, 2014) , project leadership (Prabhakar, 2008), and project strategy (Ika, 2009).

Project mission. Davis (2013) defined project mission as "clearly defined goals and direction" (p. 193). A review of the literature regarding the role of project mission found few articles solely focused on project mission, with most combing the factors of project mission, top management support, and project personnel to shed light on project leadership factors. This is true of recent research such as that of Nixon, Harrington, and Parker (2012) who focused on project manager's leadership skills (including setting the project mission and communicating that mission to management and project personnel) and how those leadership skills were related to project management success.

Top management support. Davis (2013) defined top management support as "resources, authority, and power for implementation" (p. 193). Young and Poon (2012) also explored top management support in relation to the project methodology, planning, and staffing, and found that top management support and planning "appear to be almost sufficient for success" (p. 953). These findings were based on "fuzzy analysis" and bear replication from future research. However, few other studies, using other methodologies have arrived at the same level of importance for top management support.

Project schedules and plans. Slevin and Pinto (1986) defined project schedules and plans as "a detailed specification of the individual action steps required for project implementation " (p. 58). Project schedules and plans have been explored in the body of literature, especially within the public domain, by Rosacker and Olson (2008) who found it to be among the top three critical success factors for IT implementations in state governments. Davis (2013) also explored the association between project management success and project planning and found a significant relationship, especially within the literature, between the two.

Client consultation. Davis (2013) defined client consultation as "communication with and consultation of all stakeholders" (p. 193). A review of the literature revealed that since the work of Slevin and Pinto, much of the research on client consultation was done in conjunction with the project management critical success factor of communication. With few exceptions, such as that of Ahmad, Haleem, and Syed (2012) , Finney and Corbett (2007) and Jafari, Osman, Yusuff, and Tang (2006), most authors such as Sudhakar (2012) considered client consultation as a subset of an overall communication plan that was necessary for project management success. While combination of project management critical success factors presents easier categories in which to classify literature, the overall generalizability to the practitioner is lost, making the research less useful.

Personnel. Davis (2013) defined personnel as "recruitment, selection and training of competent personnel" (p. 193). A review of the literature regarding the role of project personnel found few articles focused on individual project personnel, or recruitment strategies and numerous articles focused on the leadership capability of the

project manager, and the influence the project manager's leadership had on project management success. Nicholas (2012) identified over 2000 articles in a review of literature about leadership and project management and posited that while there is much research, a unified theory of leadership skills in project management has not emerged.

Technical tasks. Davis (2013) defined technical tasks as "ability of the required technology and expertise" (p. 193). Technical tasks were explored in the body of literature, especially within the public domain, by Rosacker and Olson (2008) who found it to be among the top three critical success factors for IT implementations in state governments, and also identified it as an area that required additional research.

Client acceptance. Muller and Jugdev (2012) defined client acceptance as the act of using the work product, or achieving the project's purpose. The concept of client acceptance, or as McLeod, Doolin, and MacDonnell (2012) considered it: Stakeholder acceptance, was explored in-depth as a key measure of success in project management and offered an explanation for how key stakeholders may have had differing perceptions of project management success. The authors considered how those differing perceptions could have been used to arrive at a framework that acted as a "sensitizing device" (p. 83) for project managers and their evaluation of project management success.

Monitoring and feedback. Davis (2013) defined monitoring and feedback as "timely and comprehensive control" (p. 193). Monitoring and feedback were explored in the body of literature, especially within the public domain, by Rosacker and Olson (2008) who found it to be among the top three critical success factors for IT implementations in state governments, and also identified it as an area that required additional research.

Communication. Davis (2013) defined communication as "timely data to key players" (p. 193). The body of research on the relationship between communication and project management success is vast; however, two distinct categories of research have emerged: Internal and external communication. While not specifically categorized by Slevin and Pinto (1986) the focus on external communication was implied in the client consultation critical success factor, leaving the critical success factor of communication to cover any other areas. Since then, the research community has explored both internal and external communication and currently seems to be focusing on communication methods (Kisielnicki, 2011).

Trouble-shooting. Davis (2013) defined trouble-shooting as "the ability to handle unexpected problems" (p. 193). A review of the existing body of literature found very little research on the relationship between trouble-shooting and project management success. In fact, the literature that does consider trouble-shooting often rejects the relationship (Kuen & Zailani, 2012). In consideration of such research, there have been very few calls for new or varied research on the relationship between the project management critical success factor of trouble-shooting and project management success.

Iron Triangle of Success

Critical to the concept of measuring success for projects is the definition of project success. As mentioned previously, the literature made contrast between project success and project management success because of the number of exogenous variables that affect project success. In research about project management success criteria, Atkinson (1999) posited that since the original delineation between project success and

project management success, the concepts of time, cost, and quality have been the driving factors for differentiating successfully managed projects from those considered project management failures. This three factor model has had many names attributed to it throughout the literature such as the Golden Triangle, the Triangle of Virtue, the Holy Trinity, or the Iron Triangle. Albeit, many in the literature have asserted the ineptitude of the Iron Triangle to judge project management success or failure, even to the point of abandonment by the Project Management Institute (2008) PMBOK Guide, no model for judging success or failure has risen to take its place in either application or popularity (Muller & Jugdev, 2012), therefore making it the de facto standard for quantitatively defining project management success.

Time

The use of time as a measure for project management success is related to the project's time objective. Kerzner (2009) defined the time objective of a project as "having defined start and end dates" (p.2). This means that if a project has not been delivered by the end date, the project may not be considered a project management success as it did not achieve the time objective. The time objective is translated as into the project management critical success factor of project schedules and plans.

Cost

The use of cost as a measure for project management success is related to the project's consumption objective. Kerzner (2009) defined the consumption objective as a project should consume "human and nonhuman resources (i.e., money, people, equipment)" (p.2). This means that if a project has not consumed the correct resources (for example, more than expected) the project may not be considered a project

management success as it did not achieve the consumption objective. The consumption objective is translated into the project management critical success factors of project schedules and plans, as well as into the project management critical success factor of monitoring and feedback.

Quality

The use of quality as a measure for project management success is related to the specific objective of the project. Kerzner (2009) posited that beyond completion of a project, a successfully managed project must arrive at the "proper performance or specification level" (p. 7) and be accepted by the customer. The author posited that while this concept seems straight forward the application can become quite tricky, as during the course of any given project requirements can and do change, meaning that the successfully managed project will need to adapt schedule and cost to meet the new target requirements. The quality objective is translated into the project management critical success factors of client consultation and client acceptance, as well as the project management critical success factor of technical tasks.

Project Management Critical Success Factors and the Public Domain

Critical to the significance of this research is the concept, put forth by the Public Value Theory, of differentiation between project management in the private domain, and project management in the public domain. While there are several themes that arise from the literature, including those themes of organizational structure, behavioral theory, and political science models, the theme that is generally accepted in the business research considers the level of government control as the key differentiating factor between project management in the public and private domains. Campbell, McDonald, and Sethibe (2009) asserted that "private and public organizations can be defined by the level of government or market influence on ownership and control" (p. 6). Adding to the assertions of Campbell, McDonald, and Sethibe (2009), Emelander (2014) posited that in the public sector, beyond influencing the decisions and the way project managers make decisions, the issue of control should be identified as a primary risk, which is uncommon in the private sector. This level of control is critical to the Public Value Theory and its position that governmental control in the public domain presents additional constraints or variables to the operating environment, and these additional constraints influence the way managers and project personnel make decisions and ultimately success or failure.

This review of literature has identified, in the light of the Public Value Theory, the different considerations that should be considered in a public domain organization, with specific regards to the authorizing environment and how the additional hurdles presented by that environment influence the way decisions are made, including presumably those of project managers in the public domain. The review then explored the body of literature on project management and the general acceptance of Slevin and

Pinto's (1986) seminal work, and modern interpretations such as Davis (2013) work, on project management critical success factors that should be considered for project management success. Each of the success factors was given consideration and previous research using each of the factors was critically evaluated arriving at a synthesis of the top three factors that will be considered in this research. Finally, the review considered the measurement of success, especially using the literature to synthesize a line between the general assumption of project success and the more specific and measurable notion of project management success. It is the concept of project management success and its measurement using the Iron Triangle of Success that will be used to operationalize successfully managed projects from those which were considered unsuccessful.

CHAPTER 3. METHODOLOGY

Research Design

The purpose of this research was to generalize about the relationship between project management critical success factors and project management success in the public domain. To quantitatively generalize about this relationship, data had to be collected that could then be analyzed to describe the relationship. The ability to quantitatively generalize about a relationship is well rooted in the positivistic research tradition (Hatch & Cunliffee, 2006), where representative samples are selected to generalize about a larger population. Examples of such extrapolation are found commonly among the social sciences as a "means for testing objective theories by examining the relationship among variables" (Creswell, 2009, p. 4). For this research, a survey research design was selected to collect data from a sample of participants in the population. The survey method is widely preferred in this situation because of the ease with which it can be administered, the relatively rapid turnaround to attain data, and the economic value versus other data collection methods such as on-site interviews (Cooper & Schindler, 2011). Further, the use of survey data collection is well documented in both the social science field (Babbie, 1990), and in the seminal research regarding project management critical success factors (Slevin & Pinto, 1986; Belout & Gauvreau, 2004; Rosacker & Olson, 2008). The data collected for this research concerns the participant's perceptions about specific project management critical success factors in a project which they have participated as well as their perceived level of project management success for that same project.

The specific survey leveraged in this research was created and validated by Rosacker and Olson (2008) to collect data on project management success and project management critical success factors in the public domain (state organizations). As this research will further build on the work of Rosacker and Olson (2008) the same instrument will be used on a different sector of the public domain: Law enforcement agencies. Rosacker and Olson (2008) conducted field testing with expert panelists and reported validity and reliability statistics at acceptable levels. Because no modifications were made to the instrument, only to the population, no field testing was conducted. Permission to use the instrument was granted for this research from the authors.

Population and Sample Frame

The population, representing the public domain, included information systems project personnel employed by nearly 18,000 law enforcement organizations. The most recent data (Reaves, 2011) indicated that there were nearly 18,000 municipal, county, and state law enforcement agencies, and 73 federal law enforcement agencies which employ over 1.1 million full-time persons.

Pre-Data Collection

To operationalize the survey design, a cluster sampling method was employed because access to the population of project personnel had to be granted by the law enforcement organization. In the cluster design a random selection of agencies, or clusters, was made, and a sample was drawn from each cluster. Vogt (2007) described the cluster sample as "randomly sampling convenient clusters of the population before using random samples within those clusters" (p. 80). Contact information for the law enforcement agencies information was requested from the United States Bureau of

Justice Statistics which contains information for nearly 18,000 municipal, county, state, and federal law enforcement agencies.

Sample

To determine an appropriate cluster sample size for the survey, an a priori power analysis was conducted (β = .9, α = .05, f^2 = .15) for 3 predictor variables and resulted in a minimum sample size of 98. This sample size is smaller than previous research on project management critical success factors in the public domain such as Rosacker and Olson (2008) which had a sample size of 156. Field (2009) suggested there are several rules of thumb for sample size when considering factor loadings however, the de facto standard is ten participants per variable that the research is assessing. As such, this research is considering the three project management critical success factors identified by Slevin and Pinto (1986) consisting of project schedules and plans, technical tasks, and monitoring and feedback as well as three variables of project management success (time, cost, and quality) which would indicate an even smaller minimum sample size of 60 participants. As such, the decision to use a sample size of 100 was made because it was larger than the 60 proposed by Field (2009), commensurate with the Power Analysis, and closer to the existing studies in the body of literature who also considered project management critical success factors in the public domain. Based on previous research of similar nature, the sample frame was expanded to account for a non-response rate of 70%. As such, to arrive at a minimum sample size of 100, the sample frame was established to be 300 clusters. As this survey was intended to collect data about the perceptions of project management critical success factors and project management success, the following inclusion criteria were established for the survey:

1. Participants had to be employed by the law enforcement organization, in a full-time status, and,

2. Participants had to have managed, assisted in managing, or participated an information system deployment.

Data Collection

An email was sent to the randomly selected agency describing the research and requesting permission for agency personnel to participate. If the agency agreed, a second email was sent with a link to the survey intended for all personnel who meet the criteria. Personnel within the agency who agreed to participate completed the survey online via the link in the email. The text of the email can be found in Appendix A. Participants completed the survey at their own convenience. The survey instrument gave written direction to establish a frame of reference for the participant to complete the survey, as identified below.

To begin this survey please consider a project which you are currently deploying, or have recently deployed, then answer the following questions.

Participants completed the survey by selecting their response to each question on a Likert-type scale using a radio button. Only one response per question was allowed. The last questions of the survey collected demographic information to use in the statistical analysis. The survey was available for a period of three months. The extended availability of the survey was due to the coincidence with the several holidays at the end of the calendar year.

Measures

The variables of research question one are project management critical success factors and project management success. Specific questions measuring project management success (Time, cost, and quality) were broken out by each factor and measured using a Likert-type scale where 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly Agree*. Likewise, specific questions measuring project management critical success factors (Project schedules and plans, technical tasks, and monitoring and feedback) were broken out by each project management critical success factor and measured using a Likert-type scale where 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neutral*, 4 = *Agree*, and 5 = *Strongly Agree*.

Project Management Success

The survey questions which operationalized project management success included:

1. The project will/did come in on time
2. The project will/did come in on/under budget
3. The project will be/is used by its intended clients
4. The project will/does have a positive impact on those who make use of it
5. Project schedules are being/were adhered to
6. All things considered, this project will be/was a success
7. The project cost objectives will be/were met

Project Schedules and Plans Critical Success Factor

The survey questions which operationalized project schedules and plans included:

1. There is/was a detailed plan for completion of the project

2. There is/was a detailed budget for the project

3. Key personnel needs (who and when) are/were specified in the project plan

Rosacker and Olson (2008) reported good internal consistency for the project schedules and plans factor, $\alpha = 0.7754$.

Technical Tasks Critical Success Factor

The survey questions which operationalized technical tasks included:

1. The project engineers and other technical people are/were competent
2. The technology that is/was being used to support the project works well
3. The appropriate technology (equipment, training, programmers, etc.) has been/was selected for the project

Rosacker and Olson (2008) reported good internal consistency for the technical tasks factor, $\alpha = 0.8176$.

Monitoring and Feedback Critical Success Factor

The survey questions which operationalized monitoring and feedback included:

1. Regular meetings to monitor project progress and improve the feedback to the project team are/were conducted
2. Actual progress is/was regularly compared with the project schedule
3. The results of the project reviews are/were regularly shared with all personnel who have an impact on the budget and schedule

Rosacker and Olson (2008) reported good internal consistency for the monitoring and feedback factor, $\alpha = 0.8188$.

Demographic Information

In addition to the above mentioned data, participants could optionally report the following demographic information.

1. Which of the following best describes the type of organization where you conducted this project? Federal agency, State agency, County agency, Local agency, Other.
2. Which of the following best describes your position within the project you are considering? Executive, Manager, Staff, Consultant, Other.
3. Are you a member of a project management association (e.g. PMI)? Yes, No.
4. How many years experience do/did you have with the law enforcement organization?
5. How many years experience do/did you have in project management?
6. How many years experience do/did you have in information technology?
7. What was the approximate budget of the project you considered?

Beneficence in Data Collection

The population identified in this research plan is not consistent with any protected populations identified in the ethical research literature. However, in this survey research the concept of beneficence is particularly applicable to data collection. Specifically, as identified by Creswell (2009), surveys can be a point of intrusion for participants, as well as a risk to privacy. Therefore, in addition to the standard informed consent protocols, particular consideration was given these issues when collecting data.

Informed Consent

In this research, each participant began participation by agreeing to the informed consent that was included in the email. The specific items addressed in the informed consent were dictated by Capella University, and the approving Institutional Review Board. In summary, the information identified the researcher and Capella University as the principals in the research, the general purpose of the research and how the data collected from the participants was to be used and interpreted in the findings, as well as identification of safeguards to the participant's privacy and confidentiality.

Intrusion

Creswell (2009) asserted that researchers need to "be cognizant of their impact, and minimize their disruption of the physical setting" (p. 90). The concern of intrusion, or physical impact to the participant, was addressed in two ways in this research: Design and execution. The design of the survey was such that each of the questions mapped directly to a variable in the research. There were no questions that did not collect necessary data for successful completion of the research. The total time to complete the survey was also minimized by clear and concise wording of the questions, and easy selection of responses to the question, which in all but a few cases could completed through a single mouse click. The execution of the survey was electronic in nature so that participants could complete the survey at their convenience and in a convenient setting of their own choosing.

Privacy Risks

Identified in the safeguards for privacy in the informed consent section of the survey, participant information was limited to data regarding their perceptions of

information system project management success and project management critical success factors, as well as some limited demographic data. No personally identifiable information was gathered on participants. Additionally, the data was collected on a secure password protected server through the data collection period. When data collection was complete the data was removed from the server and kept solely in the possession of the principal researcher. Finally, the data is only be presented in summary and aggregate totals further mitigating any possibility that the private response from any participant could be compromised or identified.

CHAPTER 4. RESULTS

Introduction

The purpose of this research was to generalize about the relationship between project management critical success factors and information system project management success in the public domain. The research is operationalized through a survey that collects perceptions of project management success and project management critical success factors from project management personnel in randomly selected clusters, or law enforcement agencies. Conclusions are drawn based on analysis of those data which will support or reject the stated hypotheses. In this chapter, both the population and corresponding sample from which the data was collected will be described. Following the description of the population and the sample, a summary of the results are offered with respect to the stated hypotheses, and finally conclusions will be presented for each of the hypotheses based on the data presented.

Description of the Population and Sample

The population from which the sample was drawn is comprised of over 1.1 million full-time law enforcement personnel (Reaves, 2011). While the subset of how many of those personnel actually participate in project management duties is unknown, it is known that that subset is clustered in over 15,000 law enforcement agencies within the United States. The following table illustrates data from Reaves (2011) and shows the breakdown within the over 15,000 clusters, or agencies.

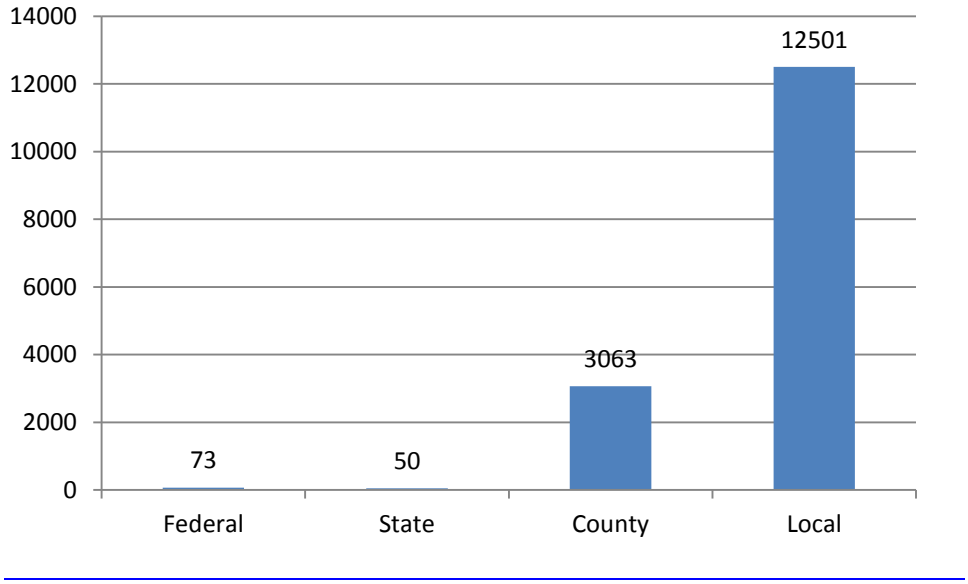

Figure 2. Population Distribution by Agency Type

This data illustrates that the vast majority, nearly 80% are local law enforcement agencies and the vast majority of the remaining 20%, over 96%, are county law enforcement agencies. Reaves (2011) also reported that together, local and county law enforcement agencies employed over 946,000, or 83%, of the over 1.1 million full-time law enforcement personnel. From this population of over 15,000 agencies a total of 101 valid survey responses were received. Following is a breakdown of the 101 responses by type of agency.

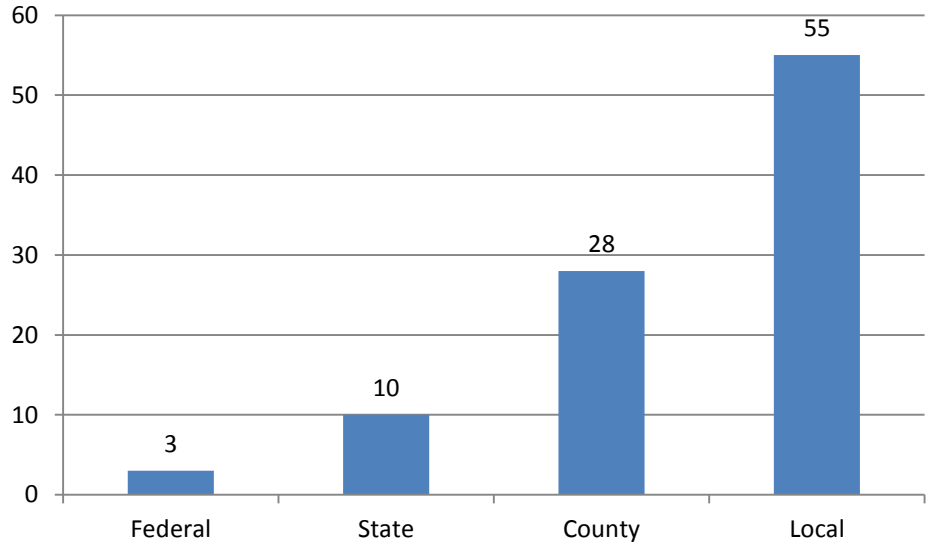

Figure 3. Sample Distribution by Agency Type

In comparison of the sample to the population, the following statistics should be noted. In the population reported by Reaves (2011), federal law enforcement agencies make up about 0.41% of the agencies, in the sample, federal law enforcement agencies make up about 3.13% of the agencies who responded to the survey. In the population reported by Reaves (2011), state law enforcement agencies make up about 0.28% of the agencies, in the sample, state law enforcement agencies make up about 10.42% of the agencies who responded to the survey. In the population reported by Reaves (2011), county law enforcement agencies make up about 17.3% of the agencies, in the samples, county law enforcement agencies make up about 29.17% of the agencies who responded to the survey. Finally, in the population reported by Reaves (2011), local law enforcement agencies make up about 69.51% of the agencies, in the sample, local law enforcement agencies make up about 57.29% of the agencies who responded to the

survey. In addition to data regarding project management success and project management critical success factors, a small amount of other demographic data was optionally reported by participants of the survey. All 101 participants completed the optional demographic questions resulting in 101 valid responses.

Participants were asked to identify the title they held during deployment of the project they considered for the purposes of the survey. Within the sample, participants largely identified their position within the project as manager, 47.5%, while 26.7% identified themselves as staff, and 13.9% identified themselves as executives. This high number of managers is expected due to the organization of projects within most law enforcement agencies, where a manager is assigned general responsibility and may pull in other resources (staff, IT, financial) as necessary.

Table 1. Frequency of Participant's Title

		Frequency	Percent
Valid	Consultant	5	5.0
	Executive	14	13.9
	Manager	48	47.5
	Other	7	6.9
	Staff	27	26.7
	Total	101	100.0

Participants were asked if they were members of a project management association. Within the sample the vast majority, 86.1%, of the participants reported that they were not a member of a project management association.

Table 2. Frequency of Association Affiliation

		Frequency	Percent
Valid	No	87	86.1
	Yes	14	13.9
	Total	101	100.0

Participants were asked how many years of experience they had in law enforcement. As is illustrated by the table below, a majority of the participants have been in the law enforcement sector for quite a while. Over 61% of the participants responded that they have 16 or more years experience in law enforcement, with 13.9% of those responding have 26 or more years experience.

Table 3. Frequency of Law Enforcement Experience

		Frequency	Percent
Valid	Less than 1 year	1	1.0
	1 to 5 years	5	5.0
	6 to 10 years	13	12.9
	11 to 15 years	20	19.8
	16 to 20 years	23	22.8
	21 to 25 years	25	24.8
	26 plus years	14	13.9
	Total	101	100.0

Participants were asked how many years of experience they had in project management. Within the sample, as was the case with the project management

association variable, a majority of the participants, 68%, reported less than 10 years of experience in project management.

Table 4. Frequency of Project Management Experience

		Frequency	Percent
Valid	Less than 1 year	7	6.9
	1 to 5 years	34	33.7
	6 to 10 years	27	26.7
	11 to 15 years	18	17.8
	16 to 20 years	6	5.9
	21 to 25 years	5	5.0
	26 plus years	4	4.0
	Total	101	100.0

Participants were asked how many years of experience they had in information technology. Within the sample, participants reported a diversity of experience, with the largest category reported being 6 to 10 years, 21.8%.

Table 5. Frequency of Information Technology Experience

		Frequency	Percent
Valid	Less than 1 year	7	6.9
	1 to 5 years	18	17.8
	6 to 10 years	22	21.8
	11 to 15 years	17	16.8
	16 to 20 years	17	16.8
	21 to 25 years	6	5.9
	26 plus years	14	13.9
	Total	101	100.0

Finally, participants were asked the approximate budget of the project which they considered for the purposes of the survey. Within the sample, participants reported a diversity of budgets with no category appearing to be dramatically over-represented.

Table 6. Frequency of Project Budget

		Frequency	Percent
Valid	less than $50, 000	15	14.9
	$51,000 to $100, 000	16	15.8
	$101,000 to $250, 000	19	18.8
	$251,000 to $500,000	15	14.9
	$501,000 to $750,000	12	11.9
	$751,000 to $1,000,000	5	5.0
	Greater than $1,001,000	19	18.8
	Total	101	100.0

The demographic data collected from the survey indicated that the sample is constructed predominately of the perspectives of project managers and staff, working on a diversity of project budgets, who have a great deal of law enforcement experience, lesser amounts of IT experience, and even lesser amounts of project management experience.

Reliability of Measure

Field (2009) posited that all instruments contain error in measurement, and that reliability statistics such as Cronbach's Alpha help identify how much error can be attributed to the instrument itself. The original authors of the instrument used in this study reported high reliability statistics as reported in Chapter 3. The following confirms the continued reliability of the instrument through high reliability statistics which are all found above 7. The questions related to Project Management Success resulted in the following reliability statistics.

Table 7. Project Management Success Reliability Statistics

Cronbach's Alpha	N of Items
.806	7

Table 8. Project Management Success Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The project will/did come in on time	24.35	11.189	.619	.768
The project will/did come in on/under budget	24.10	12.130	.545	.782
The project will be/is used by its intended clients	23.21	15.086	.394	.805
The project will/does have a positive impact on those who make use of it	23.29	13.767	.531	.785
Project schedules are being/were adhered to	24.39	11.699	.587	.774
All things considered, this project will be/was a success	23.49	13.432	.629	.772
The project cost objectives will be/were met	23.76	12.643	.571	.776

The questions related to Project Schedules and Plans resulted in the following reliability statistics.

Table 9. Project Schedules and Plans Reliability Statistics

Cronbach's Alpha	N of Items
.767	3

Table 10. Project Schedules and Plans Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
There is/was a detailed plan for completion of the project	8.14	2.001	.639	.646
There is/was a detailed budget for the project	8.10	1.970	.593	.695
Key personnel needs (who and when) are/were specified in the project plan	8.28	2.002	.571	.721

The questions related to Technical Tasks resulted in the following reliability statistics.

Table 11. Technical Tasks Reliability Statistics

Cronbach's Alpha	N of Items
.787	3

Table 12. Technical Tasks Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
The project engineers and other technical people are/were competent	8.20	1.880	.572	.768
The technology that is/was being used to support the project works well	8.20	1.840	.663	.676
The appropriate technology (equipment, training, programmers, etc.) has been/was selected for the project	8.26	1.653	.651	.685

The questions related to Monitoring and Feedback resulted in the following reliability statistics.

Table 13. Monitoring and Feedback Reliability Statistics

Cronbach's Alpha	N of Items
.837	3

Table 14. Monitoring and Feedback Item Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Regular meetings to monitor project progress and improve the feedback to the project team are/were conducted	7.49	2.832	.662	.809
Actual progress is/was regularly compared with the project schedule	7.67	2.682	.742	.731
The results of the project reviews are/were regularly shared with all personnel who have an impact on the budget and schedule	7.65	2.769	.694	.778

Summary of Results

Before conducting statistical tests on the hypotheses, the data was evaluated to ascertain whether the data met the assumptions necessary to conduct ordinal regression testing. Laerd (2013) posited that the assumptions of ordinal regression include: Ordinal dependent variable, one or more independent variables that are ordinal in nature, no multicollinearity, and there are proportional odds. The following discussions present the findings from the tests for each of the assumptions. All statistical testing was accomplished using SPSS version 22 on the PC.

Ordinal Dependent Variable

The first assumption of ordinal regression, according to Laerd (2013) is that the dependent variable must be ordinal in nature. The dependent variable identified in the survey data was Project Management Success (PMSTOTAL). This variable was

collected as seven different questions that considered each of the portions of project management success (time, budget, quality) on a five point Likert type scale where 1 = Strongly Disagree and 5 = *Strongly Agree*. The results were indexed by adding the values from each question to arrive at a total value for the Project Management Success variable. Field (2009) described this type of variable where the order is indicated but the differences between values is not indicated as ordinal data. As such the data satisfied the assumption of having an ordinal dependent variable.

Ordinal Independent Variable

The second assumption of ordinal regression, according to Laerd (2013) is that at least one of the independent variables must be categorical or ordinal in nature. Similar to the previously described dependent variable, the independent variables identified in the survey data were the project management critical success factors of project scheduling and planning (PSPTOTAL), technical tasks (TTTOTAL), and monitoring and feedback (MFTOTAL). These variables were collected as three different questions each on a five point Likert type scale where 1 = Strongly Disagree and 5 = *Strongly Agree*. The results were indexed by adding values from each question to arrive at the total value for the Project Management Critical Success Factor variable. Field (2009) described this type of variable where the order is indicated but the differences between values is not indicated as ordinal data. As such the data satisfied the assumption of having ordinal independent variables.

Multicollinearity

The third assumption for ordinal regression, according to Laerd (2013) is that there must not be collinearity between two or more of the independent variables. Collinearity between the independent variables "leads to problems with understanding which variable contributes to the explanation of the dependent variable and technical issues in calculating an ordinal regression" (p. 1). Below is a correlation matrix that displays the Pearson Correlation Coefficient for each of the independent variables.

Table 15. Independent Variable Correlations

		PSPTOTAL	TTTOTAL	MFTOTAL
PSPTOTAL	Pearson Correlation	1	.339	.432
	Sig. (2-tailed)		.001	.000
	N	101	101	101
TTTOTAL	Pearson Correlation	.339	1	.174
	Sig. (2-tailed)	.001		.082
	N	101	101	101
MFTOTAL	Pearson Correlation	.432	.174	1
	Sig. (2-tailed)	.000	.082	
	N	101	101	101

Field (2009) posited that very high, correlation coefficients of .8 should be cause for concern that the "multicollinearity may be biasing the regression model" (p. 224). Additionally, Field (2009) posited that subtle forms of multicollinearity may be identified by the Variance Inflation Factor (VIF). Field (2009) asserted that "the VIF indicates

whether a predictor has a strong linear relationship with the other predictor(s)" (p. 224). Field (2009) continues that values approaching 10 should be reason for concern regarding multicollinearity. The VIF statistics for each of the independent variables is presented below.

Table 16. Independent Variable Variance Inflation Factors

		Collinearity Statistics	
Model		Tolerance	VIF
1	PSPTOTAL	.742	1.348
	TTTOTAL	.884	1.131
	MFTOTAL	.812	1.231

a. Dependent Variable: PMSTOTAL

Based on the low correlation values from the Pearson Correlation Coefficients, and the low VIF statistics, the assumption of no multicollinearity was satisfied.

Proportional Odds.

The final assumption for ordinal regression, according to Laerd (2013), is the assumption of proportional odds. O'Connell (2006) posited that proportional, or parallel odds "implies that the explanatory variables have the same effect on the odds, regardless of the different consecutive splits to the data, for category of the model" (p. 29). This assumption was tested using the test of parallel lines in SPSS where the null hypothesis for the test is that the odds are the same between each of the categories.

Table 17. Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	389.554			
General	.000	389.554	416	.820

As seen in the output, where there is not a significant result ($p = 0.820$) (sig. $p<0.05$), the null hypothesis has been accepted and the assumption that the odds between each of the categories in the model is the same, which satisfies the assumption of proportional odds.

Statistical Analysis for Hypothesis One

Hypotheses one explored the relationship between the project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback, and information system project management success. Hypothesis one and its alternate are stated below.

> H1: The project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback does not have a statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.

> $H1_a$: The project management critical success factors of project schedules/plans, technical tasks, and monitoring and feedback have a

statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.

Based on the satisfaction of the assumptions an ordinal regression was conducted on the variables of Project Management Success, Project Schedules and Planning, Technical Tasks, and Monitoring and Feedback. The primary results of the regression are presented below.

Table 18. Hypothesis One Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	499.148			
Final	389.554	109.594	26	.000

Link function: Logit.

Table 19. Hypothesis One Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	2469.387	1300	.000
Deviance	365.772	1300	1.000

Link function: Logit.

Table 20. Hypothesis One Pseudo R-Square

Cox and Snell	.662
Nagelkerke	.665
Link function: Logit.	

Ordinal regression of Project Schedules and Planning, Technical Tasks, and Monitoring and Feedback against the dependent variable of Project Management Success was significant ($p<0.05$) for both the Model Fitting statistic and the Goodness-of-Fit statistic indicating that the model, using the observed variables, fit significantly better than the model using variables set to null, or zero. Further, the effect size of the variables is large (pseudo R-square = 0.662), according to Cohen (1988), who asserted large effects are between 0.5 and 1, thus indicating the influence the three independent variables, and also the positive nature of the relationship with the dependent variable.

Statistical Analysis for Sub-questions One, Two, and Three

Sub-question one specifically explored the relationship between the project management critical success factor of project schedules and plans and information system project management success. Sub-question one and its alternate are stated below.

$H1_{01}$: The project schedules and plans critical success factor does not have a statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.

$H1_{A1}$: The project schedules and plans critical success factor does have a statistically significant relationship with the project management success of

an information system project in the law enforcement sector of the public domain.

Table 21. Sub-question One Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	242.245			
Final	190.148	52.097	8	.000
Link function: Logit.				

Table 22. Sub-question One Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	108.310	128	.896
Deviance	87.587	128	.998
Link function: Logit.			

Table 23. Sub-question One Pseudo R-Square

Cox and Snell	.403
Nagelkerke	.405
Link function: Logit.	

Ordinal regression of Project Schedules and Planning against the dependent variable of Project Management Success was significant ($p<0.05$) for the Model Fitting statistic but not significant for the Goodness-of-Fit statistic indicating that the model, using the observed variables, may not be better than the model using variables set to null, or zero. The effect size of the variables is medium (pseudo R-square = 0.403) according

to Cohen (1988), who asserted medium effects are between 0.3 and .5 indicating the influence the variable, and also the positive nature of the relationship with the dependent variable.

Sub-question two specifically explored the relationship between the project management critical success factor of technical tasks and information system project management success. Sub-question two and its alternate are stated below.

> $H1_{02}$: The technical tasks critical success factor does not have a statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.
>
> $H1_{A2}$: The technical tasks critical success factor does have a statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.

Table 24. Sub-question Two Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	226.517			
Final	180.379	46.138	9	.000

Link function: Logit.

Table 25. Sub-question Two Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	167.100	144	.091
Deviance	90.609	144	1.000

Link function: Logit.

Table 26. Sub-question Two Pseudo R-Square

Cox and Snell	.367
Nagelkerke	.369

Link function: Logit.

Ordinal regression of Technical Tasks against the dependent variable of Project Management Success was significant ($p<0.05$) for the Model Fitting statistic but not significant for the Goodness-of-Fit statistic indicating that the model, using the observed variables, may not be better than the model using variables set to null, or zero. The effect size of the variables is medium (pseudo R-square = 0.367) according to Cohen (1988), who asserted medium effects are between 0.3 and 0.5, indicating the influence the variable and also the positive nature of the relationship with the dependent variable.

Sub-question three specifically explored the relationship between the project management critical success factor of monitoring and feedback and information system project management success. Sub-question three and its alternate are stated below.

$H1_{03}$: The monitoring and feedback critical success factor does not have a statistically significant relationship with the project management success of

an information system project in the law enforcement sector of the public domain.

$H1_{A3}$: The monitoring and feedback critical success factor does have a statistically significant relationship with the project management success of an information system project in the law enforcement sector of the public domain.

Table 27. Sub-question Three Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	255.185			
Final	228.089	27.096	9	.001

Link function: Logit.

Table 28. Sub-question Three Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	163.509	144	.127
Deviance	124.559	144	.877

Link function: Logit.

Table 29. Sub-question Three Pseudo R-Square

Cox and Snell	.235
Nagelkerke	.236

Link function: Logit.

Ordinal regression of Monitoring and Feedback against the dependent variable of Project Management Success was significant ($p<0.05$) for the Model Fitting statistic but not significant for the Goodness-of-Fit statistic indicating that the model, using the observed variables, may not be better than the model using variables set to null, or zero. The effect size of the variables is small (pseudo R-square = 0.235), according to Cohen (1988), who asserted small effects are below 0.3, indicating the influence the variable, and also the positive nature of the relationship with the dependent variable.

Details of Analysis and Results

The purpose of this quantitative survey research was to generalize about the relationship between project management critical success factors and information system project management success in the public domain by testing the relationship between the project management critical success factors and project management success. As evidenced by the significant Model Fit and Goodness-of-Fit statistics, as well as the large effect size produced as a result of the ordinal regression for the identified independent variables of Project Planning and Scheduling, Technical Tasks, and Monitoring and Feedback, there seems to exist a positive relationship, as well as a relationship that has a large effect on the dependent variable of project management success. As a result of these findings the null hypothesis H1, as well as the null hypotheses for sub-questions one, two, and three were all rejected. These results seem similar to the results of the seminal Project Management Profile researchers such as Slevin and Pinto (1986) as well as more contemporary research on project management critical success factors in the

public domain such as Rosacker and Olson (2008) who found significant positive relationships in the public domain of state organizations.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Introduction

The previous chapters of this study focused on generalizing about the relationship between project management critical success factors and information system project management success in the public domain. This chapter concludes this research by describing the results of the statistical testing in relation to the stated hypotheses. Additionally, this chapter further explores the interpretation of those results and the implications for project management success in the public domain. Finally, the limitations of the study are explored which results in a discussion of areas that could be considered for future research.

Summary of the Results

As illustrated in the previous chapters, there has been much research on project management critical success factors and their relationship to project management success. However within the literature, little has been specific to a particular domain such as the public domain, and based on an extensive review of the literature, none has been conducted in the law enforcement sector of the public domain. This lack of research is coupled with unexpectedly low project success rates (Varon, 2004; McCaney, 2009; PMI, 2013). As such, the intent of this research was to quantitatively generalize about the relationship of three project management critical success factors originally identified by Slevin and Pinto (1986) and project management success. Following is a summary of the quantitative data that was collected, and the results of the statistical tests that were performed on the data.

Likert-type data was collected using a survey developed by Rosacker and Olson (2008). Data collection yielded a sample size of 101 valid results from project management personnel within the law enforcement domain, who had managed, assisted in managing, or participated in an information system deployment in their agency. Within the sample, federal law enforcement agencies make up about 3.13% of the agencies who responded to the survey, state law enforcement agencies make up about 10.42% of the agencies who responded to the survey, county law enforcement agencies make up about 29.17% of the agencies who responded to the survey, and local law enforcement agencies make up about 57.29% of the agencies who responded to the survey. While this distribution does deviate from the population described by Reaves (2011), the overall response rate of 34% seemed commensurate with other data collections in the public domain (Rosacker & Olson, 2008; Davis, 2013). Data collected regarding the project personnel's perception of each project management critical success factor was regressed, using ordinal regression, against the perceived level of project management success reported for that project. As the data collected was ordinal in nature (i.e., categorized in a specific order with no definite distance between each category) ordinal regression was selected as the appropriate test to quantify the relationship between the independent and dependent variables. Laerd (2013) describes ordinal regression in terms of odds that the dependent variable will fall into a particular category. In the case of this research, the results of the ordinal regression reported that the presence of all three project management critical success factors significantly increased the odds of a project management success category by over 60%. Additionally, all three project management critical success factors resulted in a significant Model Fitting Statistic, and

also a significant Goodness-of-Fit Statistic, thus indicating that the model was significantly predicting the outcome of which project management success category would result.

The results of the ordinal regression testing individual project management critical success factors were less definitive. Among the three individually tested project management critical success factors, all three (project schedules and plans, technical tasks, and monitoring and feedback) were all found to have a significant Model Fitting Statistic, but were not found to have a significant Goodness-of-Fit Statistic. Finally, among the three individual project management critical success factors, project schedules and plans and technical tasks were found to have medium effect size (project schedules and plans pseudo R^2 value = 0.403; technical tasks pseudo R^2 value = 0.367), and monitoring and feedback was found to have a small effect size (pseudo R^2 = 0.234), as compared to Cohen (1988).

Discussion of the Results

The two key findings resulting from this research were first: when taken as a whole, the project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback have a large, positive effect on project management success. This finding is consistent with results found in the body of literature for other domains such as those researched by Belout and Gauvreau (2004), Prabhakar (2008), Davis (2013), Savolainen, Ahonen, and Richardson (2012), and Ika (2009) who all found that the project management critical success factors presented by Slevin and Pinto (1986) had a positive effect on project management success. Secondly, when taken individually, the project management critical success factors of project

schedules and plans (pseudo R-square = 0.403) and technical tasks (pseudo R-square = 0.367), seem to have a slightly greater effect on project management success than that of monitoring and feedback (pseudo R-square = 0.235). The effect sizes for the individual project management critical success factors are moderated by the significant Model Fit Statistic and the Goodness-of-Fit statistic which was found not significant. This finding differs from those found in the literature (Rosacker & Olson, 2008) who found large effect sizes and significant correlations between the individual project management critical success factors and project management success.

Implications of the Results

As identified in the literature (Moore, 1995; Moore & Khagram, 2004) organizations which operate in the public domain face a different operational environment and different challenges which in many cases directly affect or influence decisions especially in project management. The premise of this research was to see if the different environment and different challenges influenced the previously established relationship between project management critical success factors and project management success that had been identified in the literature. The findings of Hypothesis One (H1) indicated that when taken as a whole, the project management critical success factors originally identified by Slevin and Pinto (1986) have a similar relationship with project management success in both the public and private domains. This finding has implications for project managers in the public domain sector of law enforcement, primarily including empirical evidence that focus on the project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback has a large positive effect on the likelihood of project

management success. Additionally, the finding lends empirical support for the convergence of unified project management critical success factors across domains. This implication could dramatically reduce the need to further research project management critical success factors in other domains, if the literature is trending toward a cross-domain set of project management critical success factors.

Limitations

In as much as the findings of this research provided empirical evidence to support the stated hypothesis, that support should always be qualified with areas which may dramatically influence the outcome of the findings (Cooper & Schindler, 2011). In this research limitations are categorized into two areas including functional limitations and quality limitations. Functional limitations include those areas in the research which possibly hindered or limited the ability to arrive at the result stated by the hypotheses. Quality limitations include those areas in the research which possibly hinder or limit the quality or interpretation of the findings. Following is a discussion of each limitation area.

Functional Limitations

The purpose of this research was to generalize about the relationship between project management critical success factors and project management success. Generalizing about a relationship in a quantitative manner is well rooted in the positivistic research tradition (Hatch & Cunliffee, 2006), where representative samples are selected to generalize about a larger population, however those generalizations may be inaccurate or problematic if the sample does not properly represent the population. Based on data reported by Reaves (2011), the following graph illustrates the relationship between the population and the sample.

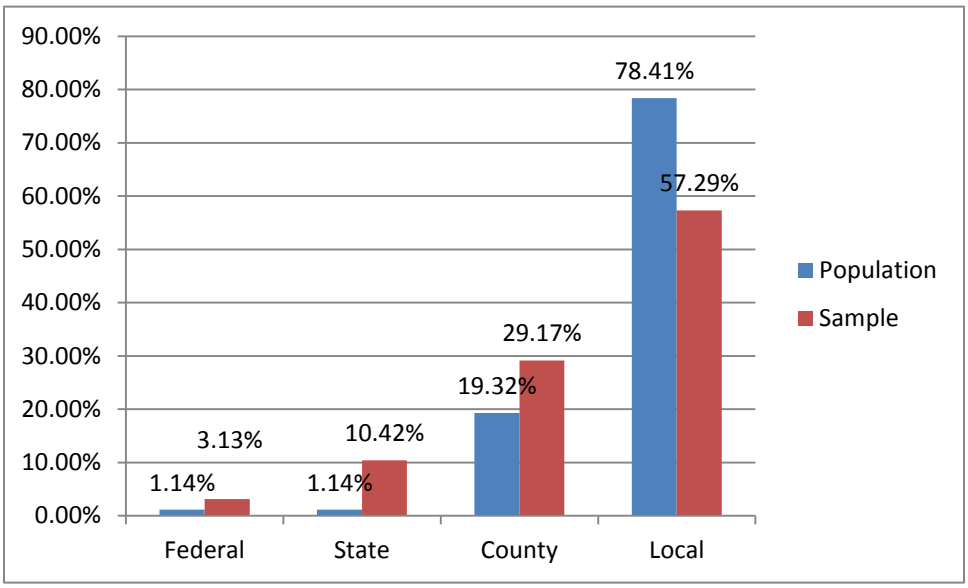

Figure 4. Population Sample Comparison

While federal, state, and county percentages are similarly distributed, the local agencies seem to be under represented within the sample. This under representation is a result of a low response rate among local agencies, where the other agencies met or exceeded the expected return rate of 30%, local agencies only had a return rate of 23%. This lower than expected return rate could be the result of any number of issues ranging from too few resources (too little time, or too large workload) to complete the survey to bias' against surveys.

Other functional limitations are specific to the design of the research. These limitations include the data collection design, which was accomplished via a self-reported survey, and which collected data on a Likert type scale. Both of these designs could potentially influence the ability to arrive at accurate generalizations about the population.

Self-reporting surveys are traditionally thought to suffer from bias' where participants tend to move more toward one extreme or the other, known as extreme response (Paulhus & Vazire, 2007). This extreme response effect may be intensified by use of the Likert type scale which forces participants to select from a small scale of responses. Mitigating such bias' may only be resolved by collection of actual project data which could be extremely difficult to collect and was not feasible for this study.

Quality Limitations

While significant results were found through testing of the data, the non-experimental nature of the research means that no causality could be determined. This limitation severely limits the practical applications of the research, in that we cannot say use of the project management critical success factors will make a project successful (Creswell, 2009). As such the findings can only speak to the relationship between the project management critical success factors and project management success in vague terms and with the assumption that there are other exogenous variables that are also influencing project management success beyond what was explored in this research. For example, this research did not account for the tempering effect that one project management critical success factor may have on the other, or the effect that the organization's project maturity level may have on how the project management critical success factors are deployed. These exogenous variables are examples of areas for future research that are discussed in the next section, and should be considered when future research is conducted.

Recommendations for Future Research

The significant findings identified in this research have given reason to believe that there is a relationship between the project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback and project management success. However the findings presented have opened opportunities for additional research in the field of project management to further define and quantify the nature of that relationship. Of primary importance for future research would be the need to further expand the scope of the project management critical success factors to the remaining seven identified by Slevin and Pinto (1986), which were not included in this research. Quantitative research on the remaining factors of project mission, top management support, client consultation, personnel, client acceptance, communication, and trouble-shooting would provide additional support that the project management critical success factors in the law enforcement sector of the public domain are similarly situated to those in other sectors of the public domain, as well as to those in the private domain. Quantitative research in this domain also adds to the existing body of literature on Public Value Theory, a theory that presents functional options for explaining the operational, authorizing, value environment for public organizations.

Additionally, based on the lack luster Goodness of Fit statistics produced by the individual project management critical success factors when regressed against project management success, it is reasonable to assume that their effect may be moderated in some way by some exogenous variable. Previous research (Patanakul, Lewwoncharoen, & Milosevic, 2010) provides clues that the individual project management critical success factors may be influenced by the position in the project life cycle. In other

words, planning and schedules may be more important in the planning portion of the project and less important in the termination portion of the project, thus influencing its overall perceived level of importance. As this research did not capture data specific to the project life cycle those moderations could not be explored. Future research may include life cycle as a portion of data collection to provide better insight as to this phenomenon. Finally, while there seems to be sufficient statistical power, and effect size generated by the sample used in this research, additional research with a sample that better reflects the population as a whole may provide better results. Specifically, the discrepancy in this research between the proportion of local agencies in the population as compared to the proportion of local agencies who responded in the sample may provide sufficient reason for future researchers to replicate this research with a better sample.

Conclusion

The findings of this research have given empirical evidence that there is a positive relationship between the project management critical success factors of project schedules and plans, technical tasks, and monitoring and feedback and project management success in law enforcement agencies in the public domain. These findings add to the existing body of project management knowledge (Slevin & Pinto, 1986;Rosacker & Olson, 2008; Davis, 2013) by supporting a tested, unified set of critical success factors that applicable to project managers across various domains. Additionally, this research provide initial empirical research that supports the importance of project schedules and plans, technical tasks, and monitoring and feedback for project managers in low enforcement agencies. This initial empirical research will hopefully act as a stepping for future research in one of the most dynamic and important sectors of the public domain: law enforcement.

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APPENDIX A. STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University's Academic Honesty Policy (3.01.01) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person's ideas or works.

The following standards for original work and definition of *plagiarism* are discussed in the Policy:

> Learners are expected to be the sole authors of their work and to acknowledge the authorship of others' work through proper citation and reference. Use of another person's ideas, including another learner's, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)
>
> Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else's ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University's Research Misconduct Policy (3.03.06) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

> Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.

Statement of Original Work and Signature

I have read, understood, and abided by Capella University's Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA *Publication Manual*.

Learner name and date	Brian J. Nichols
Mentor name and school	Dr. Charles McClain, Capella University