PROJECT MANAGEMENT OFFICE PERFORMANCE VARIABLES THAT INFLUENCE PROJECT SUCCESS: A CORRELATIONAL STUDY

by

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Abstract

Projects continue to fail caused by project management office (PMO) performance. The purpose of this study was to examine the extent to which PMO performance predicts project success to help information technology organizations rationalize the design of a successful PMO. Research shows PMOs need further investigation leaving a knowledge gap of what PMO performance factors predict project success by addressing the research questions: To what extent do project management methods predict project success? To what extent do project management standards predict project success? To what extent do project historical archives predict project success? To what extent does project administrative support predict project success? To what extent does project human resource staff assistance predict project success? To what extent does project training predict project success? To what extent do project consulting and mentoring predict project success? The research design is a quantitative, nonexperimental, correlational study that used a survey method to collect the data. Data analysis utilized an inferential statistical test of linear regression from a random sample of individual project teams (N=110) from a sample of the population of information technology project team members in information technology organizations that execute projects. The findings showed that there is a statistically significant predictive relationship between the GoP variables and project success with the presence of PMO.

Dedication

I dedicate this study to my lovely wife, who has endured me for over 30 years and throughout this PhD journey. Without her understanding and patience, this study would not have been possible.

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I would like to acknowledge everyone that has helped me complete this journey. Especially to my mentor Dr. Gottwald and committee members Dr. Wood and Dr. Vucetic, all of you have provided the patience and guidance I needed to complete the dissertation journey.

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CHAPTER 1. INTRODUCTION

The purpose of Chapter 1 is to introduce the study. The chapter begins with background information on the topics of information technology (IT) project management failure, IT project management office (PMO) performance and elements of contingency theory. Following the background of the problem is the statement of the research problem and a discussion of the purpose of the study. Chapter 1 also includes the significance of the study to both researchers and practitioners, the research questions, and definitions of terms that are central to the research. The nonexperimental correlational research design is briefly outlined, and the assumptions and limitations of the study are presented. Chapter 1 concludes with a summary of the organization of the remaining four chapters.

Background of the Problem

A relationship exists between successful PMO performance and project success, denoting those performing PMOs that support project governance: project management practices, processes, and project objectives lead to project success, and lacking such performance has been identified as a primary reason for project failure (Blaskovics, 2016; Liberato, Varajão, & Martins, 2015; Milin, Moraca, Radakovic, Jasarevic, & Hadzistevic, 2012). This study examined how PMO performance influences project success in computer and IT organizations in which employees execute projects and revealed the contingent relationship between PMO performance, project governance, and project success. The contingent relationship leaves a knowledge gap regarding which PMO performance variables are related to project success (Spalek, 2013; Too & Weaver, 2014). Solomon (2017) indicated that managers who adopt the discipline and strategy of implementing comprehensive organizational standards, the right resources, efficient planning capacity, and activity tracking of projects have lower project failure rates (p. 2). The burden

placed on managers to adopt new disciplines and strategies to stay competitive and maintain an optimal level of effectiveness has added unplanned change and introduced unwarranted complexity into the environment, thereby behooving organizational leaders to establish a PMO to mitigate project failure (Martins & Martins, 2012; Singh, Keil, & Kasi, 2009).

The positive aspects of project success are associated with fulfilling a project within its allotted time, cost, and quality objectives and creating value within the workplace. Management has used financial criteria to measure project performance, including economic returns and cost-benefit analyses (de Carvalho, Patah, & de Souza Bido, 2015, p. 2). Successful projects drive change in organizations. From a business perspective, a project aims to move the organization culture from one state to another state to achieve a specific objective. Successful projects lead to business value creation as the net quantifiable benefit derived from a business endeavor. The benefit may be tangible, intangible, or both. In business analysis, the business value is considered the return, in the form of elements such as time, money, goods, or intangibles, for something exchanged. Business value in projects refers to the benefit that the results of a specific project provide to its stakeholders. The benefits from projects may be tangible, intangible, or both. Examples of tangible elements include monetary assets, stockholder equity, utility, fixtures, tools, and market share, whereas examples of intangible elements include goodwill, brand recognition, public benefit, trademarks, strategic alignment, and reputation (Project Management Institute, 2017b).

The positive aspects of a PMO contribute to a project's success, goals, and achievements (Hyväri, 2016). Project managers within the PMO minimize project failure through effective project implementation supported by project governance (Solomon, 2017, p. 1). Other positive aspects of a PMO is the availability of multiple methodologies and tools to ensure projects are

managed on a schedule, within budget, and within scope, known as the *iron triangle*, even under a strict and maintained budget, a tight schedule, and an increase in productivity. Increases in productivities and performances occur when organizational PMOs align with corporate objectives, oversight, process control, project knowledge management, process support, project resources, business maturity, strategic alignment, training for the project team, and project financial management (Aubry, 2015). Increases in project cost of savings and project delivery on schedule are other positive aspects of PMOs influenced by the effective project management methodologies (PMMs) and techniques established within PMOs (Solomon, 2017, p. 2).

Project failure affects IT organizations. For example, frequent project failures in information systems (IS) have caused considerable loss to governments and private organizations (Dwivedi, Henriksen, Wastell, & De, 2013; Dwivedi et al., 2015; Hughes, Dwivedi, Simintiras, & Rana, 2015; Hughes, Rana, & Simintiras, 2017). The extant research on project failure revealed that only 16% of IT projects were successful (Blaskovics, 2016; Müller & Jugdev, 2012). The authors of a recent Chaos report indicated the percentage of successful projects from 2013 to 2017 revealed 43% were on budget, 40% were on time, 58% were on target, and 26% were on goal, with only 29% of the projects considered valuable and 32% satisfied with the project results (Johnson, 2018, p. 17). The most critical factor responsible for the project failures was a lack of clearly defined objectives and milestones to measure progress (37%), which indicates a lack of PMO discipline when implementing the strategy (PMI, 2017b).

Project failure literature provides an overview of key themes and insights to better understand the relationship between PMO performance and project success (Aubry & Hobbs, 2011; Dwivedi et al., 2015; Gupta et al., 2019; Hughes et al., 2015; Mir & Pinnington, 2014). IS literature on project failure is abundant, but there are gaps in the literature that require a new

understanding of the variables that contribute to project failure (Hughes et al., 2017, p. 144). This study will contribute to a better understanding of project failure causation by examining the limitations of knowledge in defining both project success and failure while revealing the contingent relationship between PMO performance, project governance, and project success.

The research literature on PMOs indicates what is known is how PMOs influence performance in organizations and that what constitutes PMO performance is based upon quantitative data, but what is not known is the relationship between PMO performance and project success (Müller, Glückler, & Aubry, 2013). Although PMOs influence performance within organizations, what contributes significantly to operating successful PMOs needs further investigation, leaving a knowledge gap regarding which PMO performance variables are related to project success (Mir & Pinnington, 2014, p. 88; Spalek, 2013; Too & Weaver, 2014). Studies conducted on technology project success and PMO performance have not provided sufficient empirical evidence on the factors related to project success, project management, and PMOs (Aubry & Hobbs, 2011). This lack of evidence may be contradictory to the rationale of establishing PMO organizations (Spalek, 2013).

Despite all the energy and experience devoted to the research, training, and consultants; and despite a significant body of research into the contributory factors of project failure, IT projects continue to fail costing organizations billions of dollars with little consensus exists regarding both the rate of actual failure and how to measure project failure. The immense cost of the high levels of failure leads to questions regarding why more progress has not been made to ensure IT projects are more consistently delivered on time, within the cost, within the scope, and meet customer needs. One of the reasons for explaining the high rate of failure within the IT

project management organization is shortcomings in general project management knowledge and training (Carlton, 2018, p. 2).

IT projects are increasingly challenging for project managers to manage due to the size of the projects and new technological innovations that require different methodologies and tools to initiate, plan, execute, control, and close out the project (Sauer, Gemino, & Reich, 2007). Project managers within IT organizations require knowledge of project methodology to support effective cost, scope, schedule, and quality project decisions, which is one of the key contributing factors to IT project success, along with adequate discipline and knowledge of PMO design and structure (Singh et al., 2009, p. 410; Young & Poon, 2013). A lack of involvement by senior management or a lack of clearly identified deliverables can cause project failure (Sauer et al., 2007). The lack of project requirements from both engineering and management is another contributing cause of project failure. Nevertheless, continuous research and new technologies on project methodologies to clarify and help reduce project requirement topics have not resulted in a practical solution to the problem**.** Researchers have identified various factors of project failure, including top management's commitment, involvement, and support; allocation of scarce resources; communication among multiple stakeholders; team configuration and structure; social cohesion in the team and the complexity of the project; and organizational culture (Carlton, 2018, p. 275). The key contributing factors to IT project success requires the correct project methodology supported by the organization (Singh et al., 2009, p. 410; Young & Poon, 2013).

The current best explanation of the problem and solution to project failure relates to inadequate PMO-related functions, such as management of information and knowledge (Milin et al., 2012). Establishing a formal PMO is a recommended solution to mitigating unsuccessful projects and bridging the chasm between high-level strategic vision and implementation (Milin et

al., 2012; PMI, 2017b; Singh et al., 2009). In the IS literature, researchers maintain that a relationship exists between successful PMO performance and project success, which indicates that PMOs that support the governance of projects (GoP) have higher project success rates; however, PMOs lack of performance has been identified as the primary reason for project failure (Blaskovics, 2016; Liberato et al., 2015; Milin et al., 2012).

Another best explanation of the project failure problem and solution is the limitations of knowledge in defining project success. The most critical issues in defining success criteria are basing the definition on a narrow set of standards, using ambiguous rules, having to compete or conflicting principles, having inadequate or an incomplete set of criteria, using unrealistic criteria, and considering all the requirements as equally important (not ranked; Hussein, Ahmad, & Zidane, 2015).

The underlying evidence is strong in supporting the current explanation of why projects fail when PMO leaders try to adopt project governance. GoP refers to "the coordinated use of systems, structures of authority, and processes and procedures to appropriate resources and control activity in a project" (Pinto, 2014, p. 8). To analyze PMO performance effectively, Blaskovics (2016) studied PMO governance referencing project success. Singh et al. (2009) supported a search for a better understanding of and greater clarity on how PMO performance relates to project success**.**

The problem with the studies of Singh et al. (2009), Blaskovics (2016), and Pinto (2014) is their lack of extensive research on IS project failure left gaps in the literature on how to contextualize new understandings of those variables that contribute to collapse, which justifies the need for further research to reveal new insights and make an additional contribution. Despite decades of research, the continuing instances of IS project failure necessitate ongoing academic

review and analysis to further the understanding and direction of future research (Müller, Pemsel, & Shao, 2014).

The primary interest of this study is to understand the root causes of project failure for mitigation purposes. Extant research indicates IT project failure may be attributed to the use of incorrect tooling due to the plethora of frameworks, methodologies, models, and life cycles on how to create and manage IT projects (PMI, 2017b). Different project management tools, structures, and methods are needed to support different classifications of projects. For example, managing software development projects require an iterative Agile lightweight framework methodology to generate intermittent value, whereas infrastructure plan-driven projects are best supported using a sequenced waterfall methodology. Incorrect tooling, framework, or method can influence project failure and is symptomatic of a lack of project management knowledge and training (PMI, 2017b).

The primary theoretical foundation of this study is contingency theory, which incorporates a positivist philosophy to support the research of PMO-related performance variables associated with the governance of projects that may influence project success (Hanisch & Wald, 2012). Hanisch and Wald justified the selection of contingency theory noting, "no project can be studied comprehensively without considering its context: the congruence of a project to the external contingencies is considered to be a factor influencing the effectiveness" (p. 4). Sauser, Reilly, and Shenhar (as cited in Howell, Windahl, & Seidel, 2010) indicated contingency theory fits project failure research for multiple reasons: the contingent nature of PMMs for given situations, different strategies help managers help structure their organization and environmental conditions and project structure and management practices should be aligned and tailored to fit their context. When applying the GoP variables within the PMO environment,

a concept of fit classifies the GoP variables to the appropriate project methodology or strategy needed to serve the best performance related to project success within computers and IT organizations that execute projects using PMO (Blaskovics, 2016). Shenhar (as cited in Howell et al., 2010) indicated there is no single approach to managing projects because project management is contingent on types of individual projects and supported contingency theory as suitable for project management research.

Statement of the Problem

The problem under study is that IT projects continue to fail due to inadequate PMO performance in computer and IT organizations in which project users execute projects in PMOs. Although PMOs influence performance within organizations, what contributes significantly to the successful operation of PMOs needs further investigation, which has left a "knowledge gap" (Spalek, 2013, p. 88) regarding which PMO performance variables influence project success. The quantitative research literature on PMOs indicates management knows how PMOs influence performance in organizations, but do not know enough about the relationship between PMO performance and project success (Mir & Pinnington, 2014; Müller, Glückler, & Aubry, 2013). Aubry and Hobbs (2011) research on technology project success and PMO performance did not include sufficient empirical evidence on the variables related to project success. The lack of evidence may be contradictory to the rationale of establishing PMO organizations requiring additional PMO performance investigation into the relationship between project success and failure (Davis, 2014; Spalek, 2013).

This study was built on previous seminal PMO research by Dai and Wells (2004) using variables that indicated the presence of a PMO, which was built on the seminal research of Pinto and Slevin (1988) and Pinto and Prescott (1988). Dai and Well's research involved analyzing the

PMO functions and services variables that differ between organizations having a PMO, having no PMO, and having something in-between. This study involved assessing the extent to which PMO performance predicts project success by analyzing the GoP variables adopted by a PMO.

Purpose of the Study

The purpose of this nonexperimental correlational research study is to solve the research problem by measuring the GoP variables that measure PMO performance related to project success and to fill the gap in the research literature regarding which PMO performance variables predict project success (Müller et al., 2014; Spalek, 2013). Conducting the study involved performing a correlational analysis by measuring variables related to project success in organizations that have a PMO. The GoP variables to measure included project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project-related training, and project-related consulting and mentoring. Research on project failure is imperative because it affects entire organizations and, combined with various business losses, can thwart the development of other potential projects (Gupta et al., 2019). Additionally, the ability to plan and monitor future projects will improve by learning from project failure, which can play a pivotal role in ensuring the long-term success of any organization and aiming for continuous improvement (Ellinas, Allan, & Johansson, 2016; Kannan, Manohar, & Kumaran, 2018; Shepherd, Patzelt, Williams, & Warnecke, 2014; Zheng, Liu, & Xiao, 2018). The results of this nonexperiential quantitative research study seek to equip current and future PMOs with design strategies that influence IT project success in computer and IT organizations that execute projects using PMOs.

Significance of the Study

The significance of this study is to the field of project management, contributing to a PMO structure solution that attempts to increase project success (Müller et al., 2014). Because project success is contingent upon PMO performance, this nonexperimental quantitative research study seeks to provide a greater understanding of new PMO-associated constructs and their significance to the multidimensional aspects of project success. Increasing understanding of the performance of PMOs may influence how organizational leaders achieve greater success (Liberato et al., 2015; Müller & Jugdev, 2012).

The significance of this study to organizations is to reveal improvements in the project management discipline based on documented evidence that effective PMOs add value to project-oriented organizations. The organization that wants to establish a PMO can enhance project management governance through methods and standards that positively affect performance in the organization (Spalek, 2013). The justification for an organization to implement any of the GoP variables or a combination of the variables could increase the rate of project success (Blaskovics, 2016).

The theoretical significance of this study is to test and confirm contingency theory, supported by the seminal work of Howell et al. (2010), as it relates to IT project management. Results from this study may lead to improvements in the field of project management based on documented evidence that can make PMOs more effective, as effective PMOs can add value in project-oriented organizations. Successfully operating PMOs need further investigation to reduce the knowledge gap regarding which PMO performance variables relate to project success (Mir & Pinnington, 2014, p. 88). This nonexperimental correlational study analyzed relationships between multiple independent variables and the dependent variables of project success. By

applying the basic contingency theory principles to determine the effectiveness of the project, the project manager will attempt to determine the best project management approach based on how well project condition fits organizational characteristics and how well organized the project methodologies conditions fit each other (Hanisch & Wald, 2012).

This study may confirm contingency theory principles, which argue projects are unique, and there is no universal or one best way to manage them, different project organizational characteristics require different conditions, and organizational and conditional fit each other determine the effectiveness of the project (Hanisch & Wald, 2012). Contingency theory relates to project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project-related training, and project-related consulting and mentoring as PMO performance variables that are a good fit for the GoP and project success. Theoretical implications of contingency theory may include a need for further refinement of comparable research to determine if other factors may increase or decrease the percentage of variability on project success for the selected variables. The implication of using contingency theory within this context confirms the contingency theory approach (Howell et al., 2010).

Research Questions

RQ1: To what extent do project management methods predict project success?

RQ2: To what extent do project management standards predict project success?

RQ3: To what extent do project historical archives predict project success?

RQ4: To what extent does project administrative support predict project success?

RQ5: To what extent does project human resource staff assistance predict project success?

RQ6: To what extent does project training predict project success?

RQ7: To what extent does project consulting and mentoring predict project success?

Definition of Terms

Project consulting and mentoring (CM). Consulting and mentoring is one of the seven operational independent variables that comprise the GoP construct (see Figure 1). The CM variable consists of assistance ensuring the use of project management in a correct manner, ensuring support is provided in deciding viable solutions for unexpected problems in a timely fashion. Project managers receive mentoring as needed for the unique situation to ensure the success of a project; executive management receives suggestions on different measures required for projects as appropriate, and project managers have access to face-to-face or electronic group sharing sessions.

Contingency theory. Contingency theory is the theoretical construct defined by a situation that considers multiple factors as internal and external organizational constraints or relationships of the organization to the environment. Within this research design, PMMs are contingent upon the situation (Hanisch & Wald, 2012; Sauser, Reilly, & Shenhar, 2009).

Governance. Governance derives from the Latin word *gubernare*, meaning to steer. Governance is about processes of rule more than institutions of government. It relates to methods and decisions that seek to define actions, grant power, and verify performance. Different instruments are available to improve governance, ranging from legally binding regulations to economic and other types of incentives, as well as information and skill development. The challenge in governance is to identify the optimal mix of different instruments (Samset & Volden, 2016). Governance refers to organizational or structural arrangements at all levels of an

organization constructed to determine and influence the behavior of the organization's members (PMI, 2017a).

Governance of projects (GoP). GoP is one of the two primary operational constructs supporting this research (see Figure 1). This construct is associated with "the use of systems, structures of authority, and processes to allocate resources and coordinate or control activity in a project" (Pinto, 2014, p. 8). The GoP involves management and governance functions for individual projects and their deliverables (Too & Weaver, 2014). The governance of projects within a PMO has broader organizational implications associated with business objectives and corporate strategic objectives (Müller et al., 2014). For this research design, the operational variables indicating the presence of a PMO and GoP are project management methods, project management standards, project historical archives, project administrative support, project human resource assistance, project-related training, and project-related consulting and mentoring (Dai & Wells, 2004).

Project human resource staff assistance (HA). Project human resource staff assistance is one of the seven operational independent variables that comprise the GoP construct. Project human resource staff assistance consists of the proper person identified to manage a project, skill requirements to manage a project provided to the project manager, assistance for conducting performance evaluations of project team members provided to project manager, project staff recruitment guidelines provided, and project staff recruitment assistance provided (Dai & Wells, 2004).

Project. A project is a research construct that indicates "a temporary project endeavor undertaken to create a unique product, service, or result" (PMI, 2017b, p. 8).

Project administrative support (AS). Project administrative support is one of the seven operational independent variables that comprise the GoP construct (see Figure 1) and consists of administrative staff to coordinate project team and document project results (Dai & Wells, 2004).

Project failure (PF). Project failure is a research construct that references the loss of value caused by a not meeting it intended purpose in regards meeting intended scope or goal (Gupta et al., 2019; Shepherd et al., 2014).

Project historical archives (HS). Project historical archives is one of the seven operational independent variables that comprise the GoP construct (see Figure 1) and consists of change information from previous projects (Dai & Wells, 2004).

Project management (PM). Project management is a research construct referencing the "application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (PMI, 2017b, p. 49*).*

Project management office (PMO). PMO is a moderating operational variable that supports GoP variables as it relates to performance influencing project success (see Figure 1). The PMO is "a management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques" (PMI, 2017b, p. 48).

Project manager (PM). The project manager is a research construct that references the person assigned by the PMO management to coordinate, supervise, and direct a team that is responsible and capable of achieving project directives and objectives (PMI, 2017b, p. 821).

Project management methods (PMM). Project management methods is one of the seven operational variables that comprise the GoP construct (see Figure 1). Methods are derived from a

project management methodology of a "system of practices, techniques, procedures, and rules used by those who work in a discipline" (PMI, 2017b, p. 546).

Project management standards (PMS). Project management standards are one of the seven operational independent variables that comprise the GoP construct (see Figure 1). PMI (2017b) defined a standard as a

> document, established by consensus and approved by a recognized body, which provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context. (p. 563)

Project-oriented organizations (PO). A project-oriented organization is a research construct defined as "organizations that perform their activities by implementing projects whose results are determined by requirements of the project customer" (Todorović, Mitrović, & Bjelica, 2013, p.41).

Project success (PS). Project success is a dependent variable and one of the two primary operating constructs for this research (see Figure 1). According to PMI (2017a), "Traditionally, the project management metrics of time, cost, scope, and quality have been the most important factors in defining the success of a project" (p. 78). Project success can also be measured by specific criteria or objectives determined by stakeholders (p. 78).

Project training (T). Project training is one of the seven operational independent variables that comprise the GoP construct (see Figure 1). Training involves knowledge transfer to project team members on project management and its relationship within the organization, relevant project management software, and management-supported attendance at training courses for strategic training requirements and coaching as appropriate in one-on-one settings (Dai & Wells, 2004).

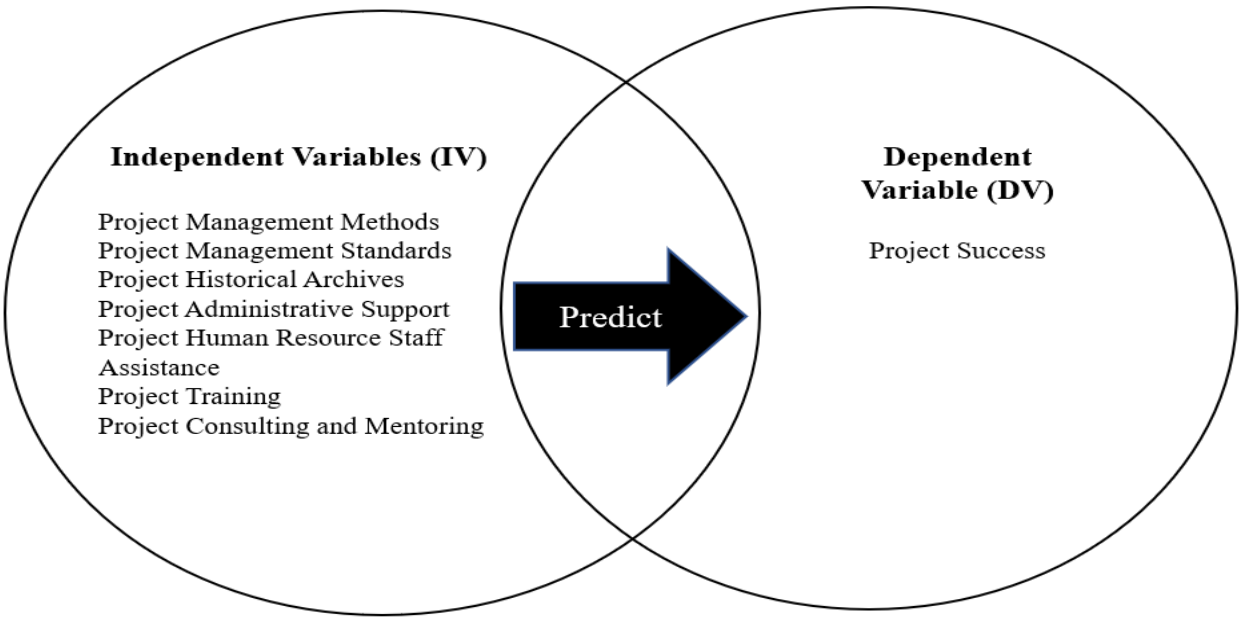

Figure 1. Venn diagram showing the relationships of the seven independent variables with the dependent variable.

The Venn diagram displays the independent variables listed in the outer left circle and the dependent variable listed in the right circle. The center circle supports the research question: "To what extent do the GoP variables predict project success."

Research Design

The research design of this quantitative, nonexperimental, correlational study is to analyze the extent to which the independent variables of GoP that measure PMO performance to predict the dependent variable project success. The methodology for this type of approach is consistent with similar research in the literature (Dai & Wells, 2004). Linear regression analysis for research with multiple independent variables and a dependent variable is supported in statistical textbooks (Field, 2017). Prior authors have influenced the framework of the research design, as Thomas and Mullay (2007) encourages additional analysis and thorough investigations to better understand how the value of project management can contribute to organizations. The

target population for this study is project users in computer and IT organizations who execute IT projects using PMOs. The sample frame was a collection of random respondents recruited using Centiment survey services from a population of IT project managers, project support managers, project coordinators, operational business team members, or project sponsors in organizations that execute projects in PMO.

The data collection instrument for this research was the Project Management Institute Members Questionnaire (PMI, 2016). This validated instrument is suitable because of the similarity of this design to previous research on project management and PMO-related variables. The survey instrument is a seven-point Likert-type scale questionnaire consisting of 67 questions subdivided into several sections. The first section consists of 11 questions related to the background information and demographics of the respondent and the respondent's association with projects and project management. The next section consists of 14 questions on project performance, including one question that provides an inquiry on the assessment of project success by the respondent. The following section has 12 questions specific to PMO-related performance information. The final section of the questionnaire consists of 30 questions in five areas. IBM SPSS 26 was the tool to analyze the data to answer the research questions and hypotheses using statistical techniques of linear regression for each research question.

Assumptions and Limitations

This nonexperimental study was subject to several assumptions and limitations. The present study assumed that the topic and the research findings would be relevant to organizations, individuals, scholars, and practitioners operating within the information

technology project management domain. Assumptions concerning applied methodologies, research design, and the philosophical approach are also addressed in this section. This section then concludes with a discussion of the relevant limitations and delimitations

Assumptions

The identification of assumptions made during a research effort demonstrated a researcher's level of transparency, ethical care, and integrity (Prinsloo & Slade, 2013; Scharff, 2013). A primary assumption supporting project, project management, and project management office (PMO) practices were based on PMI literature, specifically the PMBOK Guide (PMI, 2017a).

General methodological assumptions. Relationships (i.e., correlations) among continuous variables are under investigation in this study. Thus, a methodological assumption was that the chosen statistical model was appropriate for analyzing relationships among sets of continuous level independent variables and a single continuous level dependent variable

The research philosophy underlying ontological assumptions indicates that studies such as the proposed study are fixed and measurable. There is one defined reality for the PMO performance GoP variables as it relates to project success and, if measured, is readily visible for observation.

Epistemological assumptions indicate this study is genuine, objective, and quantifiable, thus confirming contingency theory is a suitable theoretical framework. Axiological assumptions measured PMO performance GoP and as related to project success to objectively test to confirm contingency theory, which is a value to research**.** Methodological assumptions were the variables of PMO performance GoP as related to project success are complex and can be accurately measured.

Theoretical assumptions. The primary theoretical foundation of this study was contingency theory, which assumes a positivist philosophy to support the research of PMO-related performance variables associated with the GoP and project success. Hanisch and Wald (2012) noted, "No project can be studied comprehensively without considering its context: the congruence of a project to the external contingencies is a factor influencing the effectiveness" (p. 4). This design follows a positivist quantitative approach using nonexperimental correlational analysis, including regression analysis (Unger, Gemünden, & Aubry, 2012). This research design relies on the validity of the central limit theorem from data generated from questionnaires using Likert-type scales, which are assumed to produce normally distributed data for an interval level of measurement (Field, 2017). With an assumption of normally distributed data, the statistical test selected is a parametric test and requires testing for normality, homoscedasticity, and linear relationships.

Topic-specific assumptions. From a topic-specific perspective, it was assumed that the study would contribute to the IT project management literature as researchers and scholar-practitioners continually seek to understand the factors that cause project failure. Research indicates that approximately 84% of IT projects fail. Thus, it was assumed that the study is of practical interest to organizational decision-makers.

Assumptions about measures. Another assumption of this study is the assumption of the measures. The data collection instrument for this research analysis was the Project Management Institute Members Questionnaire, supported by the seminal works of (Dai & Wells, 2004) and Trochim (2006). This validated instrument is suitable because of the similarity of this correlational research design to previous research on project management and PMO-related variables. Dai and Wells (2004) instrument expanded on a 2002 research study done by Dai on

PMO and project management research. The instrument is considered valid to consistently measure the independent and dependent variables with a high degree of accuracy for survey research (Trochim, 2006), as Dai and Well's completed confirmatory factor analysis with the instrument to assess construct validity.

Limitations

A limitation of the study was the potential for self-reporting as it relates to the research instrument. The potential exists that completing the survey questionnaire by self-reporting may lead to bias. This concern was mitigated by selecting an instrument with construct validity (Conway & Lance, 2010). Theoretical limitations related to contingency theory managerial problems are the uncertainty and variation in outcomes due to the number of variables that may influence these outcomes (Hanisch & Wald, 2012). Specifically, McLeod, Doolin, and MacDonell (2012) suggest using a subjectivist or a mixed-method approach rather than an objectivist approach. McLeod et al. further noted that researchers should integrate a subjectivist approach to understanding project success with an objectivist approach.

Lastly, a limitation based on the research design is the dynamics of the variables, specifically the definitions of project success**.** Project success is multidimensional. Many PMO-associated factors and variables can affect project success and identify and select the most significant critical variables associated with PMOs are challenging, which increases threats to validity. PMOs are unique and heterogeneous, which may make it challenging to study project success in the context of PMOs if the consistency of measures and uniformity of constructs are lacking, which causes a threat to reliability (Müller & Jugdev, 2012).

Delimitations

This study did not investigate product management which is based the principles of the Agile Manifest for Software (Beck et al., 2001) supported by the various agile methodologies and frameworks like Extreme Programming (XP) (Beck & Andres, 2005) and Scrum (Sutherland & Schwaber, 2017). Nor, did this study investigate agile scaling frameworks like Disciplined Agile Delivery (DAD), Dynamic Systems Development Method (DSDM), Large Scale Scrum (LeSS), Scaled Agile Framework (SAFe), Scaled Agile Framework (SAFe), or Scrum-At-Scale (Hayes, Lapham, Miller, Wrubel, & Capell, 2016; Sutherland, 2020).

Organization of the Remainder of the Study

Chapter 1 included an introduction to the problem to be addressed in this research study, which is project failure caused by PMO performance in computer and IT organizations whose employees execute projects in PMOs. The primary interest of this study is to understand the root causes of project failure for mitigation purposes by studying extant research that indicates IT project failure may result from incorrect tooling due to the plethora of frameworks, methodologies, models, and life cycles on how to create and manage IT projects. The relationship between PMO performance and project success remains unknown and has left a knowledge gap regarding which PMO performance variables relate to project success. The significance of this study is to the field of project management and the identification of PMO performance variables that predict project success. The primary theoretical foundation of the study is contingency theory, and the primary research question is as follows: To what extent do the seven independent variables (project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project-related training, and project-related consulting and mentoring) predict the

dependent variable project success? The research design is a quantitative, nonexperimental, correlational study conducted to analyze the degree to which the variables of GoP that measure PMO performance relate to project success.

The organization of the remainder of the quantitative research study consists of the following chapters. Chapter 2 contains a summary of the review of relevant literature related to this research. Chapter 3 describes the research methodology, research design, population, sample, population, and data collection techniques. Chapter 4 presents the analyses and findings from the survey data. Chapter 5 summarizes the findings and poses recommendations and conclusions from the data analysis.

CHAPTER 2. LITERATURE REVIEW

This study involved examining the extent to which PMO performance is related to project success in computer and IT organizations that execute projects using PMOs. Scholarly literature revealed a relationship exists between successful PMO performance and project success, which indicates that those performing PMOs that support GoP lead to project success (Blaskovics, 2016). PMO's lack of performance has been identified as the primary reason for project failure (Milin et al., 2012). Thus, this literature review on the causality of IT project failure leads to a better understanding of, and greater clarity on, how IT PMO performance relates to project success (Müller et al., 2014). This literature review addresses the following areas related to this research study: portfolio, program, and project management as a field of study, IT GoP, the theoretical construct of contingency theory, structural contingency and project contingency theory research supported by the seminal work of Mullaly and Thomas (2009), IT project success and failure, and IT project success and failure research, and IT PMO research (Davis, 2014; Hanisch & Wald, 2012; Müller et al., 2014; PMI, 2017b).

The literature review includes five main sections. The first section includes a discussion of the search methods used to find the sources used for this literature review. The second section reveals the theoretical orientation for the study and includes the major references chosen to support the theoretical orientation and briefly describe the orientation. The third section contains the literature review and involves defining and exploring the independent variables that comprise the GoP and the dependent variable while providing an analysis of how the independent variables and dependent variable relate to each other. The fourth section provides a synthesis of the findings from the review, and the fifth section includes a critique of the research methods and procedures described in the sources used in the literature review.

Methods of Searching

Primary databases and journals used for this study included ABI/Inform Global, ABI/Inform Trade & Industry, ABI/Inform Dateline, PM World Journal, IGI Global, Computers & Applied Sciences Complete, ACM Digital Library, Google Scholar, Journal of Creating Value, International Journal of Project Management, Project Management Journal and ScienceDirect. Primary search methods included daily search strings using the primary databases for scholarly literature with a date range of no more than five years and consisting of keywords with and without *information technology*. Those keywords included *project management, PMO, project success, project failure, project governance, contingency theory, project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project-related training, and project-related consulting and mentoring*. Primary peer-reviewed journals used for this study include the Journal of Project Management and International Journal of Project Management.

Theoretical Orientation for the Study

The primary theoretical foundation of this study is contingency theory, which incorporates a positivist philosophy (Hanisch & Wald, 2012). The focus within contingency theory is seeing relationships between the environment and the internal structure and learning how to adapt to both constructs (Sauser et al., 2009). Since the1950s, researchers have further developed classical contingency theory, which has evolved into structural and later project contingency theories. Hanisch and Wald 2012 described organizational fit and management theory as influencers of contingency theory supported by the seminal works of Woodward (1958, 1965), Burns and Stalker 1961), Lawrence and Lorsch (1967), and Perrow (1967) posits the effectiveness of the organization is dependent upon one's environment. These seminal works

were among the first used by researchers to develop the concept that "there is no single best way of managing and organizing" (Hanisch & Wald, 2012, p. 4) A comparison between (a) organic and mechanistic organizations' adoption levels and (b) change revealed organic organizations adapt to change better when levels to change is more frequent and mechanistic organizations performed better in stable environments. Initial developments of contingency theory supported adaptability when the focus was on organizational structure, and technological change is the contingency factor (Burns & Stalker, 1961). The seminal works on the organizational structure by Donaldson (2001), Pennings (1998), and Pfeffer (1982) have extended contingency theory research and supported the structural contingency theory construct.

Theoretical Research Perspectives on Contingency Theory

The basic idea of structural contingency theory is that the effect of two variables is moderated by a third variable, where the third variable is the contingency variable that creates instability between the first two variables. An assumption exists that change factors within the environment influence instability. That is, the effect of one variable on the effectiveness of another variable is influenced by a third contingency variable (Donaldson, 2001). The tri-variate relationship dependency can only be described by the causal statement, including the third contingency variable (Hanisch & Wald, 2012, p. 6).

The application of contingency theory as it relates to the field of project management resemblances the broad field of contingency theory materializing in different forms and implementations as well as under a broad range of use cases (Hanisch & Wald, 2012, p. 6). There is no detachment between the study of organizational theory and projects because they are detached entities within the working environment; instead, projects adopt a *concept of projects* as temporary organizations, which supports a more segmented working environment as supported

by the seminal works of Lundin and Söderholm (1995) and Packendorff (1995). The one-size-fits-all approach supported by the contingency nature of projects led scholars to apply contingency theory to project management due to a project's structure and management practices that should be tailored to suit its context (Howell et al., 2010). These structural and management practices led to the development of project contingency theory. Classical organizational contingency theory posits the effectiveness of an organization is related to its fit within its environment, and project contingency theory similarly argues that the best approach to managing a project depends on the context in which the organizational culture influences project organizational factors (Ahimbisibwe, Cavana, & Daellenbach, 2015, p. 12; Burns & Stalker, 1961; Lawrence & Lorsch, 1967).

Theoretical Application on Contingency Theory

To support the application of PMO-related performance variables associated with the GoP in relationship to project success, as prefaced, "No project can be studied comprehensively without considering its context: the congruence of a project to the external contingencies is a factor influencing the effectiveness" (Hanisch & Wald, 2012, p. 4). Contingency theory fits this research because of the contingent nature of PMMs for given situations and organizational structures (Sauser et al., 2009). Although different strategies better manage environmental conditions, the project's structure and management practices should be aligned and tailored to fit their context (Howell et al., 2010). The concept of fit classifies the GoP variables to the appropriate strategy needed to best serve PMO performance as related to IT project success within computer and IT organizations that execute projects using PMOs. This research analyzes variables of GoP associated with a formal PMO concerning project success (Blaskovics, 2016).

From a structural contingency theory approach, the effect of one variable *A* (the independent variables GoP) on the effectiveness *B* of an organization (the dependent variable project success) is influenced by a contingency *C* (the moderating variable PMO; see Figure 2). Shenhar (2001) noted the suitability of contingency theory for addressing project management research and proposed that there is no single approach to managing projects because project management is contingent on types of individual projects. Likewise, Howell et al. (2010) supported a contingency approach to managing projects that influence an organization's project methodology and organizational structure.

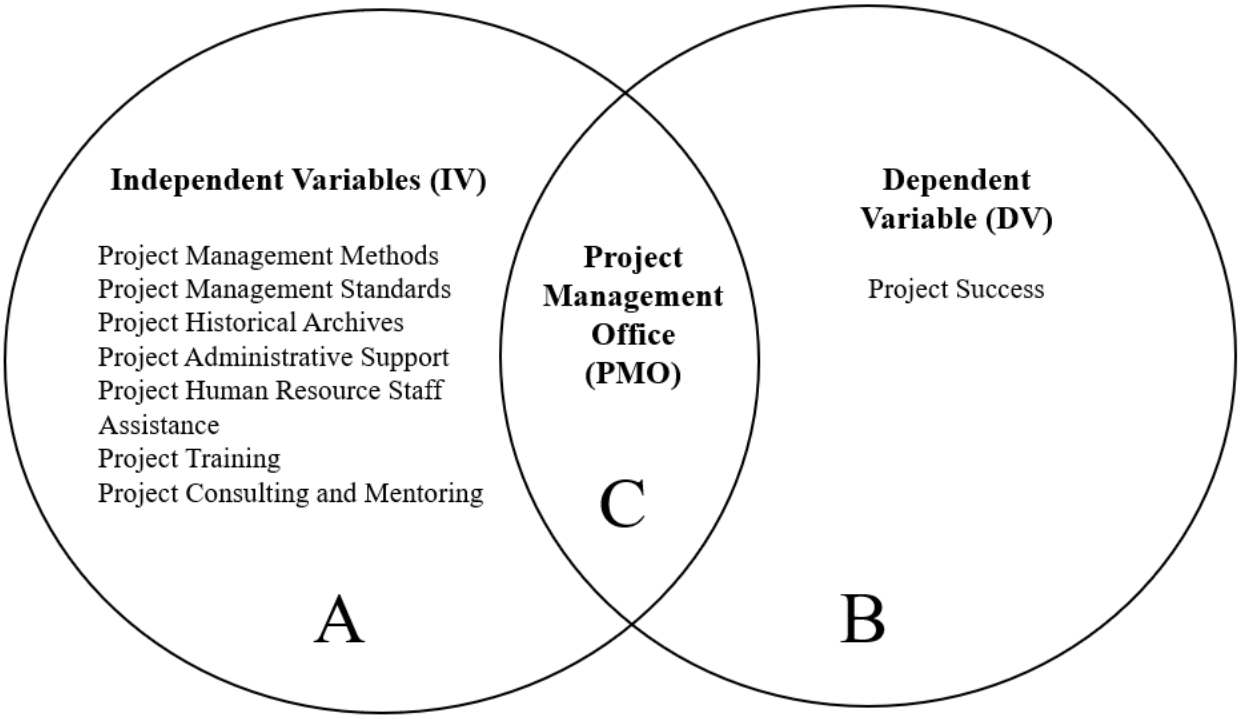

Figure 2. Relationship of research variables and theoretical orientation.

The Venn diagram depicts the research variables as effects in theoretical orientation. The effectiveness of circle A (independent variables) on the effectiveness of circle B (dependent variable project success) of the organization, influenced by contingency circle C (PMO).

Review of the Literature

This study involved examining the extent to which PMO performance relates to project success in computer and IT organizations in which employees execute projects using PMOs. The problem under study is that projects continue to fail as a result of PMO performance. The study intends to analyze variables that influence PMO performance. These variables are known as the GoP: project management methods (PMM), project management standards (PMS), project historical archives (HA), administrative support (AS), project human resource staff assistance (HR), project training (TR), and project consulting and mentoring (CM). The GoP variables were the independent variables, the PMO, and the literature review concludes with an overview of project success, which was the dependent variable.

Relationships Among Portfolios, Programs, and Projects

This section involves reviewing the relationships between portfolios, programs, and projects to gain a better understanding of how these constructs relate to the research problem. The definition for portfolio in *The Standard for Program Management* (PMI, 2017c) is a library of projects, programs, subsidiary portfolios, and services overseen as a group to achieve strategic objectives. Programs consist of related projects, subsidiary programs, and program activities orchestrated in a manner to obtain benefits not available from directing them individually. Programs can be subsets of portfolios, organized, and conducted to deliver benefits significant to an organization's strategic missions and objectives. Projects, whether coordinated independently or as part of a program, are timeboxed endeavors undertaken to create unique products, services, or results. Programs and projects, as significant elements of an organization's portfolio, are conducted to produce the outputs and outcomes required to support an organization's strategic objectives (p. 7). When looking at a project, program, and portfolio management from an

organizational perspective, the focus of program and project management is doing programs and projects the right way, while the focus of portfolio management is doing the right programs and projects (PMI, 2017a, p. 53; see Figure 3).

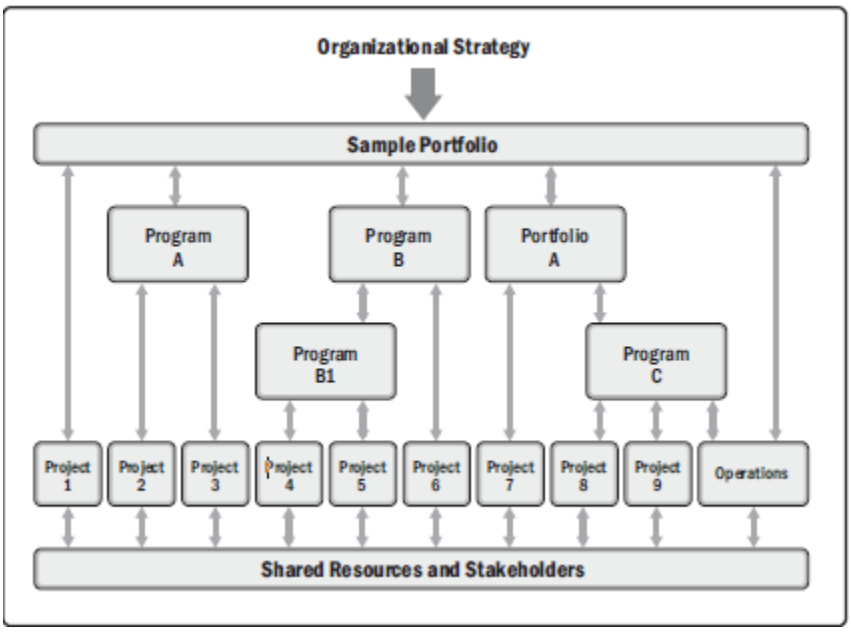

Figure 3. Examples of portfolios, programs, projects, and organizational strategy. From Project Management Institute. (2017). *The standard for program management (4th ed.)*. Newtown Square, PA: Author. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

Figure 3 provides a hierarchical view of an organizational strategy for portfolio management. At the top of the hierarchy is the portfolio supported by programs, projects, and shared resources and stakeholders.

Portfolio, Program, and Project Management

Portfolio, program and project management is an interrelated and interdependent system designed to provide a process of strategic governance within the organization. The process of governance is aligned with the vision and goals of the organization in achieving strategic initiatives adopted by the management of an organization. The process of governance reduces

complexity in the organization by prioritizing the strategic initiatives through a project portfolio selection process that classifies programs and projects based upon compliance, enhancement, strategic, existing and quantitative monetary value through payback, net present value (NPV), and individual rate of return (IRR) to weighted average cost of capital (WACC) calculations. The classification and value cost estimations are used in the vetting process to generate the organization's various portfolios that support the adopted initiatives by management. This portfolio management process helps management align strategic initiatives and estimate organizational resource capability and adoption constraints (PMI, 2017c).

Once the portfolios have been vetted and selected, the portfolios are further refined into programs which are aligned with related programs and resources to maximize value. This process is called program management. Program management is used to refine program objectives but to identify and maximize organization resources capabilities and adoption constraints. Resources capabilities related to knowledge, skills, and principles are aligned with similar program needs which if managed separate greatly reduce value if performed independently. The relationship between portfolio and program management is communication whereby managers collaborate and unify under a common understanding designed to generate the highest business value for the organization (PMI, 2017c, p. 10).

To better manage programs, many times programs are decomposed into smaller parts called projects. The methodology and frameworks needed for project managers to plan and organize the various programs is called project management. The project manager is responsible to create value by delivering projects on time and within the prescribed costs and scope. Projects not related to programs are supported to support emergent organizational objectives. Through various project management methodologies and various frameworks, project managers create

value by completing the project objectives by applying their knowledge, processes, skills, tools, and techniques (p. 10; see Figure 4).

Organizational Project Management			
	Projects	**Programs**	**Portfolios**
Definition	A project is a temporary endeavor undertaken to create a unique product, service, or result.	A program is a group of related projects, subsidiary programs, and program activities that are managed in a coordinated manner to obtain benefits not available from managing them individually.	A portfolio is a collection of projects, programs, subsidiary portfolios, and operations managed as a group to achieve strategic objectives.
Scope	Projects have defined objectives. Scope is progressively elaborated throughout the project life cycle.	Programs have a scope that encompasses the scopes of its program components. Programs produce benefits to an organization by ensuring that the outputs and outcomes of program components are delivered in a coordinated and complementary manner.	Portfolios have an organizational scope that changes with the strategic objectives of the organization.
Change	Project managers expect change and implement processes to keep change managed and controlled.	Programs are managed in a manner that accepts and adapts to change as necessary to optimize the delivery of benefits as the program's components deliver outcomes and/or outputs.	Portfolio managers continuously monitor changes in the broader internal and external environments.
Planning	Project managers progressively elaborate high-level information into detailed plans throughout the project life cycle.	Programs are managed using high-level plans that track the interdependencies and progress of program components. Program plans are also used to guide planning at the component level.	Portfolio managers create and maintain necessary processes and communication relative to the aggregate portfolio.
Management	Project managers manage the project team to meet the project objectives.	Programs are managed by program managers who ensure that program benefits are delivered as expected, by coordinating the activities of a program's components.	Portfolio managers may manage or coordinate portfolio management staff, or program and project staff that may have reporting responsibilities into the aggregate portfolio.
Monitoring	Project managers monitor and control the work of producing the products, services, or results that the project was undertaken to produce.	Program managers monitor the progress of program components to ensure the overall goals, schedules, budget, and benefits of the program will be met.	Portfolio managers monitor strategic changes and aggregate resource allocation, performance results, and risk of the portfolio.
Success	Success is measured by product and project quality, timeliness, budget compliance, and degree of customer satisfaction.	A program's success is measured by the program's ability to deliver its intended benefits to an organization, and by the program's efficiency and effectiveness in delivering those benefits.	Success is measured in terms of the aggregate investment performance and benefit realization of the portfolio.

Figure 4. Comparative overview of project, program, and portfolio management. From Project Management Institute. (2017). *The standard for program management (4th ed.)*. Newtown Square, PA: Author. Copyright and all rights reserved. Material from this publication has been reproduced with the permission of PMI.

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Figure 4 shows an organizational perspective of projects, programs, and portfolios by definition, scope, change, planning, management, monitoring, and success.

Project Failure

This section includes a review of project failure to gain a better understanding of how this construct relates to the research problem. Data from the 2019 Pulse survey (PMI, 2019) revealed that organizations wasted almost 12% of their investment in project spending in 2018 due to poor performance. This waste resulted in fewer jobs revolving around static responsibilities requiring a skill-set improvement in technology quotient to adapt, manage, and interpret technology in a world remodeled continuously by technology (PMI, 2019, p. 3). The focus of data gathered from the survey was the top three process and project management capabilities: (a) project management skills, (b) project manager training, and (c) business skill sets (PMI, 2019).

The 2018 Pulse survey (PMI, 2018) reported that out of every dollar, 9.9% is wasted due to underperforming projects, which equates to $99 million of every $1 billion invested. Scaled to encompass total global capital investment, around $1 million is wasted every 20 seconds—or $2 trillion every year. The gross domestic product contributions from project-oriented industries are forecasted to reach $20.2 trillion over the next 20 years. Only 41% of organizations with an enterprise-wide project management office (EPMO) report that it closely aligns with the organization's strategy. The EPMO is a centralized function that should operate at a strategic level with executives. The EPMO should ensure strategic alignment between business objectives and the projects and programs that deliver them. The lack of alignment indicates the need for executives to recognize better the full potential of how the EPMO can bridge strategy and value delivery. Ninety-three percent of organizations report using standardized project management practices. Embedding consistent, standardized practices reduces risk and leads to better outcomes, mainly when the use of these standardized practices occurs throughout the organization. Seventy percent limit their use (PMI, 2018).

Extant research on defining project failure reveals IS failure is multidimensional, which demonstrates a distinct lack of consensus on an agreed set of criteria to define failure (Hughes et al., 2017). Researchers have often analyzed the classification of IS project failure and proposed a framework as a mechanism or tool to assist with failure analysis and classification (p. 144). Further IT project failure research on reduced IT project success rates and lack of situational improvement can be best explained as Cobb's paradox, which is as follows: "We know why projects fail; we know how to prevent their failure—so why do they still fail?" (Carlton, 2018, p. 30). Until recently, no systematic literature review had been done on project failure (Gupta et al., 2019). Gupta et al.'s research in the field of project management revealed that failures occur more often than successes, specifically in the IT sector (p. 275). Gupta et al.'s research indicated there are more publications on project success than on project failure, and Gupta et al. attributed the reason for the publication bias to management not being willing to reveal their failure data for research purposes (p. 277).

Shepherd et al. (as cited in Gupta et al., 2019) defined project failure as the "the termination of an initiative to create value that has fallen short of its goals" (p. 281). Project failure has been viewed against the iron triangle of time, cost, and quality. With the increase in competition and changing business environments, expectations from projects have multiplied, and project failure criteria have also evolved based on the project life cycle and stakeholders' expectations (Gupta et al., 2019, p. 281).

Researchers have identified causality factors for project failures. The prominent ones are as follows: top management's commitment, involvement, and support; allocation of scarce resources; communications among various stakeholders; team configuration and structure; social cohesion in the team and the complexity of the project; and organizational culture (Gupta et al.,

2019, p. 275). These are the most frequently cited critical failure factors (Carvalho & Rabechini, 2015).

Software Project Failures

Research in software project failure, as a breakdown in software project outcomes, includes a wide variety of definitions (Lehtinen, Mäntylä, Vanhanen, Itkonen, & Lassenius, 2014). Software project failure refers to a recognizable failure to succeed in the cost, schedule, scope, or quality goals of a project (Lehtinen et al., 2014. p. 624). Al-Ahmad et al. (2009) noted, "It may be almost impossible to find agreement about whether a project succeeded or failed" (p. 95). For example, while the developers perceive a project as a total success, other stakeholders perceive it as a dramatic failure (Glass, 1999). Success and failure often relate to the perceptions of project members regarding the fulfillment of project goals **(**Agarwal & Rathod, 2006).

The Standish Group described the causality of software project failures and challenges as related to slow decision latency based upon the claim within decision latency theory that the value of the interval is greater than the quality of the decision**.** Therefore, to improve project performance, management needs to consider ways to speed up how decisions are made (Johnson, 2018, p. 2). Whitney and Daniels (2013) discussed two types of projects to consider when evaluating the causes of failure. Type 1 projects are well-understood, routine projects with a clearly defined scope, and few unknowns. The extent of their complexity is that they may be intensely detailed. They may run late or over budget and fail if technical expertise to handle unexpected deviations from the plan is lacking. Type 2 projects, which are considered complex, typically have many unknowns and have an unclear scope, which causes many difficulties to arise during the beginning stages of the project. Type 2 projects are characterized by the client's

disapproval of the project itself, planning problems, and defining project scope, which is the primary culprit of failure associated with Type 2 projects.

A review of the existing software engineering literature on software project failures revealed the causes of failures are caused by the project environment related to project complexity, organization factors, available assets, policies, structures, business domain, technology, tasks related to project scope, goals, resources, technologies, methods attributed to the actions of developers, users, top management, externals agents, project team, and people-related causes such as the lack of subject matter experts, social interaction, skills, and motivation (Lehtinen et al., 2014, p. 624).

Recent studies in IT project failure broaden the paradigm slightly by including the complexity and size of a multifaceted project as a root cause. The significant frameworks used are not conducive to understanding the underlying nature of systemic complexity inherent in complex adaptive systems. Complex adaptive systems are nonlinear (unable to be determined or represented through the sum of their components and subsystems), nonergodic (interact with their environment by receiving inputs and providing outputs but with limited control over the outcomes), and emergent (change and evolve their behavior in response to inputs). Order emerges through the interaction among the system's parts as they evolve within the more extensive system in response to the changing environment (Whitney & Daniels, 2013).

Project Failure Influenced by Management

There are two types of factors that might lead to IS project failures: managerial and technical. Managerial-type failure factors relate to poor leadership, poor communication, meager competencies, and poor methodology in work. The managerial factors related to the management of IS are the most critical factors that may lead to failure and therefore affect the individual level,

the complexity of the organization, and management support. Technical factors that affect a project's failure the most are inappropriately defined as software requirements, improper technical design and tools, and poor technical support. Organizational behavior and politics were significant in the success and failure of a project (Sweis, 2015)

Carlton (2018) described why managers continue to make the same mistakes despite all the subject matter expert (SME) advice and information provided to the manager that is available as situation incompetence. Situational incompetence stems from managers placed in a position of authority over a domain of activity for which they are neither educated nor experienced. Management's lack of knowledge led them to overestimate their abilities and to underestimate the challenges. Their lack of expertise resulted in an inability to identify competence in others and an inability to intuit an appropriate response when the project experiences challenge them (Carlton, 2018, p. 4). This phenomenon is further explained as the Dunning-Kruger effect, where the less competent an individual is within a domain, the more likely the individual is to overstate his or her perceived knowledge and ability. This effect may be referred to as a confidence–competence dissonance. Individuals who lack competence in a domain (incompetent) but are not self-aware of their lack of competence generally perceive their performance to be not significantly inferior to those who possess significant competence, training, and ability (the experts; Carlton, 2018, p. 10).

This phenomenon can also be described as an unskilled and unaware problem (Ryvkin, Krajč, & Ortmann, 2012). Essentially, according to the unskilled and unaware problem, individuals who are unskilled in a domain overestimate their competence in both absolute terms and relative terms. Top performers underestimate their absolute and relative performance. The seminal work of Kruger and Dunning (1999) found that unskilled individuals were more likely to

misstate their absolute and relative competence dramatically. Much more concerning for complex IT projects, Kruger and Dunning determined that the skills necessary to do the job are the same skills necessary to identify competence in others. This facet of the research on the unskilled and unaware problem is particularly important when an unskilled individual is placed in a position of decision-making authority, such as an IT project. When unskilled individuals possess neither the skills necessary to do the job nor the skills necessary to identify competency in others, they are not able to make informed decisions on complex issues.

Engelbrecht, Johnston, and Hooper (2017) aimed to identify whether a causal relationship exists between the various components of business managers' IT competence and IT success, revealing that business managers' IT competence exerted a strong influence on project success, a lack of knowledge or competence had a negative effect on project outcomes, and, surprisingly, the involvement of non-IT stakeholders can work detrimentally and can confound and confuse proceedings, even causing errors. Engelbrecht et al. also found that business managers may be influenced by some suppliers or colleagues whose IT knowledge they had access to and who insisted on a particular course of action. If a business manager is particularly influential in an organization, there could be similar levels of confusion, delays, and even inappropriate decisions. Given the importance of information technologies to business success, and their presence in almost every endeavor, one would expect to see an increase in technically literate, skilled, or experienced management to provide adequate oversight and governance. Instead, the lack of knowledge of IT projects and an executive's inability to parse the information is one of the root causes of dysfunction and project failure (Carlton, 2018, p.10).

Coertze and von Solms (2013) found that 10% of organizations had chief information officers (CIO) or equivalent representation at the board or executive level of governing

organizational management. Only 15% of organizations had board members with any IT-related qualifications, and in their United Kingdom sample, no organization exhibited board-level oversight of organizational IT through qualified representation directly as a board member. A focus on general business competence over specific IT competence occurs at the CIO level, where less than 50% of CIOs in the U.S. public sector had primary qualifications from technical or engineering backgrounds (Ionescu, 2017). If management and leadership are devoid of the skills needed to understand or lead complex IT projects, this training deficiency can lead to both narcissism and leadership competence. A narcissist, in modern terms, refers to "a person who possesses an extreme love of the self, a grandiose sense of self-importance, and a powerful sense of entitlement" (Grant & McGhee, 2013, p. 3). While generally applied to individuals, the concept of narcissistic personalities has also been applied to groups and organizations (Brown, 1997). The narcissistic personality entails the denial of a difference between the ideal and the actual self' (p. 646), which segues directly into studies of competence versus confidence by Kruger and Dunning (1999) and Ryvkin et al. (2012).

Governance of Projects (GoP)

Project governance. Project research has started to widen the scope of success factors and focus more on the structural characteristics of the project context and its impact on success. One of these factors is project governance, which has grown exponentially in popularity since 2005, identified by the structural characteristics needed for successful project execution (Biesenthal & Wilden, 2014; Müller, Glückler, Aubry, & Shao, 2013; Müller & Lecoeuvre, 2014). Research led by Ul Musawir, Serra, Zwikael, and Ali (2017) denoted wide variations in the understanding and definition of project governance, often depending upon the technical background and research fields of the authors (Bekker, 2015; Roe, 2015). Müller (2017) defined

project governance as "the value system, responsibilities, processes, and policies that allow projects to achieve organizational objectives and foster implementation that is in the best interest of all stakeholders, internal and external, and the corporation itself" (p. 4). Samset and Volden (2016) referenced project governance as the processes, systems, and regulations that a financing party must have in place to ensure projects are successful, including a regulatory framework to provide adequate quality at entry, compliance with agreed objectives, management and resolution of issues that may arise during the project, and standards for quality review of relevant appraisal documents. These processes and regulations are referred to as stage-gate phase models.

Otra-Aho, Arndt, Bergman, Hallikas, and Kaaja (2018) indicated that PMO governance helps to clarify the objectives and interdependencies of single projects and assists in defining procedures for reporting and monitoring. PMOs ensure projects have a good fit with strategies, with structures, and with the assets of the organization (p. 42). Biesenthal and Wilden (2014) analyzed 62 articles published in 21 non-project-management-specific journals and 34 articles across the leading project management journals that discussed project governance and found that project governance was essential in ensuring successful project delivery. Project management is concerned with the operational control and execution of daily work at the project level, whereas project governance represents a higher-level structure with defined processes and structures to govern multiple projects and to manage strategic objectives (p. 1291).

While the strategic alignment of project objectives has always been one of the functions of project governance, it is increasingly being stated more explicitly (Samset & Volden, 2016). Strategic alignment is also included in the definition of project governance in the PMI's practice guide for the governance of portfolios, programs, and projects: "the framework, functions, and processes that guide project management activities in order to create a unique product, service, or

result to meet organizational strategic and operational goals" (PMI, 2016, p. 4). On its most basic level, project governance supports an organization in aligning its project objectives with its organizational strategy, achieving set project objectives, and monitoring performance. Project governance is an overarching business function in project-based organizations (PMI, 2016) and provides a framework for organizational processes, decision-making models, and project management tools that supports the successful delivery of projects, programs, and portfolios (Biesenthal & Wilden, 2014, p. 1291). However, there is a lack of a consensus on how to define project governance, which supports the different terminologies referenced in this literature review. This lack of definition has led to the identification and exploration of the categories enumerated below (Ahola, Ruuska, Artto, & Kujala, 2014; Dai & Wells, 2004; Roe, 2015).

Project management methods (PMM). PMI (2017b) defined project management as "the applications of the relevant knowledge, tools, skills, and techniques to project activities to meet the project requirements" (p. 9) and adhering to PMMs. Joslin and Müller (2015) differentiated between a method and a methodology. In essence, a method is the sum of processes, tools, techniques, capability profiles, knowledge areas, and is what is applied in a particular situation, whereas a methodology is the sum of all methods and a detailed understanding of them. Hasan and Al-Hashimi (2019) defined PMMs as a set of procedural guidelines that can be tailored to a specific need and applied to accomplish an end and deliver a product, service, or solution. PMMs reduce risk, cut costs, and improve success rates, which supports why different organizations employ different PMMs to increase the efficiency and effectiveness of their projects (Hasan & Al-Hashimi, 2019). PMMs contribute 22.3% to project success when adopting a well-established methodology to improve project performance (Berssaneti & Carvalho, 2015; Joslin & Müller, 2015).

Project management standards (PMS). A PMO can develop and maintain a set of standards that can become a steward of documented PM expertise within an organization. The standard procedures should be detailed enough to provide guidance but not so excessively detailed as to inhibit creativity. The representative areas reflected in the survey instrument are proposal development, change management, risk assessment, documentation standards, and project closeout (Dai & Wells, 2004).

Hasan and Al-Hashimi 2019 posit management tend to standardize their project management processes while maintaining a level of flexibility to minimize the variation in project execution, which could lead to improving speed and quality and to a lower cost because of less rework. They revealed three critical factors that could influence project success: standardized tools, standardized project leadership skills, and standardized processes.

Project historical archives (HA). The next category that helps define the presence of a PMO and governance of projects is historical archives. Project historical archives consist of change information from previous projects, risk management documentation from previous projects, plan versus actual variance analysis, metrics, and information on previous successful and unsuccessful projects, and lessons-learned databases. The PMO can support a knowledge management system that can catalogue process and procedures related to project management. Representative areas include records of project performance, status reports, variance analysis, and changes to the baseline plan, risk lists, and other risk management documents, information on previous successful and unsuccessful projects, and a database of lessons learned.
Project archives are significant, as they provide a reference to collected project knowledge and future projects. A PMO is a resource supporting the historical archives of a lessons-learned database of risk management documents from previous projects or information on successful and

unsuccessful prior projects could be beneficial to a project team. Historical archives help provide a library of knowledge repository to document and share knowledge to mitigate the risk of project failure and improve the likelihood of project success (Pemsel & Wiewiora, 2013).

Aubry, Müller, and Glückler, 2011 noted that a primary reason for project failure is poor knowledge management in the form of poor communication, reduced use of previous lessons learned, and inadequate use of information sharing. PMO functions include the capacity for knowledge management, such as managing project management document archives and databases on risks and lessons learned. Pemsel and Wiewiora (2013) noted that PMOs provide the added capacity to provide a "repository for lessons learned" (p. 36). Müller et al. (2014) referred to historical archive databases as mechanisms that, in combination with the critical success factors (CSF) previously mentioned in this literature review, result in organizational enablers. Combining multiple factors of project success is noted as a significant consideration. Specifically, CSFs alone is not necessarily the sole determinant of project success; instead, a multidimensional approach of a combination of CSFs and mechanisms found in variables of historical archives influence project success.

Project administrative support (AS). Project administrative support consists of administrative staff who coordinate periodically with the project team, administrative assistance provided to help document project results through standard documentation, use of a project conference room or meeting place available for the project team, and standardized project management software made available to project team. Administrative support can be considered the role of a PMO. In this capacity, administrative support as a function of the PMO, along with vision and leadership along with other roles of coach, information manager, and knowledge manager, can add value to an organization (Dai & Wells, 2004).

As management in more organizations has carried out their activities through projects, the demand for qualified project managers has grown. Assistance can be provided to identify the proper person to manage a project and the appropriate skill requirements for a project team, to gather data to conduct performance evaluations, to recruit project staff outside the organization, and to grant awards or other types of extraordinary recognition (p. 56).

Project human resource staff assistance (HR). Project human resources staff assistance consists of identifying the proper individual or individuals to manage a project, providing the skill requirements necessary to manage a project to the project manager, providing assistance for performance evaluation of project team members to the project manager, providing project staff recruitment guidelines, and providing project staff recruitment assistance (Dai & Wells, 2004). PMOs are also a "facilitator of human resources" (Spalek, 2013, p. 88). The inadequate allocation of human resources to projects can result in "problems that negatively influence the success of projects" (Costa, 2013, p. 102). Additionally, Zwikael and Unger-Aviram (2010) noted, "Human resource management (HRM) practices are critical for organizational success" (p. 413).

Project-related training (TR). Project-related training consists of assistance provided to project team members to identify and document skill sets and training provided to project team members on project management; it is a relationship within the organization, training provided to project team members on relevant project management software, management-supported attendance at training courses for strategic training requirements, and training and coaching provided as appropriate in one-on-one settings (Dai & Wells, 2004). As projects are temporary organizations, the training and competence of the individual team members may be challenging to manage with internal project resources (PMI, 2017a). The PMO typology identified as a

headquarters PMO (Müller, Glückler, Aubry, & Shao, 2013) provides "tools, techniques, training, and certification programs" (p. 66). PMO staff can also help coordinate training, track training competence, and monitor training needs (Anderson, Henriksen, & Aarseth, 2007). Müller et al. (2013) noted that a PMO provides support to a project team and "provides for operational support in projects through training, consulting, and specialized task execution" (p. 61).

As management devote more resources to conducting business on a project basis, the need for PM training grows. PMO management takes a leadership role in working with a human resource department in the areas of skill-set identification, training on PM and related software, financial support to conduct training, and one-on-one coaching.

Project-related consulting and mentoring (CM). Project consulting and mentoring involve providing assistance as appropriate, ensuring the correct use of project management, and providing assistance in deciding viable solutions for unexpected problems in a timely fashion. Other consulting and mentoring responsibilities consist of project managers receiving mentoring as needed for the unique situation to ensure the success of the project, executive management receiving suggestions on different measures required for projects as appropriate, and project managers having access to face-to-face or electronic group-sharing sessions (Dai & Wells, 2004).

Roles of PMOs include "having 'mentors' to offer aid, monitoring the projects' performance, harmonizing approaches and tools between the projects, and competence development" (Anderson et al., 2007, p. 99). PMO management can provide the structure needed to guide and assist in developing the members of the project team. Dai and Wells (2004)

highlighted the role of the PMO as "mentoring on unique measures that must sometimes be taken to foster project success" (p. 525).

As organizations become more sophisticated in project management, the need to move from an ad hoc to a more strategic project management approach increases. PMO management can contribute by providing the following areas of consulting and mentoring: assistance in employing PMMs and responding to risk events, mentoring on different measures that must sometimes be taken to foster project success (and sharing those same ideas with upper management), and group-sharing sessions for project managers.

Project management office (PMO). Müller et al. (2013) posit that economic situations produce uncertainty that exerts pressure on how projects are managed, which creates a dynamic duality of strategizing and organizing for doing the right projects right**.** IT faces many challenges related to increased competition, the need for innovation in products, services, and processes; and a growing emphasis on time to market. To deal with these challenges, management has adopted more flexible organizational forms where the projects are more numerous and strategically vital (Viglioni, Cunha, & Moura, 2016), which translates into high levels of pressure for strategy implementation to deliver expected benefits from investments (Müller, Glückler, Aubry, & Shao, 2013). Otra-Aho et al. (2018) identified three reasons why it has become harder and more critical for organizations to run projects successfully:

1. It has become pivotal for managers to align their project processes with the strategy and structure of the organization.
2. Recent cases have shown that the degree of complexity in projects has increased.
3. Projects are increasingly grounded in value creation for the organization itself as well as for its customers.

Given the problem of increased complexity introduced by the change in adopting new technology to stay competitive, it behooves organizational management to recognize the need to define and establish a central set of support services for IS development activities—generally known as a PMO— to provide systematic coordination and unified handling of essential project-related tasks (Viglioni et al., 2016). PMOs may be an attractive solution to overcome the challenges of increased complexity and the importance of projects in organizations. A PMO acts as the governing body that aligns organizational policies, processes and procedures to help regulate and monitor the sharing of resources, methodologies, tools, and techniques (PMI, 2017a). Otra-Aho et al. (2018) defined a PMO as an organizational unit that is permanently integrated into the project business of the organization providing structures, functions, and processes of the organization aimed at maximizing its value. In a PMI (2014) survey of the project management profession, 42% of organizations report a high level of alignment between projects and organizational strategy (Philbin, 2016). PMOs are ideally placed for improving this level of alignment and for technology and engineering projects where significant levels of technical and management uncertainty may exist, and related projects can also be subject to many challenges. The PMO can have a positive impact on project performance, where there is a high level of task uncertainty (Philbin, 2016, p. 7). The primary purpose of the PMO is to facilitate project success through standardizing projects and implementing best practices, mitigating project risks, and supporting effective project delivery according to schedule, budget, and scope requirements (p. 9).

Roles and functions of a PMO. The PMO is an organizational entity created to generate value through the standardization of how projects are to be structured, organized, and managed. It is possible to develop conventional approaches, systems, management tools, and

methodologies, models, and frameworks to ensure projects are delivered on schedule, on budget, and within specified quality parameters (Philbin, 2016). Organizations are increasingly using projects or programs as a means of achieving strategic change by establishing PMOs (also called program management offices) to improve control, coordinate, and rationalize the projects caused by the multitude of projects being undertaken and the complexities of managing them (Martins & Martins, 2012; Singh et al., 2009; Ward & Daniel, 2013). The function of a PMO that specializes in specific groups of tasks and responsibilities relates to ensuring projects align with organization strategies, conducting project evaluations, gathering and disseminating project knowledge, developing competencies, and implementing the standard (Otra-Aho et al., 2018). The apparent purpose of the PMO is to improve the performance and success of projects, but empirical research has struggled to find correlations between PMO roles and project performance (p. 42). Otra-Aho et al.'s research revealed three primary roles of how PMO management determines how to act toward its stakeholders but describes how the PMO manager accomplishes its goal and sets the expectations about methods and tools used in the PMO. The *controller role* may be responsible for program and project management processes, including procedures and tools that help to prioritize projects, allocate resources, and to lead people according to the goals of the organization. The *coordinator role* may use integrative methods of portfolio and program management while avoiding direct supervision and facilitating the interactions of different project teams. The *supporter role* consists mainly of coaching and supporting project teams, promoting project action, and developing processes and procedures without direct supervision (p. 43).

This nonexperimental quantitative research study acknowledges and supports the definition of the PMO as "a management structure that standardizes the project-related

governance processes and facilitates the sharing of resources, methodologies, tools, and techniques" (PMI, 2017a, p. 820). The categorization of PMOs includes three types. Type one is the nurturing type of PMO, which provides a consultative role for PMO management to provision the use of templates, project management good practice, training, access to information as well as lessons learned from previous projects. The PMO is a knowledge library, where the degree of control is low. Type two is the controlling type of PMO, which provides support and requires compliance of projects via various means through the adoption of qualitative and quantitative risk-based project management matrices and standards, using specific templates, forms, or conformance to certain governance arrangements. The degree of control provided is moderate. Type three is the directive type of PMO characterized by PMO management directly controlling projects through the provision of project management services to enable the delivery of the projects. The degree of control provided is high.

Project success (PS). Project success is the dependent variable supporting this study. Like project failure, which has no standard definition (PMI, 2017a), project success is a multidimensional concept with researchers far from agreeing on its definition, as it means different things to different people, can be viewed from different angles, and depends on the context (Davis, 2014). Published research and conceptual articles reflect inconsistencies in definitions about what successful project management is and what skills are needed by project managers, with little focus on IT project managers. A diversion is created causing the definition of success to be continually shifting based on stakeholder perspectives and the project life cycle, offering a tri-focal lens inter-relational definition based upon the sweet spot of project manager efficacy. For project managers to be successful, they need to work within the three lenses or sweet spot (Millhollan & Kaarst-Brown, 2016, p. 90).

One of the main approaches to defining project success is Barnes's iron triangle (Albert, Balve, & Spang, 2017, p. 807), known as the metrics of time, cost, and performance (Berssaneti & Carvalho, 2015; Carvalho, Patah, & Bido, 2015; Joslin & Müller, 2015; PMI, 2017a). Traditionally, these criteria have been the most critical factors in defining the success of a project. Otra-Aho et al. (2018) posited that the success of projects depends on the support of the top management, coherent goal setting, efficient governance, and product management processes (p. 43). Practitioners and scholars have determined that project success should also be measured with consideration of the achievement of project objectives. Project stakeholders may have different ideas as to what the successful completion of a project will look like and which factors are the most important. It is critical to document the project objectives and to select measurable objectives. Three questions that the key stakeholders and the project manager should answer are as follows: What does success look like for this project? How will success be measured? What factors may impact success (Otra-Aho et al., 2018, p. 34)?

The first step to providing clarity on the multidimensional concept of project success is the differentiation between project success factors and project success criteria (Albert, Spang, & Balve, 2018; Cooke-Davies, 2002)**.** Project success factors serve as levers to increase the probability of project success, and include, for example, project spirit, user advocacy, or communication among project parties (Aronson, Shenhar, & Patanakul, 2013). Instead, project success criteria assess project success as neither part of a project's mission nor explicitly defined tasks**.** To classify project success criteria is to make a distinction between hard and soft criteria (Pinto & Slevin, 2006). Hard project success criteria in this study included the dimensions of the iron triangle (time, budget, and performance). Soft criteria include all criteria related to the satisfaction of people involved in or affected by a project. Hussein et al. (2015) established the

relationship between the problems associated with defining the project success criteria at the project initiation phase, with the most critical problems in defining the success criteria as basing the definition on a narrow set of criteria, using ambiguous criteria, having competing or conflicting criteria, having an inadequate or incomplete set of criteria, using unrealistic criteria, and considering all the criteria as equally important (not ranked).

Similarly, in an interview with Ralf Müller (PMR, 2018), when asked about the importance of social intelligence (soft skills) and tools and techniques (hard skills), Müller referenced two seminal studies and listed ten hard success factors (project mission, top management support, project schedule/plans, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication, and troubleshooting), which explained 69% of projects' success, or about 7% per factor (Pinto & Slevin, 1988), and the project managers' leadership style (shared, distributed, vertical, or horizontal) as a success factor that affects project success between 9% and 43% (Müller & Turner, 2010). Soft skills are more important than hard skills and should be the focus of project management training and delivery (PMR, 2018). Müller and Turner (2010) also discussed the awareness and growth for soft skills and the importance of social intelligence for good project results: "Moreover, people need structure and methodologies, but in the end, it is the people who go the last mile, or the extra mile, to make the project succeed. Projects are made successful by people, not by tools or techniques" (p. 5).

To classify soft and hard skills further, Millhollan and Kaarst-Brown (2016) applied a traditional theory approach based on skills acquisition to the seven levels of learning from Bloom's taxonomy of the cognitive domain, which delineates the differences between hard and soft skills. The first three levels are knowledge, comprehension, and application. These levels are

aligned with the project management hard skills demonstrated through certification or with the other technical skills required for IT projects. The next three levels are analysis, synthesis, and evaluation. These levels align with the soft skills associated with critical thinking and decision making (p. 91). This nonexperimental quantitative research study supports Blaskovics's (2016) project success definition that includes a recommendation for taking a holistic approach based upon a triple criteria model that evaluates project completion (efficiency) and project result (effectiveness) using the project triangle (time, cost, quality), client satisfaction, and stakeholder satisfaction (p. 5).

Synthesis of the Research Findings

This section will summarize the main points of Chapter Two, showing both the strengths and the weaknesses of the theoretical orientation and the study's relationship with the previous research on the topic of project failure, both in content (research findings) and methods (methodology); it also sets the stage for a discussion in the following chapter.

Defining Project Success and Failure

Research on defining both project failure and project success is multidimensional and includes no agreed-upon definition (Hussein et al., 2015). Additionally, criteria for defining project success or project failure vary substantially; that is, current literature does not have consistent criteria for what constitutes project success or failure. There is some information about success and failure rates in software development projects and mega-projects (albeit with different criteria), but virtually no information is available on other project types or projects in different application areas. There is an urgent need for much more comprehensive data than currently exists, covering the broadest possible range of project types and application areas.

Despite the maturity of the project management discipline, published research and conceptual articles reflect inconsistencies in definitions of successful project management, in the skills, project managers need, and in the lack of focus on IT project managers (Stretton, 2018, p. 2).

PMO Performance

To reduce and overcome the challenges of project complexity can best be defined and by creating a central set of support services for IS development activities known as the PMO. A PMO is a management system that governance processes and facilitates the sharing of tools and resources (PMI, 2017a, p. 820). The primary role of a PMO is for management to ensure project success through prioritizing and standardizing projects and implementing good practices, removing project risks, and to ensure projects are delivered on schedule, on budget, and within scope requirements (PMI, 2017a, p. 9).

Project performance will improve when PMOs formalize project processes. Even though projects should align with organizational strategic goals, PMO management that takes on the role of a strategy manager will not increase project efficiency and hamper project efficacy**.** Management within the organization should pay more attention to organizational strategies and how they are aligned with value creation and project performance. They should not overstate the task of the PMO as a strategy watchdog (Otra-Aho et al., 2018, p. 49).

Project Failure Causality

Overall findings from an organizational perspective posit the causality of project failure as an intra-relational issue requiring a contingency project management approach to research the cause of project failure. The detection of misfit may help explain project failure more effectively. Understanding the nature of the organizational environment and its internal structure, and the need to learn how to adapt both constructs will lead to a better decision on how to manage and

design projects (Sauser et al., 2009). Organizational effectiveness is dependent on a management's ability to adjust or adapt to the environment, and there is a need for congruency between the environment and the structure, with organic organizations adapting to change more effectively when levels to change are higher which revealed mechanistic organizations would perform better in stable environments (p. 666).

Defining Project Governance

There is a lack of consensus on defining project governance and the fundamental elements it constitutes (ul Musawir, Abd-Karim, & Mohd-Danuri, 2020). Governance focuses on mediating the competing interests of the temporary project organization and the more permanent parent organization. Both the temporary project organization and permanent parent organization have governance requirements that a business imposes upon its projects that are subject to the subject matter expert's (SME) influence, interests, and knowledge. The temporary project organization, parent organization, and SME's may be constrained to make effective decisions due to the different understandings of the various competing governance models and may even have terminology discrepancies (ul Musawir et al., 2020; as cited in Ahola, et al., 2014; Biesenthal & Wilden, 2014; Pitsis, Sankaran, Gudergan, & Clegg, 2014).

Project governance can be broadly defined as the management of project management as a system that exists at a higher level than projects and provides oversight of the project management system (ul Musawir et al., 2020; as cited in Too & Weaver, 2014). Whereas project management is concerned with how project work should be organized and conducted, project governance is concerned with defining the institutional environment within which project decisions are made and ensuring that these decisions are made in a manner that is consistent with project objectives and stakeholder interests (ul Musawir et al., 2020; as cited in PMI, 2016).

Biesenthal and Wilden 2014 (as cited in PMI, 2016) indicated defining effective project governance is vital to successful project delivery because it provides a strict alignment within the organization objectives and is "the framework, functions, and processes that guide project management activities in order to create a unique product, service, or result to meet organizational strategic and operational goals" (p. 4). Project governance represents a higher level structure by defining processes and structures (e.g., project management methods (PMM), project management standards (PMS), historical archives (HA), administrative support (AS), human resource staff assistance (HR), training (TR), consulting and mentoring (CM)) to govern multiple projects and to manage strategic objectives (p. 1291).

Critique of Previous Research Methods

This study will include previous research that supports opposing viewpoints, disconfirming evidence or counterarguments to contingency theory, the purpose of the PMO, and project management methodologies to better understand all sides of project failure causation and mitigation.

Methodological Limitation of Contingency Theory

Recent studies supporting the methodological limitation of the contingency theory theoretical framework include arguments that a contingency approach should be dependent upon project success and how efficiently a project can deal with environmental uncertainties. Project "success, risk, and management strategies need to be tailored to its project characteristics and objectives" (Ahimbisibwe et al., 2015, p. 14). Thus, the chances to increase project success support the notion of matching the project type and the software development approach. Howell et al. (2010) noted project managers are discouraged from considering alternative methodologies

due to the "lack of a decision support tool and theory connecting project types and project methodology" (p. 256).

PMO Purpose

Kutsch, Ward, Hall, and Algar (2015) posited a counterargument that PMOs' primary purpose is to facilitate project success with project performance increasing when PMOs formalize project processes. Instead, PMOs appear to be unstable entities that have to rearrange their services repeatedly (Aubry, Hobbs, & Thuillier, 2007). PMOs have no or only a little significant effect on any of the traditional project objectives of scope, cost, and time although other studies disagree (Li & Yetton, 2007; Martin, Pearson, & Furumo, 2007). Lastly, literature is inconsistent on whether and how PMOs contribute to IS/IT project performance (Kutsch et al., 2015, p. 106).

Project Management Methodological Complexity

Contrary to the notion that PMMs improve results**,** Joslin and Müller (2015) posited that effective implementation of PMMs does not guarantee positive project results; also, weak performance does not necessarily arise from weak PMM implementation. Despite the popularity of some methodologies, limitations associated with them have been reported. Joslin and Müller (2015) showed that 47.9% of project petitioners disagreed that PMMs fulfilled their expectations for effective project management. This finding was similar to Charvat (2003), which indicated many PMMs are either the wrong methodologies or not applied fully, although the use of methodologies in a business strategy allows companies to maximize the project's value to the organization.

The literature is not clear whether customizing or standardizing PMMs leads to a higher success rate. Whitney and Daniels (2013) posited that project failure is related to incorrect PMM

strategy characterized by its complexity. Projects that have a clearly defined scope with few unknowns and maybe intensely detailed are knowns as a Type 1 project, which references a more traditional waterfall PMM strategy. Complex projects related to software development characterized by unknowns and an unclear scope are known as Type 2 projects and supported by a complex adaptive system mind-set based on the following characteristics. Nonlinear: a systems thinking approach where the whole is unable to be determined or represented through the sum of its components and subsystems. Nonergodic: interacting with its environment by receiving inputs and providing outputs, but with limited control over the outcomes. Emergent: dynamic in that its behavior changes and evolves in response to its inputs. Although Type 2 projects are best suited for software development adopting Agile frameworks of Extreme Programming (XP), Lean, or Scrum, clear guidance is still lacking regarding what is the best PMM strategy to mitigate project failure (Whitney & Daniels, 2013, p. 327).

Summary

Project failure is a complex problem caused by a lack of agreement on definition, on organization design, and on the best PMO strategy to handle project complexity. Complexity depends on a structural solution based on project governance to reduce and manage project complexity and to help reduce overall organizational complexity. Project complexity reduction is achieved by adopting a formal PMO structure based on GoP variable adoption. This nonexperimental quantitative research study posits that PMOs that do not adopt the GoP variables are prone to project failure**,** and PMOs that adopt the GoP variables will influence project success. The next section will involve applying a nonexperimental correlational research methodology to ascertain whether GoP variables, which are project management methods (PMM), project management standards (PMS), project historical archives (HA), project

administrative support (AS), project human resource staff assistance (HR), project training (TR), and project consulting and mentoring (CM), predict project success.

CHAPTER 3. METHODOLOGY

The purpose of Chapter 3 is to explain and justify the choice of research design, data collection, and analysis, and details the steps of the research design. The chapter begins with the purpose of the study, the research question(s) and hypotheses, the research design, the target population and participant selection, the procedures used to conduct the study, the instruments used to collect the data, and the ethical considerations. Chapter 3 concludes with a summary of the organization of the remaining two chapters.

Purpose of the Study

The purpose of this quantitative nonexperimental, correlational study was to solve the research problem by analyzing the extent to which GoP variables project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project training, and project consulting and mentoring predict project success (Müller et al., 2014; Spalek, 2013). The problem addressed by this study was projects continue to fail caused by PMO performance in computers/information technology organizations that execute projects in PMO. The research methodology supports the research design and considers the theoretical foundation of contingency theory (Mullaly & Thomas, 2009). Research on project failure is imperative because it affects entire organizations and, combined with various business losses, can thwart the development of other potential projects (Gupta et al., 2019). Additionally, the ability to plan and monitor future projects will improve by learning from project failure, which can play a pivotal role in ensuring the long-term success of any organization and aiming for continuous improvement (Ellinas et al., 2016; Kannan et al., 2018; Shepherd et al., 2014; Zheng et al., 2018).

This research is accomplished by incorporating a nonexperimental design and conducting linear regression to the research problem of measuring factors related to project success in organizations that have a PMO. The research systematically addresses multiple variables to assess the level of fit (Venkatraman, 1989) with the degree and direction of variables using correlation analysis as well as analyzing the predictive nature of the variables using linear regression. The results of this study will generate new knowledge regarding how to equip current and future PMOs with design strategies that influence project success in computers/information technology organizations that execute projects utilizing PMO.

Research Questions and Hypotheses

In support of the research design, the following research questions and hypotheses were investigated to measure the extent to which, if at all, the governance of projects (GoPs) variables that measure PMO performance predict project success.

RQ1: To what extent do project management methods predict project success?

$H_0 1$ Project management methods have no statistically significant predictive relationship with project success.

$H_A 1$: Project management methods have a statistically significant predictive relationship with project success.

RQ2: To what extent do project management standards predict project success?

$H_0 2$: Project management standards have no statistically significant predictive relationship with project success.

$H_A 2$: Project management standards have a statistically significant predictive relationship with project success

RQ3: To what extent do project historical archives predict project success?

H_03: Project historical archives have no statistically significant predictive relationship with project success.

H_A3: Project historical archives have a statistically significant predictive relationship with project success.

RQ4: To what extent does project administrative support predict project success?

H_04: Project administrative support has no statistically significant predictive relationship with project success?

H_A4: Project administrative support has a statistically significant predictive relationship with project success.

RQ5: To what extent does project human resource staff assistance predict project success?

H_05: Project human resource and assistance has no statistically significant predictive relationship with project success.

H_A5: Project human resource and staff assistance has a statistically significant predictive relationship with project success.

RQ6: To what extent does project training predict project success?

H_06: Project-related training has no statistically significant predictive relationship with project success.

H_A6: Project-related training has a statistically significant predictive relationship with project success.

RQ7: To what extent does project consulting and mentoring predict project success?

H_07: Project-related consulting and mentoring has no statistically significant predictive relationship with project success.

H_A7: Project-related consulting and mentoring has a statistically significant predictive relationship with project success.

Research Design

The research design for this study utilized a nonexperimental correlational study. A quantitative method was considered appropriate because the study was conceptualized through a postpositivist lens. Nonexperimental designs are appropriate when variables are not manipulated, and correlational designs are appropriate for investigating relationships between or among one or more independent variables and a single dependent variable (Tabachnick & Fidell, 2019). The nonexperimental approach is consistent with the research question because it allows the researcher to collect and analyze the opinions of survey participants, which may permit for generalization of the subjective data to a larger population (Vogt, 2006). Langbein (2014) asserted that nonexperimental studies lack the random assignment of individuals to groups and the manipulation of independent variables. Based on Langbein's description, a nonexperimental approach was appropriate for the present study as each of the groups examined were independent of each other, and the respondents of each group received no statistical controls to manipulate the outcome.

Prior authors have influenced the framework of the research design, as Thomas and Mullay (2007) encourages additional analysis and thorough investigations to understand better how the value of project management can contribute to organizations. This nonexperimental correlational approach analyzed by data collected in a survey in the studies performed by Dai and Wells (2004). This research design seeks to provide results to add empirical evidence for the relationship of PMOs and governance of projects to project success (Singh et al., 2009). Additionally, this design requires the collection of data from a single reference point in time and

is a cross-sectional correlational research design using statistical analysis based on a positivist perspective. Since the present study is nonexperimental, and relationships between the variables may be established, causality is not implied and will not be ascertained (Nowaczyk, 1988).

A random sampling technique was used to select members of the target population for participation in the study utilizing a survey questionnaire based on an existing instrument as the single method of data collection for obtaining the necessary data from IT project managers, project support managers, project coordinators, operational business team members affected by the project, or project sponsors in the United States. The use of random sampling maximizes external validity, reduces or eliminates bias, and increases a sample's representation of the overall population (Dobson, Woller-Skar, & Green, 2017). A survey is a suitable and reliable method to collect individual opinionated data without manipulation of the predictor variables, the setting, or the survey respondents (Vogt, 2006).

Data collection was accomplished using the SurveyMonkey survey services and a validated instrument survey instrument questionnaire. The data collected from the survey was imported into the IMB Statistical Package for the Social Sciences (SPSS), version 26, also referenced as IMB SPSS v26. IMB SPSS v26 is an accepted commercial statistical software commonly used in academic research (Field, 2017). Data for this study is collected, considering an objective view of reality. Participants' responses were measured using a 7-point Likert scale.

This analysis attempted to identify statistical significance between the selected independent and dependent variables. The descriptive statistics sought to describe and test for the measure of the central tendency, the measure of relative position, the measure of association, and the measure of dispersion (Trochim, 2006; Vogt, 2006). One test required is the test for normality since the parametric test of regression and correlation were used. This analysis

included visual inspection as well as analysis based on established norms of each test, assessing the report outputs from IMB SPSS v26. Test for normality includes visual analysis of the histogram looking for a pattern similar to a bell-shaped curve as well as visually inspecting the scatter plot for data expected to represent generally a straight line (Field, 2017). To complete the analysis of the data using descriptive statistics, exploratory data analysis was conducted on the variables generated from the data in the survey instrument. The exploratory analysis was conducted, checking for violations of assumptions of the statistical test.

A correlational approach was well suited to examining the relationships between GoP (IVs) to predict project success (DV). The test used to investigate the hypotheses involved an inferential statistical test in concluding just the data (Trochim, 2006). To analyze the predictive nature of the GoP (IVs) to project success (DV), linear regression analysis was applied (Hargreaves Heap, Verschoor, & Zizzo, 2012). For this study, variables were not manipulated, and relationships among the set of IVs, and single DV were investigated. Figure 5 shows the relationship between the GoP (IV) and project success (DV) variables.

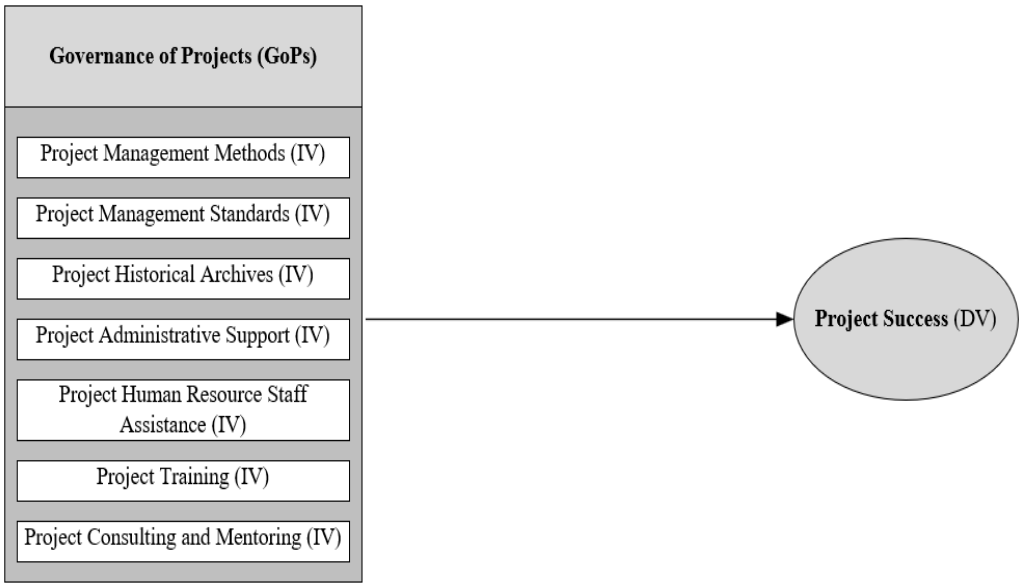

Figure 5. Relationship between governance of projects and project success.

Target Population and Sample

The section contains information regarding the study's target population and sample. The first segment includes details concerning the population of interest. The following segment presents information related to the sampling frame and sampling criteria. A power analysis concludes this section with a brief discussion of sampling size along with values for statistical significance.

Population

The target population for this study used computers/information technology organizations that execute projects utilizing PMO within the United States. The sample frame was a collection of random respondents using Centiment survey services from IT project managers, project support managers, project coordinators, operational business team members affected by project,

or project sponsors in organizations that execute projects in PMO. The approximate age of the randomly selected respondents ranged from 18 to 65.

Sample

The sample frame was a collection of random respondents using Centiment services from IT project managers, project support managers, project coordinators, operational business team members affected by project, or project sponsors in organizations that execute projects in PMO. The sample frame is generated from a collection of random respondents using Centiment services. The random respondents completed an online survey of questions using the selected instrument.

Sample inclusion targeted PMO and department management teams; those organizations that are not associated with a PMO or project management were excluded from this study. The sample frame is comparable to previous research samples (Dai & Wells, 2004). Relative to different types of statistical models, the size of a sample is important when conducting linear regression analyses, for this has a bearing on bias in the results of the study. The sample size also affects whether the researcher should accept the null or alternative hypothesis.

Power Analysis

This research design seeks to achieve the largest practical sample size for the representative sample (Vogt, 2006). A power analysis procedure in G*Power 3.1.9.4 (Faul, Erdfelder, Buchner, & Lang, 2019) determined the appropriate sample size relative to the linear regression statistical model. From an A priori sample size for linear regression, it was determined that 110 respondents would be required for this study. The sampling strategy used a survey to gather interval-based data. The sampling strategy is based on probability. The specific sample method used a stratified random methodology.

Procedures

The procedures described in this study relate to the implementation of the quantitative post-positivist methodologies used in the research, which include the selection and protection of participants, data collection, and data analysis.

Participant Selection

The respondents for the survey were selected using a stratified random sampling approach. The participants were selected at random from a pool of individuals maintained by the third-party vendor Centiment. Centiment is a commercial online data collection company that was hired to draw a sample from its panel of voluntary online survey participants and collect the data for this study. Centiment services provide a random sample of data to "maximize external validity" (Vogt, 2006, p. 78) from Centiment*'s* extensive database, increasing the generalizability of the results (Creswell & Creswell, 2017). The company applied random probability sampling techniques to draw a sample from the population of interest. The use of a commercial company to collect the data removed the researcher from personal interaction with study participants and maintained objectivity in the study. Centiment's selection process accomplishes participant screening. In addition to offering tools for online instrument design and delivery, Centiment also offers a participant recruitment service. The pool of prospective participants consists of over 10,000 prescreened panelists registered with Centiment (Kavanaugh, Bessett, Littman, & Norris, 2013).

Protection of Participants

The survey instrument was administered in an online format. The online format provided by Centiment confirmed that no personally identifiable information would be collected for study respondents. No respondents were permitted to access the survey tool without first

acknowledging and affirming their willingness to participate voluntarily through an informed consent declaration. The completion of the informed consent form did not require any personally identifying information and maintained respondent anonymity. Following acceptance of the survey, participants received detailed instructions on how to complete the survey and an informed-consent form. A description of the study and how participants can contact the researcher if they have further questions were included. Once the data were collected, it was downloaded and saved to an encrypted hard drive. Potential respondents who agreed to participate in the study were invited to visit the Centiment's website, where a link was provided to SurveyMonkey to complete an online survey of questions using the selected instrument (SurveyMonkey & IRB Guidelines, 2017. Following acceptance of the survey, participants received detailed instructions on how to complete the survey and an informed-consent form. The survey data was stored on an encrypted hard drive that requires a unique 16-character complex password for access. This protection measure was used to ensure restricted access to collected data. Only aggregate results of the survey responses were available for analysis, and thus, no data is traceable to a single unique respondent. The collected data will be retained and maintained no longer than seven years from the date of collection on an encrypted hard drive protected under AES-128 (advanced encryption standard) with a 256-bit encryption key. When the hard disk is not in use, it is stored in a personal combination safe located in a private office space. After seven years have passed and the data is no longer needed, the files containing the data will be destroyed using the latest version of BCWIPE. The BCWIPE software can comply with the data destruction requirements of several nations, including the United States (Shi et al., 2017). BCWIPE will be used to destroy collected data by overwriting the disk sectors retaining the collected data with both binary and hexadecimal randomized values a minimum of seven times.

This process ensures that direct and relative links to the disk address associated with the respondent data are destroyed. In the rare and unlikely instance that the disk is compromised, and an attempt is made to recover the deleted data, the overwriting process reduces the likelihood of data recovery (Shi et al., 2017).

Data Collection

Data for this study was accrued using the online survey service SurveyMonkey. Online research instruments are now the most common type of device used in research. Data for this study is collected considering an object view of reality. This is accomplished using the SurveyMonkey's survey services using a validated instrument survey questionnaire from Project Management Institute (Dai & Wells, 2004; PMI, 2008).

Data Analysis

The types of data to be analyzed in this study consist of seven independent variables project management methods, project management standards, project historical archives, project administrative support, project human resource staff assistance, project-related training, and project-related consulting and mentoring and one dependent variable, project success (see Table 1).

Table 1

Statistical Analysis: Research Questions, Variables, Survey Questions, Hypothesis Testing

Research Question (RQ)	Variables	Survey Questions	Hypothesis Testing
RQ1: To what extent do project management methods predict project success?	Project Management Methods (IV) Project Success (DV)	SQs 38-40 Based on Project Management Methods	Linear Regression
RQ2: To what extent do project management standards predict project success?	Project Management Standards (IV) Project Success (DV)	SQs 41-42 Based on Project Management Standards	Linear Regression
RQ3: To what extent do project historical archives predict project success?	Project Historical Archives (IV) Project Success (DV)	SQs 43-52 Based on Project Historical Archives	Linear Regression
RQ4: To what extent does project administrative support predict project success?	Project Administrative Support (IV) Project Success (DV)	SQs 48-52 Based on Project Administrative Support	Linear Regression
RQ5: To what extent does project human resource staff assistance predict project success?	Project Human Resource Staff Assistance (IV) Project Success (DV)	SQs 53-57 Based on Project Human Resource Staff Assistance	Linear Regression
RQ6: To what extent does project training predict project success?	Project Training (IV) Project Success (DV)	SQs 58-62 Based on Project Training	Linear Regression
RQ7: To what extent does project consulting and mentoring predict project success?	Project Consulting and Mentoring (IV) Project Success (DV)	SQs 63-67 Based on Project Consulting and Mentoring	Linear Regression

As summarized in Table 1, all the independent variables and the dependent variable have Likert-type seven-level responses, which are combined to create the variables between one and seven. These seven research questions are associated with an independent variable and one dependent variable. Each research question is supported by multiple survey instrument questions. Linear regression is the tool used for hypothesis testing.

Organizing the raw data was supported by Survey Monkey's online survey tool, which was used to administer the "Project Management Institute Members Questionnaire." Survey Monkey provides secure access for researchers to download Excel data files that can be loaded directly into the SPSS statistical software package for comprehensive data analysis.

Managing and processing survey data is anonymous and only associated with the participant's demographics. Once downloaded from Survey Monkey, the data files were stored on the researcher's password-protected computer for analysis and a backup stored in a locked location.

Preparation of data for analysis. The raw data received from Survey Monkey consisted of numeric answers to the Likert-type seven-level questions. The raw data was filtered to remove invalid answers, such as codes for no-response, unwilling-to-answer, and empty fields. The assumptions of linearity, normality, and homoscedasticity were confirmed. The Likert-type responses for each variable were combined to create values between one and seven.

Descriptive statistics. Descriptive statistics were generated to examine the summaries of the values for the variables used in the survey instrument. They are also useful when making decisions to include or exclude participants based on the evaluation of the respondent data. Examinations of the results of the Descriptive Statistics and Exploratory Data Analysis (EDA) provided information about the composition and distribution of responses in the data.

Frequencies and percentages were calculated, and several of these outputs were in the form of graphs and charts that provided facts and insight on the measurement of the variables, makeup of the sample, and the spread of the data.

The use of frequency graphs was assessed visually to determine the general composition of the sample; histograms and scatterplots were examined to detect the spread of the data and whether there were outlying data points outside of a standard deviation (SD) of ± 3. The locations of these data points were indicative of whether there were outliers in the data that could skew the results, in which case remedial actions could be taken. Additionally, it was necessary to check several assumptions concerning the data. Violations of these assumptions would mean that multiple regressions would not be an appropriate statistical model with which to analyze the data, and a different model would have to be chosen; therefore, an analysis of various statistical outputs helped to determine the fit of the data to the regression model.

Assumptions check. Based on Rahman, Sathik, and Kannan (2012), the assumptions related to the linear regression model concern the variable type, linearity, independence of observations, outliers, homoscedasticity, multicollinearity, normality of distribution of errors or residuals. Results from running the regression analysis such as the *R*2 statistic the SD values obtained from the Descriptives and Exploratory Data Analysis (EDA) outputs aided in determining the fit of the data to the regression model. Altogether, this information helped to assess any violations of assumptions.

Hypothesis testing. To determine whether there was a statistically significant relationship between the sets of IV and the DV, the Significance Value statistic, denoted by $p < 0.05$, was examined. This statistic is located in the Model Summary output from the regression analyses. In this study, statistical significance is $p = 0.05$, as this is the level used conventionally

in regression analysis (Farrokhyar, Reddy, Poolman, & Bhandari, 2013). When statistical significance is less than $p = 0.05$ ($p < 0.05$), the effect of the IVs on the DV is statistically significant. In this case, the researcher rejects the null hypothesis, accepting the alternative hypothesis instead. However, if p is greater than 0.05 ($p > 0.05$), the null hypothesis is true, and therefore accepted.

The primary objective of a linear regression analysis is to determine the explanatory power of the regression model by examining the relationships between one DV and multiple IVs (Tabachnick & Fidell, 2019). Pearson's correlation coefficient, r, is a statistic that measures the direction and magnitude of the relationships between variables (Nowaczyk, 1988). The possible values of r range from -1.00 to 1.00. The sign of r describes the type of relationship, either positive or negative, whereas a value of .00 for r indicates that variables are not linearly related. The absolute value of r quantifies the strength of the linear relationship and the ability of the regression model to predict the criterion (Swanson & Holton, 2005). The coefficient of determination R^2 is an output of regression analysis that represents the proportion of the variability of the DV that is predictable from the IV (Nowaczyk, 1988; Swanson & Holton, 2005).

Instruments

The data collection instrument for this research analysis is the "Project Management Institute Members Questionnaire" which was created by Xiaoyi Christine Dai supporting Dai's 2002 seminal research, Dai and Wells (2004), and Trochim (2006). Xiaoyi Christine Dai was contacted via email requesting permission to use this instrument in this study. She replied to this request granting explicitly permission to use this instrument in this study. This validated instrument is used because of the similarity of this design to previous research on project

management and PMO related variables. This instrument is considered valid to consistently measure the independent and dependent variables with a high degree of accuracy for survey research (Trochim, 2006) as Dai and Wells (2004) completed Confirmatory Factor Analysis to assess construct validity.

Project Management Institute Members Questionnaire

The data collection instrument for this research analysis is the "Project Management Institute Members Questionnaire" (Dai & Wells, 2004; PMI, 2008). This validated instrument is used because of the similarity of this design to previous research on project management and PMO related variables. This instrument expands upon a previous study of PMOs and project management (Dai & Wells, 2004; PMI, 2008).

The survey instrument is a seven-point Likert-type scale questionnaire consisting of 67 questions subdivided into several sections. The first section consists of 11 questions related to the background information and demographics of the respondent and the respondent's association with projects and project management. The next section consists of 14 questions on project performance, including one question that provides an inquiry on the assessment of project success by the respondent. The next section has 12 questions specific to PMO-related performance information. The final section of the questionnaire consists of 30 questions in five areas.

Validity. Validity consists of the level to which an implemented measure achieves the results set out to measure or the "meaningfulness of research components" (Drost, 2011, p. 114). This instrument is considered valid to consistently measure the independent and dependent variables with a high degree of accuracy for survey research (Trochim, 2006) as Dai and Wells (2004) completed Confirmatory Factor Analysis with the instrument to assess construct validity.

A random sample was selected for this study to attempt to mitigate threats to external validity and increase generalizability (Vogt, 2006). Factor stability was verified by conducting a confirmatory factor analysis, which resulted in acceptable factor loading for each factor. Factor analysis also established construct validity. For all factors utilized in the study that published the instrument (Serrador & Pinto, 2015), factor loading measurements were above the 0.50 level. Factor loading measurements ranged from 0.524 to 0.916.

Reliability. Reliability is the "extent to which measurements are repeatable" (Drost, 2011, p. 105). The reliability of this research study is increased as it builds upon previous valid results in the literature (Dai & Wells, 2004). Dai and Well's research design conducted tests to measure the Cronbach's alpha to ensure the selected instrument consistently measured what was supposed to be measured. Cronbach's alpha approximates the split-half reliability (Field, 2017) and is the internal consistency of a test to determine the instrument reliability. A scale reliability analysis resulted in Cronbach's alpha values for all constructs in the survey to be at least 0.7, the lowest being 0.927. These values for Cronbach's alpha are acceptable and suitable for research purposes.

Ethical Considerations

The *Belmont Report* outlines three significant areas of consideration toward human beings in research, which relate to (a) respect for persons, (b) beneficence, and (c) justice. Respect for personal concerns is in place to ensure all elements are met by requesting informed consent, and the participant's voluntariness was considered. Beneficence has to do with researching if there is a different way to obtain information and minimize risk to any participants. Justice entails distributing burdens and benefits around the selection of participants (National Commission for the Protection of Human Subjects of Biomedical and Behavioral

Research, 1979). The three *Belmont Report* principles were upheld in the study by providing information about the study through the Informed Consent form, and by the methods used to collect the data. Providing informed consent ensured that the respondent understood and accepted any forecasted risks presented by the present study. The completion of the informed consent form did not require any personally identifying information and maintained respondent anonymity.

In the Informed Consent document, details about the research were in the clear, unambiguous language, which showed respect for persons as the reader was able to make an informed decision about whether to participate in the study or not. The use of random sampling techniques assured justice to every member of the population as each had an equal probability of inclusion in the study, with particular favor shown to none. Justice was evident in the guarantees of protection of respondents' data, as well as the provision of contact information so that the survey taker could report concerns about the study. Respondents also had the power to communicate with the researcher, the mentor, or the Capella IRB to make further inquiries about the research, or lodge complaints.

During the data collection phase of the present study, the survey was distributed to respondents that met the inclusion criteria by Centiment. The collection of personal identifying information from the respondents is not allowed by the vendor. To prevent the collection of personal identifying information, the vendor assigns a tag per each respondent participating in the survey. To further support anonymity, turning off the storage of IP addresses is supported by various applications.

Centiment uses a technology called fingerprinting that combines IP address, device type, and screen size, and cookies to ensure unique panelists entered the survey process of data

transfer between the respondents, vendor, and researcher. Centiment also uses invisible ReCaptcha to defend against bots. Centiment does not store any project data once results have been delivered. Centiment uses a technology called TLS (transport layer security) for the security/encryption of all user transmitted data, referred to as SSL or HTTPS.

Centiment*'s* data centers are only present in the United States. These servers are secured by firewalls and have DDoS preventive measures enabled. This study was reviewed and received approved from the Capella University IRB.

Summary

The focus of Chapter 3 was on describing the methodologies used in this study. These methods included restatements of the purpose of the study and the research questions. Also included were explications of the design of the research, descriptions of the target population and sample, and methods applied in sample selection. The research questions guided the design of the study, as well as the choice of statistical model for data analysis; this was a multiple regression model. As explained in this chapter, this model is appropriate since the relationship between the internal level IVs and a continuous DV is under investigation. Discussions extended to procedures that involved participants' selection and protection, data collection, data analysis, and descriptions of the survey instrument and its reliability and validity. The chapter concluded with a discussion about ethical considerations that involved respect for persons, beneficence, and justice. Reports of the analysis are in Chapter 4, followed by the interpretation of these reports in Chapter 5.

CHAPTER 4. RESULTS

Chapter 4 is organized into four primary sections: Background, Description of Sample, Hypothesis Testing, and Summary. The background section presents the research questions that guided the present study and provides context for data presented in Chapter 4. The description of the sample section presents a detailed description of the respondents that met inclusion criteria. The hypothesis testing section presents the detailed results of the linear regression analysis performed on the collected data. The summary section provides a brief review of the analysis result in each presented hypothesis. Chapter 4 presents the results of the data analysis, but no interpretation of the results is presented.

The purpose of this nonexperimental correlational study was to determine the degree to which GoP variables predict project success (Mir & Pinnington, 2014; Müller et al., 2014). The summary of the initial results of the study shows a statistically significant predictive relationship with all of the GoP variables and project success. The description of the data demonstrated the credibility and validity of the conclusions.

Description of the Sample

For the present study, stratified random sampling was used to select participants from a sample frame. The population for this research study included project team members in organizations that execute projects. The inclusion and exclusion criteria established for the present study were used to ensure that only eligible respondents were included in the study. The inclusion criterion for this sample frame was project team members in project-oriented organizations executing IT projects with or without a PMO. Code Book reports provided descriptions of the distribution of demographic characteristics in the sample. The target sample

frame requested for analysis before the survey was (N = 110). The final number analyzed from random respondents generated from Centiment was (N = 110) with a Power=.08 (Soper, 2020).

To identify the respondent's role for the project, a majority of the respondents were project managers (n = 65, 59.1%), and the smallest percentage of respondents identified as a member of the business unit affected by the project (n = 2, 1.8%). The remainder of the respondent distribution included project team member (administrative; n = 3, 2.7%), project team member (technical; n = 24, 21.8%), project support manager (n = 9 ,8.2 %), and project coordinator (n = 7, 6.4 %).

The certification level based upon PMI management Professional (PMP) varied across the demographic for the sample. 70.9% *(n = 78)* were certified through the industry benchmark of the PMI Project Management Professional (PMP), while 29.1% *n = 32)* were not.

The education level for almost half of the 110 respondents had received a bachelor's degree (n = 59, 53.6%) with the remainder had a high school education (n = 8, 7.3%) or master's degree (n = 34, 30.9%), while a small percentage had a non-PhD other Doctorate education (n = 4, 3.6%).

Table 2 displays total time (in years) the respondents spent working on IT projects.

Table 2

Total Time (In Years) Spent Working on IT Projects

Number of Years		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 2	6	5.5	5.5	5.5
	2 – 5	23	20.9	20.9	26.4
	6 - 10	34	30.9	30.9	57.3
	11 - 20	38	34.5	34.5	91.8
	> 20	9	8.2	8.2	100.0
	Total	110	100.0	100.0	

Table 2 categorizes the respondents into five experience groups, with 73.6% or 81 of the ten respondents having more than five years of IT project experience.

The average size of the project was in US dollars. The majority of the project costs are in the range of < $100,000 to $1 Million (*n*= 42, 38.2%). The remaining distribution of average size project from the respondents was < $100,000 (*n* = 17, 15.5%), $1 million to $10 million (*n* = 40, 36.4.0%), > $50 Million (*n* = 11, 10%).

Data Management and Data Transformation

Data management procedures included averaging the responses in each of the subscales to obtain composite scores for each of the variables. The seven items (IVs) represented the range of GoP activities related to the dependent variable (DV) Project Success. Responses ranged from 1 = *strongly disagree* to 7 = *strongly agree.* A data computation procedure in SPSS resulted in a single average score on each of the variables. These scores were renamed, relabeled, and assigned the same response values, which ranged from *1* through *7*. Four items measured Project Success (DV), which had the same range of response values as the IVs from 1 = *strongly disagree* to 7 = *strongly agree.* A data transformation procedure in SPSS produced one composite score for analysis. Reliability statistics depend on sample size; therefore, reliability reports were different from research to research, including from the original research report. The reliability of this research study is increased as it builds upon previous valid results in the literature (Dai & Wells, 2004). Dai and Wells (2004) conducted tests to measure the Cronbach's alpha to ensure the selected instrument consistently measured what was supposed to be measured. Dai and Well's study showed that the variables substantially exceeded the minimum threshold of 0.70, ranging from 0.81 to 0.92. (Dai & Wells, 2004, p. 526).

Assumption testing was required for this correlation analysis. First, the data were tested for linearity and assumptions of normality. In testing for assumptions of normality, a visual inspection of the histogram for the variables indicated an approximately normal distribution, as depicted in Figure 6 with a normal bell-shaped curve.

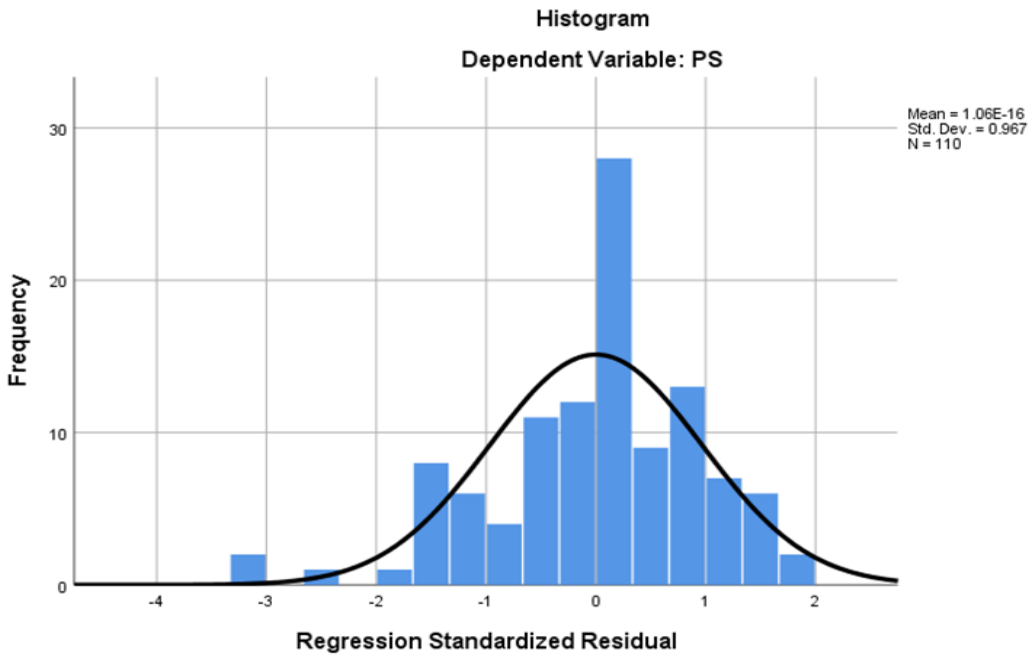

Figure 6. Histogram supporting normality of distribution.

The strength of the relationship used the convention $r < .30$ as small strength of relationship while $r > .50$ was considered a high or strong relationship, and a positive value for Pearson *r* indicated a positive relationship, and the negative value indicated a negative relationship (Rockinson-Szapkiw, 2013). The research design also used a statistical significance of > .05, or 5% (Vogt, 2006). Those values of $p < .05$ indicates that the GoP variables have a linear relationship with project success (see Table 3).

Table 3

Correlations Matrix (Project Success and Seven Independent Variables)

		PS	PMM	PMS	HR	TR	CM	HA	AS
Pearson	PS	1.000	.389	.451	.559	.554	.568	.555	.531
Correlation	PMM	.389	1.000	.683	.801	.676	.701	.719	.761
	PMS	.451	.683	1.000	.587	.515	.568	.507	.734
	HR	.559	.801	.587	1.000	.815	.835	.769	.769
	TR	.554	.676	.515	.815	1.000	.807	.820	.674
	CM	.568	.701	.568	.835	.807	1.000	.741	.813
	HA	.555	.719	.507	.769	.820	.741	1.000	.708
	AS	.531	.761	.734	.769	.674	.813	.708	1.000
Sig. (1-tailed)	PS	.	.000	.000	.000	.000	.000	.000	.000
	PMM	.000	.	.000	.000	.000	.000	.000	.000
	PMS	.000	.000	.	.000	.000	.000	.000	.000
	HR	.000	.000	.000	.	.000	.000	.000	.000
	TR	.000	.000	.000	.000	.	.000	.000	.000
	CM	.000	.000	.000	.000	.000	.	.000	.000
	HA	.000	.000	.000	.000	.000	.000	.	.000
	AS	.000	.000	.000	.000	.000	.000	.000	.

As displayed in Table 3, the results of using Pearson *r* and Sig. (1-tailed*)*, consistently show a strong positive correlation between the GoP variables and project success, r (110) = .451, p = .000 PMS, r (110) = .389, p = .000 PMM, r (110) = .559, p = .000 HR, r (110) = .554, p = .000 TR, r (110) = .568, p = .000 CM, r (110) = .555, p = .000 HA, and r (110) = .531, p = .000.

Linear Regression

Linear regression is the analytic technique used to examine the predictive magnitude of relationships between the IVs and the DV (Swanson & Holton, 2005; Tabachnick & Fidell, 2019). The use of the coefficients results of the linear regression analysis establishes the statistical significance of the IVs within the sample population. Null hypotheses were rejected or

accepted using the p-value for the statistical significance of .05. If $p > .05$, then the null hypothesis was accepted; otherwise, the null hypothesis was rejected.

Validating Assumptions for Linear Regression

In linear regression, the residuals must be independent of one another, homoscedastic to have constant variance, and approximately normally distributed. Outliers are assumed to be absent on all predictor and outcome variables. Multicollinearity between the independent variables is also assumed to be absent.

An assessment of the outputs from Code Book reports as well as results from an Explore analysis helped to determine whether there were any violations of the eight assumptions related to the standard regression models. The assumptions and results are as follows:

Measurement of the variables. The criteria for conducting linear regression analyses are that the dependent variable (DV) must be continuous (i.e., measured at the interval or ratio level), and the independent (IV) could be either continuous, categorical, or a mix of both. An assessment of the Code Book report showed that the variables were all continuous, measured at the interval levels.

Linearity. Scatterplots (Figure 7) of the dependent variable regressed against the independent variables were examined to determine linearity. Linearity does not exist if the residuals form curved or cone-shaped patterns in the scatterplot. The residuals were more or less rectangularly scattered.

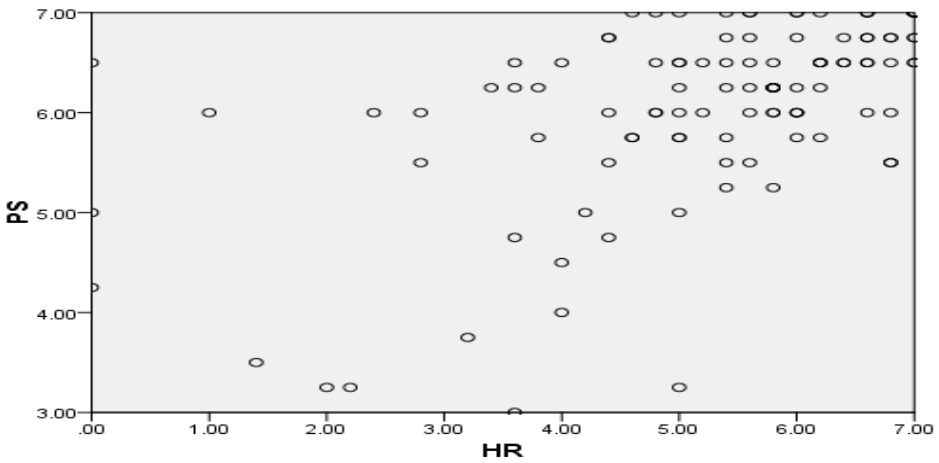

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Figure 7. Scatterplot between composite HR variable versus composite project success

Independence of errors. The Durbin-Watson (D-W) statistic in the Model Summary table is an indication of the independence of errors. A Durbin-Watson statistic of approximately 2.00 is a sign that there is no violation of this assumption. The D-W Statistic was 1.614

Homoscedasticity. The same scatterplots employed in checking for linearity are used to check for homoscedasticity. The distribution of data points in the scatterplot was in a rectangular pattern.

Multicollinearity. When two or more of the predictors in a regression model are correlated moderately or highly, multicollinearity exists. A correlation coefficient of minus one (−1) denotes a perfect negative relationship. A value of 0 implies that the two variables are not linearly related. No multicollinearity in the variables was displayed. This was determined by examining the variance inflation factor (VIF) VIF < 4 for all seven predictor variables. Field (2017) suggests VIF of 10 as the point of which to be concerned about

multicollinearity for the model. In this study, this was not the case. In the output results, there was no indication of multicollinearity in the data correlation ($r > .9$) among predictors as a threshold measure (Field, 2017). The highest correlation was .835 between HR SUM (composite variable of human resource/staff assistance resource) and CM SUM (consulting and mentoring composite variable of).

Significant outliers/influential cases. The Casewise Diagnostics output showed case 56 and 104 as the two outliers in the data.

Normality of distribution. Shapiro-Wilk (S-W) statistic, which is an output of the Explore function, produced the histogram and the P-P Plot. These outputs produce information on the normality of distribution. Significant S-W statistics (i.e., $p < .05$) are indications of non-normality.

Linear Regression Analyses: Procedures

After testing for the assumption for multicollinearity, homoscedasticity, linearity, and normality, a detailed analysis of the data for the seven research questions was conducted. To investigate the seven research questions, linear regression was performed on the variables associated with the governance of projects (GoP) and the presence of a PMO in relationship to project success. Previous studies of project management and project success, when viewed from a multidimensional perspective, also used regression analysis (Mir & Pinnington, 2014). Additionally, Mullaly and Thomas (2009) used regression analysis assessing contingent factors concerning project management from a theoretical construct based on contingency theory as with this research design.

Hypothesis Testing

The following are restatements of the research questions as well as the hypotheses, which answered the research questions (RQs). The results of the linear regression analyses that tested the null hypotheses (H_0) follow the restatement of the RQs and the H_0.

RQ1: To what extent do project management methods predict project success?

H_01: Project management methods have no statistically significant predictive relationship with project success.

H_A1: Project management methods have a statistically significant predictive relationship with project success.

In analyzing the output results in Table 4, the null hypothesis is rejected, $H_0$1: Project management methods have no statistically significant predictive relationship with project success.

Table 4

Model Summary: Project Success and Project Management Methods

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.389[a]	.151	.143	.85291	.151	19.216	1	108	.000	1.583

[a.] Predictors: (Constant), PMM
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project management methods variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 19.216, p = 000].

RQ2: To what extent do project management standards predict project success?

H_02: Project management standards have no statistically significant predictive relationship with project success.

H_A2: Project management standards have a statistically significant predictive relationship with project success.

In analyzing the output results in Table 5, the null hypothesis is rejected, H_02: Project management standards have no statistically significant predictive relationship with project success.

Table 5

Model Summary: Project Success and Project Management Standards

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.451[a]	.204	.196	.82610	.204	27.606	1	108	.000	1.550

[a.] Predictors: (Constant), PMS
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project management standards variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 27.606, p = 000].

RQ3: To what extent do project historical archives predict project success?

H_03: Project historical archives have no statistically significant predictive relationship with project success.

H_A3: Project historical archives have a statistically significant predictive relationship with project success.

In analyzing the output results in Table 6, the null hypothesis is rejected, $H_0$3: Project historical archives have no statistically significant predictive relationship with project success.

Table 6

Model Summary: Project Success and Project Historical Archives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.555[a]	.308	.302	.77004	.308	48.068	1	108	.000	1.715

[a.] Predictors: (Constant), HA
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project historical archives variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 48.068, p = 000].

RQ4: To what extent does project administrative support predict project success?

H_04: Project administrative support has no statistically significant predictive relationship with project success.

H_A4: Project administrative support has a statistically significant predictive relationship with project success.

In analyzing the output results in Table 7, the null hypothesis is rejected, $H_0$4: Project administrative support has no statistically significant predictive relationship with project success.

Table 7

Model Summary: Project Success and Project Administrative Support

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.531[a]	.282	.275	.78440	.282	42.406	1	108	.000	1.578

[a.] Predictors: (Constant), AS
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project administrative support variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 42.406, p = 000].

RQ5: To what extent does project human resource staff assistance predict project success?

H_05: Project human resource and assistance has no statistically significant predictive relationship with project success.

H_A5: Project human resource and staff assistance has a statistically significant predictive relationship with project success.

In analyzing the output results in Table 8, the null hypothesis is rejected, $H_0$5: Project human resource and assistance have no statistically significant predictive relationship with project success.

Table 8

Model Summary: Project Success and Project Human Resource and Assistance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.559[a]	.313	.306	.76752	.313	49.098	1	108	.000	1.541

[a.] Predictors: (Constant), HR
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project human resource and assistance variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 49.098, $p = 000$].

RQ6: To what extent does project training predict project success?

$H_0$6: Project-related training has no statistically significant predictive relationship with project success.

H_A6: Project-related training has a statistically significant predictive relationship with project success.

In analyzing the output results in Table 9, the null hypothesis is rejected, $H_0$6: Project-related training has no statistically significant predictive relationship with project success.

Table 9

Model Summary: Project Success and Project-Related Training

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.554[a]	.307	.301	.77040	.307	47.925	1	108	.000	1.593

[a.] Predictors: (Constant), TR
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between project-related training variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 47.925, p = 000].

RQ7: To what extent does project consulting and mentoring predict project success?

$H_0$7: Project-related consulting and mentoring has no statistically significant predictive relationship with project success.

H_A7: Project-related consulting and mentoring has a statistically significant predictive relationship with project success.

In analyzing the output results in Table 10, the null hypothesis is rejected, $H_0$7: Project-related consulting and mentoring has no statistically significant predictive relationship with project success.

Table 10

Model Summary: Project Success and Consulting and Mentoring

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.568[a]	.322	.316	.76212	.322	51.328	1	108	.000	1.486

[a.] Predictors: (Constant), CM
[b.] Dependent Variable: PS

The alternate hypothesis is accepted because of Sig. F Change data results show .000, which demonstrates a statistically significant relationship exists between the project-related consulting and mentoring variable associated with the presence of PMO and governance of projects to project success with $p < .05$ [F (1,108) = 51.328, p = 000].

Summary

Highlighted in this chapter was an introduction to the purpose of the study, which was to investigate the predictive relationships between seven IVs and one DV. Descriptions of the sample, results of hypotheses testing, and a summary of the tests of the hypotheses were reported. The assumptions that are related to the linear regression model were checked, and the goodness of fit of the model to the data was assessed. The research questions and hypotheses were restated, and the hypotheses were tested.

Regarding Research Questions 1 -7, there were statistically significant predictive relationships between GoP variables and project success. These results are interpreted in Chapter 5.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Chapter 5 serves as a culmination of the research study with the purpose to provide a discussion of the results presented in Chapter 4, examine the implications of those results, and provide recommendations for future studies. Divided into seven major sections, Chapter 5 includes a summary of the results, discussion of the results, conclusions based on the results, limitations, implications for practice, research recommendations, and conclusions.

Summary of the Results

The purpose of this study examined the extent to which project management office (PMO) performance predicts project success in computers/information technology organizations that execute projects in PMO by solving the research problem of measuring the GoP variables that measure PMO performance related to project success. The present study was significant because it may help information technology organizations rationalize the design of a successful PMO. The literature review primarily focused on the causation of project failure within the field of project management and project management office (PMO).

The methodology utilized an inferential statistical test to determine if the GoP variables (IV) have a predictive relationship with project success (DV). The test used was a linear regression. The findings of the review showed evidence that the GoP variables are statistically significant and predict project success with the presence of a PMO.

Discussion of the Results

This study addressed seven research questions: RQ1: To what extent do project management methods predict project success? RQ2: To what extent do project management standards predict project success? RQ3: To what extent do project historical archives predict project success? RQ4: To what extent does project administrative support predict project

success? RQ5: To what extent does project human resource staff assistance predict project success? RQ6: To what extent does project training predict project success? RQ7: To what extent does project consulting and mentoring predict project success?

To respond to these research questions, two sets of hypotheses were applied to show if there was a statistically significant predictive relationship between the GoP variable and project success or if there was no statistically significant predictive relationship between the GoP variable and project success.

Based on the results of the statistical analysis performed on the data collected from the survey instrument, all the GoP variables was a significant predictor of project success. The results were within the $p < .05$ threshold, indicating a significant correlation. The statistically significant correlation between the GoP variables and project success reasonably concludes, allowing the rejection of the null hypothesis, which indicated there was no significant predictive relationship between the predictors and the dependent variable. The results of the present study revealed that the GoP variables: project management methods, project management standards, project historical archives, project administrative support, project human resource and staff assistance, project-related training, and project-related consulting and mentoring all have a statistically significant predictive relationship with project success when associated with the presence of a PMO.

The results have practical implications as they aid organizations in deciding whether if it is financially prudent to invest in a PMO solution to mitigate project failure. Although the results of the data analysis do support the hypotheses, whether PMO performance predicts project success was not directly conclusive. The research study adds research data to the body of project management knowledge.

From a theoretical discussion, the effect of the GoP variables (IVs) on the effectiveness of project success when associated with the presence of a contingency PMO is significant. GoP variables and project success are contingent upon the need for a PMO. The relationship of the GoP variables to project success is significant with the presence of a formal PMO structure. This could substantiate the power of GoP variables as an indicator of project success and a performing PMO.

Conclusions Based on the Results

There are significant relational and predictive correlations between the GoP variables and project success when the PMO is present. This would indicate that a PMO that provides additional project governance capability will influence project success.

Comparison of the Findings

As deliberated in Chapter 2, this study indicated a relationship exists between successful PMO performance and project success, denoting those performing PMOs that support project governance: project management practices, processes, and project objectives will lead to project success, and lacking such performance has been identified as a primary reason for project failure (Blaskovics, 2016; Liberato et al., 2015; Milin et al., 2012). The findings showed evidence that the GoP variables are statistically significant and are related and predict project success with the presence of a PMO. There is disconfirmation with the previous literature and the theoretical framework as it relates to how this study examined PMO performance influences project success in computers and IT organizations in which employees execute projects revealing the contingent relationship between PMO performance, project governance, and project success.

From a researcher's discipline and community of interest perspective, the knowledge gap regarding which PMO performance variables as related to project success indicate the GoP variables are of great importance to project success with the presence of a PMO.

Interpretation of the Findings

This conclusion is consistent with Dai and Wells (2004), who performed a similar survey but analyzed only six of the seven GoP variables, resulted in similar conclusions indicating there is highly correlated evidence that organizations that have PMOs utilize PM standards and project historical archives (p.531). In this study, the GoP variables have a significant predictive correlation to project success. The findings showed strong evidence that the GoP variables are statistically significant to predict project success with the presence of a PMO.

Limitations

A limitation of this research design is the lack of definition of what is PMO performance. PMO performance implied those PMOs that utilized the GoP variables that led to project success. The need to better define a model of what factors define performance could have helped clarify the study.

Another limitation of this research design is the complexity of the constructs and complexity of the study. These constructs include governance of projects and project success. The construct of project success is multidimensional

Various factors influence project success; identifying and researching the most significant critical factors are complicated and can be a threat to validity (Müller & Jugdev, 2012).

Another limitation of the research design is the survey instrument. Although the instrument was validated from prior research (Dai & Wells, 2004), the instrument was adequate but not wholly conclusive. For instance, the premise for the survey questionnaire used

was that the respondents were capable of providing objective measures of project success from a self-reported questionnaire. Self-reported data could lead to a bias whereby compromising the results (Conway & Lance, 2010).

Implications for Practice

Based on the results discussed in Chapter 4, this research may have contributed to the general field of IT project management in defining project success by using the results of this study, which indicated the GoP variables are related and predict the project process explaining what performance factors determine project success. In this paper, the results of the literature review revealed that there are appropriate types of project methodologies, which usage and selection depend mainly on the governance of the organization. This information gives scholar-practitioners an advantage when researching the applicable Agile practices vs. Waterfall methodologies as it relates to project execution. Results showed mitigating project failure by investing in a PMO, may not directly warrant project success. The study showed that mitigating project failure is achieved by how to adopt the GoP variables within the organization with the presence of PMO.

Recommendations for Further Research

This nonexperimental correlational research was built upon prior research of Dai and Wells (2004) utilizing empirical evidence to determine if a statistical relationship exists between successful PMO performance and project success denoting those performing PMOs that support project governance will lead to project success. However, those PMOs lacking such performance has been identified as a primary reason for project failure.

Recommendations Developed Directly From the Data

A recommendation would be to study how organization leadership, specifically situational incompetence, impacts project failure. The cause of many project failures is related to management's weak and indecisive decision making influenced by situational incompetence.

Recommendations Based on Delimitations

Recommendations for future research consists of new multiple methodological approaches. These recommended approaches would add greater clarity and include studies using mixed methods, quantitative, and qualitative research methods.

Conclusion

This study, the relationship between the independent variables (IV) *GoP* variables and the dependent variable (DV) *project success,* was examined within the presence of PMO. All the IVs made a statistically significant relational and predictive contribution to project success. A review of the literature confirmed the results of this study. Limitations that were associated with this study were stated, and, based on the outcome of the study, the implications of the result to organizations, scholar-practitioners, the field, and academia were articulated. Finally, recommendations were made for future studies.

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