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Relationship Between Risk Identification, Risk Response, and Project Success

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College of Management and Technology

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Marsha Marinich

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Dr. Natalie Casale, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Alexandre Lazo, Committee Member, Doctor of Business Administration Faculty

Dr. Judith Blando, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2020

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Abstract

Relationship Between Risk Identification, Risk Response, and Project Success

by

Marsha Marinich

MS, University of Wisconsin-Milwaukee, 1974

BS, Lane College

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

December 2020

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Abstract

Projects are used to implement the organization's strategic goals, but high failure rates reduce projects' effectiveness in successfully achieving goals. High failure rates reduce project managers' effectiveness of projects in successfully achieving goals. Senior leaders and project managers are unable to deliver successful projects due to unmanaged risks. Grounded in expected utility theory, the purpose of this quantitative correlational study was to examine the relationship between risk identification, risk responses, and project success. A survey was created in SurveyMonkey® and distributed on LinkedIn. Survey responses were analyzed from 71 project managers with at least five years of experience in Washington, DC. The results of the standard multiple linear regression indicated the model was able to significantly predict project success, $F(2, 70) = 7.260$, $p < .001$, $R^2 = .18$. However, risk identification ($t = 3.262$, $p < .002$) was the only statistically significant predictor. A key recommendation is for project managers to identify and mitigate any risks that could negatively impact a project. The implications for positive social change include the potential for project managers to understand how risk identification and risk response can lead to successful projects that achieve organizations' goals and create opportunities for innovative products and services that deliver value to stakeholders.

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Dedication

I dedicate this dissertation to my grandparents, Mr. and Mrs. Epsy and Ethel Mapp and my husband. They instilled and nurtured a fierce love of learning in me and an abiding curiosity to know and understand. I am a lifelong learner because of them. My maternal grandmother provided a strong belief in me and unconditional love and support. My incredible husband and partner in life has been with me every step of this journey. He is as deserving of this degree as me.

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Acknowledgments

The retirement of my first advisor resulted in the assignment of Dr. Natalie Casale as my first chair. I did not know how fortuitous this would be for me. Dr. Casale is a unique blend of compassion and advocacy, and she coaches you to do your best with constructive mentoring. Her unwavering support has gotten me to the end of this journey. My second chair, Dr. Alexandre Lazo, and URR, Dr. Judith Blando, rounded out my support team to contribute to the doctorate's attainment. I am grateful to my entire committee for their support. I have high praise for the Walden librarians and writing center resources. They are talented and resourceful and help make Walden students better researchers and writers. I would be remiss not to mention the project team that has been with me throughout my journey, along with far more people than I can name.

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Section 1: Foundation of the Study

Projects have become ubiquitous in many organizations as important constructs to implement strategy and achieve organizational goals (Anantatmula & Rad, 2018). Executives in organizations use portfolios of projects to establish growth and sustainment strategies related to the present and future use of resource investments (Derakhshan, Turner, & Mancini, 2019), with information technology (IT) projects representing a major share of corporate spending (Aranyossy, Blaskovics, & Horváth, 2018). Leaders of organizations expect project outcomes to show a positive return on investment to expand organizational capacity for future growth (Baptestone & Rabechini, 2018). Executive leaders assign project managers (PM) to projects to be responsible for the successful implementation of the strategic initiatives of the organization. The failure rates of IT projects remains high, at 70% (Engelbrecht, Johnston, & Hooper, 2017). High failure rates reduce the effectiveness of projects in successfully achieving goals. This study intended to identify whether the predictor variables of risk identification and risk response correlate with success in relation to time, budget, and scope of IT projects.

Background of the Problem

The successful execution of projects was the topic of this study. The business problem I addressed in this study was whether risk management could contribute to project success. This problem was worthy of research as projects have become an essential tool of change management and strategy execution within organizations, and there has been significant interest in how to improve their odds of success since reliance

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on projects for strategic attainment is a primary tool of organizational development (Cooke-Davies, Crawford, & Lechler, 2009; Fabricius & Büttgen, 2015). Initially, the standardization of project management was intended to be the chief means of embedding success into projects (Todorović, Petrović, Mihić, Obradović, & Bushuyev, 2015). However, standard project practices and processes have not proven effective in improving project success and goal attainment (Pinto, 2013).

Identifying the factors that lead to project success has proven to be difficult (Carvalho, Patah, & de Souza, 2015). The prediction of a successful outcome at the beginning of the project is unlikely due to the number of threats and opportunities that move a project off track (Fabricius & Büttgen, 2015). Threats and opportunities to the successful outcome of projects are known as risks (Dandage, Mantha, Rane, & Bhoola, 2017). The management of threats and opportunities in projects is known as risk management (Pimchangthong & Boonjing, 2017). Expanding the understanding of how risk management in projects will lead to successful projects and better organizational performance was a goal of this research.

Problem Statement

IT projects continue to exhibit high failure rates despite years of research in project management. The failure rate of IT projects is unsustainably high at 70% (Engelbrecht et al., 2017). The general problem was that unmanaged risks continue to adversely affect project success (Dandage et al., 2017). The specific problem was that

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some project managers do not understand the relationship between risk identification, risk response, and project success.

Purpose Statement

The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. The independent variables were risk identification and risk response. The dependent variable was project success. The targeted population was IT project managers in the Washington, DC metropolitan area. The implications for positive social change included the potential of improved project success to foster the creation of jobs, economic stability, and socially cohesive communities.

Nature of the Study

A quantitative method was the research approach for this study. Project management is a well-researched domain with sufficient extant literature to support the hypotheses of the study using a quantitative approach (Gliner, Morgan, & Leech, 2009). Research questions that seek to identify relationships or associations between measurable variables are appropriate for investigations using the quantitative approach (Weathington, Cunningham, & Pittenger, 2012; Yilmaz, 2013). When a researcher wants to analyze the strength of the relationship between variables, the quantitative approach is used (Negussie & Demissie, 2013); therefore, the quantitative method was appropriate for this study. In contrast, a qualitative approach was not used for this study because the approach is best suited to fields in which little research has been conducted (Fassinger & Morrow,

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2013). A mixed-method approach, which combines the quantitative and qualitative approach (Palinkas, Mendon, & Hamilton, 2019; Venkatesh, Brown, & Bala, 2013), was not necessary to provide enhanced insight into the research problem posed in this study. Therefore, the mixed-method approach was not appropriate for this study.

I selected a correlational design to examine the relationships between risk identification, risk response, and project success. Relationships between two or more variables are best suited for correlational designs (Yardley & Bishop, 2015). Correlational designs are appropriate when the independent variables are not directly manipulated or under the control of the researcher (Gabbiadini & Greitemeyer, 2017). Cause and effect, which is the goal of experimental and quasi-experimental designs (Antwi & Hamza, 2015), are not the goal of this research. Therefore, the experimental and quasi-experimental approaches are not suitable for this study. My focus was on examining whether there is a predictive relationship between the predictor variables of risk identification and risk response, and the dependent variable, project success; therefore, the correlational design was appropriate for my study.

Research Question

What is the relationship between risk identification, risk response, and project success?

Hypotheses

Null Hypothesis (H_0): There is no statistically significant relationship between risk identification, risk response, and project success.

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Alternative Hypothesis (H_1): There is a statistically significant relationship between risk identification, risk response, and project success.

Theoretical Framework

Von Neumann and Morgenstern's utility theory or expected utility (EU) was the theoretical framework used as the basis of this study. John von Neumann and Oskar Morgenstern, the theorists behind EU, developed the theory in 1947 (Busemeyer, 2015). Von Neumann, a mathematician, and Morgenstern, an economist, collaborated on a utility theory to explain decision-making in uncertain situations (Ramos, Daamen, & Hoogendoorn, 2014). EUT is a decision theory upon which risk management has been conceptualized (Moeini & Rivard, 2019b). I analyzed responses from the risk survey for the independent variables, risk identification and risk response, based on this theory.

Projects are inherently risky undertakings in which decisions about risks are fundamental to project risk management (Flyvbjerg, 2013). Several key components of the expected utility theory (EUT) are relevant to risk management and the tools used for risk analysis (Hartono, Sulistyo, Praftiwi, & Hasmoro, 2014). The management of risks involves continual and iterative assessment of decisions to reduce the impact of risks on the project (Sato, 2014). The principle concept of utility theory is a rational decision-maker uses three axioms to make and mitigate decisions. Busemeyer (2015) explained utility theory as follows: (a) Axiom A, dominance, refers to the quality of an action and suggests that of two actions, the better action is chosen; (b) Axiom B, transitivity, operates when multiple actions are possible - if A over B, and B over C, then A over C;

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and (c) Axiom C, independence, affirms that when actions have the same consequence, either action is an acceptable decision. The axioms of the Von Neumann and Morgenstern's utility theory can assist project managers in decision-making. The project managers' decisions represented by the risk response process and applied to risk response strategy are a prime application of EU axioms (Moeini & Rivard, 2019a).

Operational Definitions

An advantage of the field of project management is the terminology it provides for practitioners to communicate efficiently (Borgonovo, Cappelli, Maccheroni, & Marinacci, 2018). The absence of common language in a field is indicative of immaturity (Tarhan, Turetken, & Reijers, 2016). The following terms in this study are common to the field of project management.

Project efficiency: This is a summary term for the time, cost, and scope goals of a project (Zidane & Olsson, 2017).

Risk: This term refers to a future event that could impact the ability of the project to be delivered on time, on budget, and within scope (Mishra, Das, & Murray, 2016).

Risk management: The management of risks involves processes for identifying, categorizing risks by impact and severity, responding to risks, and mitigating risks (Muriana & Vizzini, 2017).

Assumptions, Limitations, and Delimitations

In this section, I discuss the assumptions, limitations, and delimitations of this research. When researchers identify the assumptions, limitations, and delimitations of

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their studies, readers are in a better position to evaluate the research from the point of view of the researcher (Bryman, 2016). In the statements that follow, I identified the underlying assumptions of the study, the limitations that affected the findings, and the delimitations that structured the study.

Assumptions

Assumptions are facts assumed to be true, but not verified (Browning, 2019). The first assumption of this study was that organizational leaders select projects to return the highest value to the organization, underscoring why projects are essential to organizations. The ancillary assumption was project failure represents a significant financial shortfall and strategic misalignment for organizations. A related assumption was project risk management mitigates project failure and increases the odds of project success. Another assumption was that the high rate of project failure would continue to have an adverse impact on organizational performance. As noted in the theoretical framework section, Von Neumann and Morgenstern based utility theory on the principles that the decision-maker operates rationally (Elmar Kutsch & Hall, 2010). An assumption regarding project managers was that they are rational decision-makers. I also assumed that risks derive from uncertainty, and the level of uncertainty determines the threat potential to the project.

I assumed that study participants were aware of and practiced risk management in their projects. An ancillary assumption was that study participants are versed in the processes of risk management and have applied those processes in their projects. I based

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this assumption on the knowledge required of project managers and the certification exam project managers take to become project management professionals (PMP).

Limitations

Limitations are influences and potential weaknesses affecting the research that are beyond the researcher's control (Flick, 2015). A primary limitation was the composition of the study survey. I combined two instruments because I was unable to find one instrument that measured risk and project success. Researchers (Blumenberg et al., 2019; M. Liu & Wronski, 2018) found that the flow of surveys had a negative impact on completion rates. The second limitation was the loss of control over the accuracy of participant responses in online surveys.

Delimitations

Delimitations identify the boundaries of the study, with particular attention to what is not covered by the study (Gliner et al., 2009). The first delimitation in this study was the use of only project managers as participants. The second delimitation was the definition of project success as meeting cost, schedule, and performance goals. New factors (e.g., stakeholder satisfaction and business value) relating to project success were not considered in this study. Meeting the goals of time, scope, and budget are the traditional measures of project success (Dandage et al., 2017). A third delimitation of the study was the use of only two risk management processes as independent variables. Other risk management processes are not being investigated in this study. Javani and Rwelamila (2016) identified six risk management processes, including the two used in this study.

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The use of two independent variables may limit the predictive power of the study. I did not investigate how companies select projects that will be implemented by the company.

Significance of the Study

This study is valuable to businesses because its findings may help project managers achieve the criterion variable of project success. Project managers identify and acknowledge risks to recognize potential causes of failure (Cagliano, Grimaldi, & Rafele, 2015). The value of this study to business is project leaders may move one step closer to identifying how to manage risk to achieve project success. Organizational leaders may better understand the role of risk management and create a culture that values the practice of risk management.

Contribution to Business Practice

Project managers who can achieve project success by acknowledging and mitigating risks may contribute to improved business practice (Aranyossy et al., 2018). This study contributed to improving the likelihood of project success. Any research that increases the probability of project success would provide a significant contribution to project management and, by extension, organizational success (Martens, Machado, Martens, Silva, & Freitas, 2018). The expectation is this research would provide new insights into the management of projects.

Implications for Social Change

Company executives know their strategies must keep them competitively viable (Kopmann, Kock, Killen, & Gemünden, 2017). To achieve competitive viability, leaders

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select strategies that need to be flexible and modular (Abrahamsen, Pettersen, Aven, Kaufmann, & Rosqvist, 2017). Projects used as interchangeable pieces are the flexible and modular approach to strategic management (Kopmann et al., 2017). Successful strategic management based on projects can result in jobs, innovative products and services, and lower prices to contribute to positive social change (Sirisomboonsuk, Gu, Cao, & Burns, 2018). Employment, for many people, is a source of happiness and self-worth (Marcelino-Sádaba, Pérez-Ezcurdia, Echeverría-Lazcano, & Villanueva, 2014). Successful companies are more likely to be employers and contribute to positive social change by providing opportunities for employment and social stability.

A Review of the Professional and Academic Literature

The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. Von Neumann and Morgenstern's utility theory or EU (1947), which explains decision-making under conditions of uncertainty, provided the theoretical framework for this study. Projects deliver goods, services, and products as a delivery system for the strategic initiatives of organizations (Browning, 2019). This literature will focus on the research question and hypotheses:

RQ: What is the relationship between risk identification, risk response, and project success?

H_0: There is no statistically significant relationship between risk identification, risk response, and project success.

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H_1: There is a statistically significant relationship between risk identification, risk response, and project success.

I included a discussion of each of the variables in this literature. Each independent variable, risk identification and risk response, is treated separately. Project success, defined as meeting cost, scope, and schedule objectives, is also considered in this literature review (Derakhshan et al., 2019).

The literature for project management is substantial regarding research on the topic of project success alone and leads back to the 1970s (Davis, 2014). Project management is a fertile field for research because of the massive adoption of projects by organizations to structure organizational initiatives (Löwstedt, Räisänen, & Leiringer, 2018). One concern of project management researchers is to identify new techniques and models for successful outcomes for projects (Elzamly & Hussin, 2015). This emphasis on identifying the factors driving project success underscores how vital projects are to organizations.

Identifying factors that contribute to project success is a significant research problem in project management (Eliezer & Dror, 2018). The factor I explored in this study was risk management, with an emphasis on risk identification and risk response. In this study, I evaluated the relationship between these two risk management processes and project success to assess the significance of risk management on project success. I began this literature review with an analysis of the theoretical framework and overview of the research problem and its significance as a business problem. Through the review of the

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literature, I established the strategic importance of projects as contributors to organizational performance by establishing that organizations implement strategy through projects.

Literature Search Strategy

I based the literature review on a critical analysis of the literature pertaining to utility theory, the theoretical framework of this study. The main variables of the study, project success (dependent variable) and risk identification and risk response (independent variables), are presented. I used Google Scholar with the Walden University library link as my initial search strategy. To accomplish more precise Boolean searches, I explored the Walden Library databases and found scholarly papers from Business Source Complete, ScienceDirect, EBSCO, ProQuest Central, Walden Dissertations and Theses, ABI/Inform Complete, and Academic Search Complete.

I reviewed the literature, within the last five years, to address the question of whether applying risk management processes to projects contributed to project success. I reviewed 196 peer-reviewed journal articles with 85 articles from the year 2015 to 2019. Of the 111 articles older than five years from graduation, 42 were published in 2014. Table 1 provides a graphical depiction of the articles used in this literature review. Seminal papers on project management and papers on uncertainty theory comprise the bulk of the older documents. I searched the literature on project management using these themes as keywords. Keywords used in searches were *project success, project failure, information technology, change management, decisions, decision theory, expected utility,*

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knowledge, risks, risk identification, risk response, project management, projects, project managers, uncertainty, surveys, questionnaires, and *risk management*.

Table 1

Frequency and Percentages of Resources

Source	Within 5 years	Older than 5 years	Total	Percentage
Peer-Reviewed	98	108	206	48%
Books	3	3	6	50%
Dissertation	0	1	1	
Total	101	115	213	98%

Application to the Applied Business Problem

The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. The targeted population was IT project managers in the Washington, DC metropolitan area. The null hypothesis was there is no statistically significant relationship between risk identification, risk response, and project success. The alternative hypothesis was there is a statistically significant relationship between risk identification, risk response, and project success.

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Theoretical Framework

Von Neumann and Morgenstern's utility theory or EU provided the theoretical framework for this study. The two researchers developed EUT in 1947 (Busemeyer, 2015). Von Neumann, a mathematician, and Morgenstern, an economist, postulated rational decision-makers would select the optimal course of action, established by a weighted numeric utility when more than one decision is possible in risk-based situations (Jansen, Schollmeyer, & Augustin, 2018). I chose EU theory to ground my study because of the prominence of the decision making with limited knowledge in project management.

Starmer (2000) explored several theories of decision making in the context of risk and uncertainty. Starmer specified EUT as a theoretical framework for decision making to manage risk and uncertainty. While Alter and Ginzberg (1978) postulated a relationship between risk and uncertainty, Starmer identified EUT as a theory that could explain the relationship between the choices or decisions an individual would make under uncertainty. Alter and Ginzberg questioned whether a relationship existed between uncertainty and risk. In the 22 years since their question, Starmer asserted that there was a relationship that could be explained by EUT.

With the developments of Alter and Ginzberg (1978) in the quest for a theoretical framework for uncertainty in decision making, the stage was set to formulate uncertainty into constructs. Starmer (2000) postulated that uncertainty is the precursor of risks. Risks as expressions of uncertainty was a significant contribution to risk management.

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Decisions

Decisions are prevalent throughout the project lifecycle. Project success depends on the quality of the decisions made by the project manager (Daniel & Daniel, 2018). Poor decision making can affect the overall strategic performance of an organization (Baker, 2018). For this reason, I grounded my study in Von Neumann and Morgenstern's theoretical construct of EU theory, a theory of decision making under uncertainty. Problems are solved when project managers make decisions (Jansen et al., 2018). For example, executive leadership selects projects for execution based on strategic alignment decisions (Samset & Volden, 2016). Other decisions related to projects are determining the scope, budget, and timeline of projects (Berssaneti & Carvalho, 2015). The quality of these executive decisions enhances or worsen project success.

The principle concept of utility theory is a rational decision-maker uses three axioms to make decisions (Busemeyer, 2015). Busemeyer explained utility theory as follows: (a) Axiom A, dominance, refers to the quality of an action and suggests that of two actions, the better action is chosen; (b) Axiom B, transitivity, operates when multiple actions are possible - if A over B, and B over C, then A over C; and (c) Axiom C, independence, affirms when actions have the same consequence, either action is an acceptable decision. The axioms of the Von Neumann and Morgenstern's utility theory (1947) can assist project managers in decision making. The project manager's decisions represented by the risk identification and risk response processes and applied to these two processes are a prime application of EU axioms (Browning, 2019).

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The unique nature of projects makes them susceptible to risks. Projects are inherently complex and uncertain undertakings in which decisions about risks are fundamental to project risk management (Ruan, Yin, & Frangopol, 2015). Managers use several components of the EU theory to mitigate the risks that are inherent in projects. The management of risks involves continual assessment of decisions to reduce the impact of risks on the project (Carvalho & Junior, 2015). The independent variables I selected for this study are decisions represented by risk identification and risk response. The selection of risks and responses to risks are decisions (Daniel & Daniel, 2018). Furthermore, there are alternative risks and responses to risks from which the decision-maker can choose (Baptestone & Rabechini, 2018). I maintained that the expected utility theory could govern the selection of risks and the responses to selected risks.

A project manager faces many decisions about risks and responses. From the perspective of EU theory, the project manager, as a decision-maker, would select the risks and risks responses with the highest utility (Ramos et al., 2014). The risks and risk responses that have the highest utility to the success of the project are the decisions that impact project performance (Ramos & Mota, 2014). Based on the EU theory, the best decision is the one with the highest utility (Jonassen, 2012).

Decisions made throughout the project are the basis of risk management. Decision making regarding risks is a component of managing risks (Cagliano et al., 2015). Risk identification decisions are one of the project manager's significant responsibilities (Apostolopoulos, Halikias, Maroukian, & Tsaramirsis, 2016). Risk response decisions

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formulated into mitigations represent the application of EU theory in this study (Elzamly & Hussin, 2014). The project manager can use the axioms of EU theory to enhance the quality of the decisions that are applied to the project.

Projects

In this section, I reviewed the importance of projects in organizations. Executive leaders use projects to succeed based on the use of projects as self-contained initiatives of organizational strategy (Svejvig & Andersen, 2015). Project success is imperative for organizational success (Güngör & Gözlü, 2016). The encapsulation of corporate initiatives into projects creates an equivalency between project success and organizational success. Projects are measurable, observable, and modifiable delivery systems for strategic goals.

Projects are unique, one of a kind systems of processes bounded by a beginning and end date (Derakhshan et al., 2019). Projects are nonrepeating events with no precedent. Managers use projects to deliver specific business benefits to organizations (Martens et al., 2018). Managers also operationalize the mission and vision of organizations with projects, programs, and portfolios (Martens et al., 2018). Patanakul and Shenhar (2012) provided a framework for project strategy and posited the purpose of projects is to win or create value for the organization. Managers increasingly use projects as value creators and change agents in organizations (Svejvig & Andersen, 2015).

The formal construct of projects is associated with the construction of the Transcontinental Railroad. The government project initiated in the 1860s is considered

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one of the earliest projects to be undertaken in America (Susser, 2012). As projects evolved, terms associated with projects made their way into the lexicon. Tasks, a concept from early explorations into work management (Löwstedt et al., 2018), form the basis of project execution. Project managers decompose work into tasks that represent the lowest form of an activity that can be performed (Abyad, 2019). The elements of time, cost, and scope make projects effective work units for organizational initiatives (Daniel & Daniel, 2018).

Projects are one tool to organize work in organizations to achieve specific objectives to gain a strategic advantage (Kopmann et al., 2017). Company leaders use projects to execute strategies for change and growth and (Hwang, Zhao, & Toh, 2014). Projects capture the strategic intent of an organization into a temporary (Samset & Volden, 2016) and unique structure with time, scope, and costs constraints (Varajão, Dominguez, Ribeiro, & Paiva, 2014). The set of activities, milestones, deliverables, and resources of a project represents an organization's investment in its growth and sustainability (Guo, Chang-Richards, Wilkinson, & Li, 2014). According to Teller et al. (2014), the benefits of projects include:

- optimal use of resources through re-use and reassignment on demand,
- maximum use of limited resources such as subject matter experts and equipment,
- maximum return on investment of financial resources, and
- rapid strategy changes through rebalancing project portfolios.

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An attribute of projects is that they are unique. The unique nature of projects portends their execution will be uncertain and unpredictable (Dey, Clegg, & Cheffi, 2013). By definition, projects are one of a kind, temporary organizations (Aubry & Lavoie-Tremblay, 2018; Sydow & Braun, 2018) to which resources are assigned with scheduled, sequenced activities of a given duration (Söderlund & Lenfle, 2013). Projects are non-repeating events that do not have a precedent but may be preceded by similar projects which provide learned lessons (Andersen & Hanstad, 2013). The uncertainty in projects is represented as risks throughout the lifecycle of every project due to the uncertain environments in which managers execute projects (Ramos et al., 2014). Four categories of uncertainty recognized in the PMI PMBOK are technical, external, organizational, and project management (Project Management Institute, 2017). Managers can use these categories to identify risks throughout projects (Bowers & Khorakian, 2014).

Projects as strategy. Projects represent the vision and mission of company leaders and are a strategic roadmap for organizational goal setting and implementation of a strategy (Cabrey & Haughey, 2014). Company leaders find projects to be an effective means of structuring strategic initiatives (Svejvig & Andersen, 2015). Traditionally, projects are constrained by time, cost, and scope, often referred to as the iron triangle (Banihashemi, Hosseini, Golizadeh, & Sankaran, 2017). When project managers deliver a project on schedule, time, and within costs, this meets the project management goals of the project (Pinto, 2013). The failure of projects is an economic problem for companies

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as leaders rely on projects to implement a strategy (Joslin & Müller, 2016). When projects overcome the constraints of time, schedule, and costs, project leaders are free to repurpose the resources that had been allocated to projects that are ending.

Project management. Project management is a form of general management that managers use to focus on projects as an organizational activity to create a service or a product **(**Löwstedt et al., 2018). Project management evolved from the management of single projects to the management of multiple projects (Ward & Daniel, 2013). The trend toward multiple projects reflects the increased use of projects for strategic execution by organizations (Patanakul & Shenhar, 2012; Shenhar, 2004). Categorization of projects into programs and portfolios capture company leaders' strategic direction with multiple projects (Paquin, Gauthier, & Morin, 2016).

Through the use of project management, managers strive to make effective decisions about projects (Papadaki et al., 2014). Managers make decisions regarding the use of the limited resources of time and money to meet organizational goals (Clegg, Killen, Biesenthal, & Sankaran, 2018). Processes that are optimized for decision-making form the basis of project management (Baptestone & Rabechini, 2018). Decisions made by executive leaders and project managers in the areas of resource allocation and strategic alignment of projects to goals are another example of how decision-making underpins project management.

Project management researchers traced the concept of its origins to the missile program, which first used project terms and techniques in 1955 (Johnson, 2013). Susser

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(2012) claimed that as the use of project management grew, the organization and specialization of project management as a field began to take shape in the U.S. and Europe. In the late 1960s into the early 1970s timeframe, project management practitioners stood up the first professional associations of project management in the United States and Europe (Garel, 2013; Pollack & Adler, 2015; Shepherd & Atkinson, 2011). In the United States, the Project Management Institute (PMI) published its standards in the project management book of knowledge (PMBOK) (Susser, 2012).

Project management is a process-driven standard for managing the lifecycle of projects and reduce the probability of project failure (Davis, 2014). To deliver the expected value of projects, organizational leaders use the project management methodology for managing based on decades of research and practice (Berssaneti & Carvalho, 2015). Project managers apply the principles of project management to bring order to the chaos and uncertainty inherent in projects (Müller, Rolstadås, Tommelein, Morten, & Ballard, 2014).

Project management has evolved since the early 1960s (Susser, 2012). However, traditional project management is not without its critics. For example, the traditional focus of project management's cost, performance, and schedule, known as the project efficiency is considered too narrow a framework for managing projects and determining project success (Chih & Zwikael, 2015).

Organizations can grow through project management associated with change (Badewi, 2016). The projects selected by an organization's leaders indicate the direction

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and desired change of its performance path (Chipulu et al., 2014). Ultimately, the achievement of business goals through successfully managed projects contributes to positive organizational change (Müller et al., 2014).

Risk

A best practice of project managers is the early identification of risks and the acknowledgment that risks exist in projects because of uncertainty (Kardes, Ozturk, Cavusgil, & Cavusgil, 2013). Uncertainty is prevalent in projects throughout the project life cycle (Ramasesh & Browning, 2014). The unique nature of projects as temporary, unprecedented constructs makes them particularly susceptible to uncertainty (Samset & Volden, 2016). By definition, projects are temporary, one of a kind work structures designed to advance an organization's strategic goals (Project Management Institute, 2017). The characteristic of projects, as unique entities, lends to the inherent risks in projects (Martens et al., 2018). Therefore, the assumption was that projects have risks, both positive and negative (Didraga, 2013). Didraga (2013) contended risk management is the project manager's best tool for achieving project success.

The content of the literature on risk management concentrates on the process and the origins of risk in projects (Haji-Kazemi, Andersen, & Krane, 2013). A universal definition of risk is uncertain events or conditions that could positively or negatively impact the project mission (Fabricius & Büttgen, 2015; Perrenoud, Lines, & Sullivan, 2014). Risks are pervasive in projects because projects are unique, temporary initiatives

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without a roadmap (Mythen & Wardman, 2016). The unique nature of projects makes their management uncertain and unpredictable (Saunders, Gale, & Sherry, 2015).

Several high visibility accidents, such as the 1986 NASA Challenger disaster, the destruction of the Columbia in 2003, and the 2012 Costa Concordia accident have highlighted the risk-taking cultures of organizations (J. Pinto, 2014). Based on the accidents noted in the previous statement, ignoring risks can result in loss of lives, damage to property, damage to organizational reputations, loss of income and profit, and failure of projects in general. Human beings internalize the risk culture of their organizations and may become incapable of detecting danger (Liu, Meng, & Fellows, 2015). When deviant behavior becomes common, it is accepted, and a high tolerance for risk becomes the new normal (Hall, 2016). "Normalization of deviance" captures the tendency to make a high tolerance for risk the norm. Diane Vaughan, a sociologist, coined the term during her study of the NASA Challenger accident (J. Pinto, 2014). Leadership's tolerance for risk describes their attitude, propensity, capacity, and knowledge of risks (W. Cooper, Kingyens, & Paradi, 2014). An organization's portfolio may contain a mix of projects ranging from high to low risk to balance the organization's exposure to risk (Petro & Gardiner, 2015).

The number of risks in a project depends on several factors, such as the project's mission, size, duration, complexity, uncertainty, and allocation of resources (Reed & Knight, 2013). The factors that capture these terms are performance, schedule, and costs, which are known as project constraints (Joslin & Müller, 2016). Risks occur throughout

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the lifecycle of the project and can be a barrier to success when not managed (Ruan et al., 2015). Risks are any event or condition that disrupts the timeline of the project and pose a threat to the timely completion of project requirements within the allocated budget (Schiller & Prpich, 2014). Lemos (2020) defines risk as a three-part concept based on their ability to have unexpected impacts on projects because of uncertainty and perceived influence.

Uncertainty: The source of risks. There are constructs in the environment of projects that affect the performance of projects. These constructs are complexity and uncertainty that are dynamically interacting to create instability for project execution (Daniel & Daniel, 2018). Eliminating uncertainty is not an option, but it can be managed using processes, tools and techniques, and methods (Teller, Kock, & Gemünden, 2014). Risks are the form of uncertainty takes in projects, and risk management is the process by which the impact of risks is reduced (Kardes et al., 2013). Uncertainty reduces to a level of minimal impact on a project through risk management. The critical distinction between risk and uncertainty is risks have a numeric value, whereas uncertainties may be unknown and unmeasurable (Gomes et al., 2019).

The acknowledgment of uncertainty in projects provides insight into the intransigence of project performance. In their seminal paper, Alter and Ginzberg (1978) postulated a relationship between uncertainty and project outcome. Achieving a successful project outcome was considered a matter of accurately scoping, costing, and scheduling of a project (Zidane & Olsson, 2017). However, with unanticipated cost

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overruns, schedule delays, and scoping issues, project managers and sponsors ultimately had to acknowledge that the uncertainty inherent in all projects was contributing to unplanned project outcomes (Reed & Knight, 2010). Mapping risks to uncertainty provides project managers with a broader perspective on the problems that might be affecting project outcomes. Projects are not executed in a vacuum. Instead, projects are conceived and implemented in dynamic environments where many unknowns exist that could impede and undermine the success of projects (da Silva, Vieira, Melhado, & Carvalho, 2019).

Project risks appear throughout the project lifecycle (Qazi, Quigley, Dickson, & Kirytopoulos, 2016). Risk is inherent in projects as a result of the uncertainty in the environment (Olechowski, Oehmen, Seering, & Ben-Daya, 2016). Uncertainty occurs when knowledge is absent about what events could happen now or in the future (Driskill & Goldstein, 1986). The message for executives and project managers is to reduce uncertainty in the internal and external environments surrounding projects (Eker & Eker, 2019).

The risk-oriented nature of projects derives from uncertainty. Risks are projections of future events, assessed in terms of probability and impact, which could occur under the right circumstances (Rodney, Ducq, Breysse, & Ledoux, 2015). Therefore, risks are statements of the absence of knowledge. The less knowledge, the higher is the risk (Jugdev, Perkins, Fortune, White, & Walker, 2013). Converting uncertainty to risks is an aspect of the decision-making role of project managers

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(Apostolopoulos et al., 2016). However, there is evidence that decision-makers do not consider risk in their deliberations (Oehmen, Locatelli, Wied, & Willumsen, 2020). The quality of project managers' decisions contributes to the success of their projects. The axioms of EUT provide guidelines on how project managers can make the best choice among competing decisions (Ramos et al., 2014).

Complexity is an increasingly prevalent aspect of projects (Cagliano et al., 2015). Global projects, supply chains, virtual teams, years-spanning projects, industry spanning projects, and innovation are characteristics that lend to complexity in projects (Pitsis, Sankaran, Gudergan, & Clegg, 2014). Company leaders strive to deliver innovation through IT projects which are complex by nature (Whitney & Daniels, 2013). Risk management reduces the impact of risks/uncertainty and complexity of project objectives (Jurisch, Rosenberg, & Krcmar, 2016).

Risk management. Risk management is the exercise of decision-making under uncertainty. The project manager, characterized as a rational actor, performs risk management. The processes of risk management are identification, evaluation, and responding to risk (Denney, 2020). These processes are core to many risk management systems. Risk management is an essential practice for project success, but researchers have found that risk management has a low adoption rate among project managers (da Silva et al., 2019).

The management of risks is considered a path to project success (Qazi, Dikmen, & Birgonul, 2020). Through risk management, the project manager identifies threats and

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opportunities, which can lead to project success (Denney, 2020). Threats to costs, scope, and schedule, known as project efficiency, make projects especially vulnerable. Projects may be underfunded with poorly defined requirements and unrealistic timelines. When projects meet cost, scope, and schedule objectives, they are considered successful. de Bakker, Boonstra, and Wortman (2012) asked the question, does risk management contribute to project success. They conducted a meta-analysis of peer-reviewed research between 1997 and 2009 to explore the question of risk management's contribution to project success. The dissimilarity between the studies in the meta-analysis did not lead to a conclusive finding.

Project risk management. Project risk management is the controlled management of a project's risk (Elzamly & Hussin, 2015) to measure the probability and consequence or impact of not achieving a project goal (Khameneh, Taheri, & Ershadi, 2016). Uncertainties that predicate risks are assumed to be different in each stage of the project, thereby necessitating the need for risk management throughout the project (Mythen & Wardman, 2016). Papadaki et al. (2014) noted risk management supports organizations in meeting their strategic objectives by mitigating barriers that obstruct movement toward goals.

The importance of risk management stems from the inability to predict a successful outcome for a project at the beginning of the project (Kock, Heising, & Gemünden, 2016), thereby compelling the need to manage threats to project success. However, the effect of risk management on project success is an ongoing debate (de

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Bakker, Boonstra, & Wortmann, 2010) from the point at which Alter and Ginzberg (1978) suggested identifying and mitigating uncertainties throughout all the stages of the project could influence the success of IT projects. Notwithstanding the debate, risk management is gaining recognition of its role as improving project success (Olechowski et al., 2016). Research on risk management remains high due to the lack of evidence that risk management practices are effective (Oehmen, Olechowski, Kenley, & Ben-Daya, 2014; Olechowski et al., 2016).

Project managers use risk management as a comprehensive management tool to protect from corrosion of stakeholder value in public and private organizations (Bronte-Stewart, 2015). Risk is generally held to be the primary threat to the viability and sustainability of organizations (Jovanović & Pilić, 2013). The benefits of risk management do not guarantee that project managers will utilize risk management practices (Pimchangthong & Boonjing, 2017).

Irimia-Diéguez et al. (2014) maintained that risk management has both the effect of controlling threats and leveraging opportunities. This statement alludes to the aspect of risks that are positive rather than negative. The conception of risks as threats does not take into account the opportunities risks present that can have a favorable effect on projects (Bouras & Bendak, 2014; Olechowski et al., 2016).

Risk management is considered a process model (Badewi, 2016). Generally accepted risk management practices are identification, analysis, and responding to risks in the form of planned mitigations (Pimchangthong & Boonjing, 2017). The two

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variables I used from the risk management process are (a) risk identification and (b) risk response planning. Risk management principles such as the International Organization of Standardization (ISO) 31000:2009 are considered more flexible and cognizant of differences in projects (Olechowski et al., 2016).

The independent variables I used in this study were from the PMBOK (Project Management Institute, 2013) standards. Of the six sub-processes, I used two in this study (see Table 2). I captured responses for the independent variables on a Likert Scale ranging for strongly disagree (SD) to strongly agree (SA). An ordinal scale of measurement measures the independent variables.

Table 2

Independent Variables

Risk Subprocess	Description	Measurement
Identify Risks	Risk identification	Ordinal
Plan Risk Response	Risk responses	Ordinal

Risk Identification

Risk identification is a decision a project manager makes to manage projects and a risk management practice (Pimchangthong & Boonjing, 2017). The reason project managers engage in risk identification is to identify vulnerabilities to the project that could affect the outcome of the project (Apostolopoulos et al., 2016). Standard business practices that can be used to identify risks are SWOT analysis, brainstorming, analysis of other projects, and project plans or documents (Apostolopoulos et al., 2016). Change

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management approaches used with uncertainty management provide a less disruptive environment for implementing projects. Examples of models that can be used to scan the environment are Porter's Five Forces, Lewin's Force Field, and Kotter's 8 Step Change Model (Galli, 2019).

Projects are subject to risks throughout the project lifecycle. Identification of risks, as they arise, is essential to their mitigation. Risk identification is an essential stage in the risk management process (Sanchez-Cazorla, Alfalla-Luque, & Isabel Irimia-Dieguez, 2016). Ghasemi et al. (2018) consider risk identification a critical activity. I have selected risk identification as a predictor variable in this study. According to Dandage (2017), risk identification was a focus of much research in risk management. Javani and Rwelamila (2016) stated that risk identification is conducted in most projects.

Risk Response

After risk identification, the project manager moves to the risk response phase. When project managers do not manage risks effectively, the result can lead to cost, schedule, and performance problems (Zhang & Fan, 2014). I have selected risk response as my second predictor variable in this study. Risk response specifies the decisions made by the project manager to reduce the impact of identified risks on the project (Zhang & Fan, 2014). PMI recognizes four risk response approaches avoidance, acceptance, transfer/share, and control/mitigation (Project Management Institute, 2013). To arrive at the optimal approach, the project manager identifies several courses of action for decision analysis for each identified risk (Creemers, Demeulemeester, & Vonder, 2014). The

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outcome of risk response decision analysis is a risk response plan for each risk for implementation and risk reduction (Zhang, 2016).

Project Success

Project success is the dependent variable in this study. A number of factors have been proposed as contributors to project success. Carvalho and Rabechini (2017) suggested a project sustainability model to ensure the project provided social benefits. Badewi (2016) suggested a combination of benefits risk management and project management contributes to project success. Chih and Zwikael (2015) attributed project success to organizational performance. Customer satisfaction has also emerged from the ongoing research in project success as a measure of project success (Urbański, Haque, & Oino, 2019). The critical point is the prevalence of ideas regarding what drives project success. These studies highlight the wide-ranging perspectives scholars have on project success. Organizational reliance on projects to create value continues to fuel the research agenda for project management (Chih & Zwikael, 2015). The value created by successful projects for the organization and the economy are the benefits that encourage leaders to use projects for strategic gain.

For Didraga (2013), risk management is important to project success. Project success is important to organizations because projects are often expressions of organization strategy. Project success and its corollary, project failure, have been attributed to many factors. Pinto (2013) attributed the poor performance of projects to ineffective initial planning. Failure equates to discontinuation or cancellation of projects,

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poor execution of requirements, high cost and time overruns, and low return on investment (ROI) (J. Pinto, 2014). Some of the success factors found in the literature are leadership (Mir & Pinnington, 2014), communication (Ramos & Mota, 2014), the project manager (Moriya, 2014), the project team (Krane, Olsson, & Rolstadås, 2012), and stakeholders (Davis, 2014). The study by Didraga (2013) continued the question asked by de Bakker et al. (de Bakker et al., 2010; 2011) regarding the contribution of risk management to IT project success. By examining the relationship between risk and project management, my study will further advance research started by de Bakker (2011) and Didraga (2013).

Researchers defined project success along several dimensions. Projects deliver products and services, so it is not surprising that a project success measurement is the delivery of the products or services promised by the projects (Varajão et al., 2014). Product success is typically a more meaningful construct for all stakeholders. Project success and failure are bottom-line issues with strategic and tactical implications (R. Cooper, 2019).

Project success has been on the research agenda for more than 20 years (Pimchangthong & Boonjing, 2017). The structuring of work into projects has made the success of projects of paramount concern to business leaders (Davis, 2014). Project success is associated with meeting time, cost, and scope targets set for the project (de Bakker et al., 2010). Constraints and the iron triangle are additional terms used to refer to these characteristics of the project (Serrador & Turner, 2014). Project success is the

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outcome variable in this study. For this study, I measured project success by the traditional project constraints of time, cost, and scope.

Pimchangthong and Boonjing (2017) explored the influence of risk management practices on project success. Their sample included project managers, IT managers, and analysts in Thailand. While project success was the dependent variable, the researchers added organizational factors as an independent variable. The study included four risk processes. The inclusion of organizational factors was a new twist on the risk management and project success research domain. MLR analysis found risk identification and risk response planning to be statistically significant in predicting project success. Organizational type, but not size, influenced project success.

Javani and Blessing (2016) conducted a study in South Africa. Similarities with the Pimchangthong and Boonjing (2017) were the limitation to IT projects and the exploration of risk management processes. However, their sample population was 500 employees from the public sector. I received permission from the researchers to use their questionnaire in my study. The Javani and Blessing study supported the importance of risk management to project success.

Carvalho and Junior (2015) examined the relationship between risk management and project success but added a variable for project complexity, characterized by the interaction of many variables. The study involved 415 project managers across eight industries in Brazil who took a survey. The researchers interviewed 263 project managers regarding the analysis of company documents to assess project performance. Carvalho

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and Junior's study placed more emphasis on uncertainty than other studies that examine risk management and project success.

I conducted my study in the Northern Virginia area of the USA. The study participants were project managers. Based on my review of the literature, my research examined two risk management processes. I do not examine additional variables. My study was similar to other studies in its use of cost, schedule, and scope to operationalize project success.

Transition

Section 1 lays out the foundation of the study. This section contains the background of the problem, problem statement, purpose statement, nature of the study, research question, hypotheses, theoretical framework, and operational definitions. Assumptions, limitations, and delimitations of the study are spelled out. I established the significance of the research and how it will contribute to business practices and social change. As well, I presented a chronological and topical review of the professional and academic literature.

Section 2 repeated the purpose statement and hypotheses. I discussed the researcher's role and the research method and design. I specified the participants for the study and the population of their origin. I presented the components of ethical research. In this section, I elaborated on the data collection instruments and techniques used in the study. Data analysis and study validity are also in this section.

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Section 3 includes the findings of the study and their implications for professional practice and social change. I made recommendations for action and further research. I reflected on the development of this study and provided my conclusions.

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Section 2: The Project

This section outlines the approach and the methodology used in the study. The purpose of the study is restated, followed by the role of the researcher in quantitative research. I discuss the participants in the study are as well as the population of origin and the sampling technique used. I state the importance of ethical research and how it impacts data collection instruments and techniques. In closing, I discuss data analysis and study validity.

Purpose Statement

The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. The independent variables were risk identification and risk response. The dependent variable was project success. The targeted population was IT project managers in the Washington, DC metropolitan area. The implications for positive social change included the potential of improved project success to foster the creation of jobs, maintain economic stability, and foster socially cohesive communities. Successful projects contribute to the organization and the economy.

Role of the Researcher

The research process starts with the researcher's curiosity about some observed phenomenon (Kaczynski, Salmona, & Smith, 2014). This curiosity may express itself in questions which lead to hypothetical statements that can be measured (Ma, 2012). The impetus for this study stemmed from my interest in risk management as a driver of

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project success. For quantitative research, the researcher identifies a theoretical framework in which the hypothetical constructs exist (Steen, DeFillippi, Sydow, Pryke, & Michelfelder, 2018).

A subsequent research design is developed to examine and respond to the questions posed by the researcher (Morgan, 2018). A researcher uses a qualitative or quantitative methodology to formulate a research design and collects data based on that design (Morgan, 2018). The approach is in keeping with the idea that methodology is a means to understand reality (Hewege & Perera, 2013). The role of the researcher in quantitative research is to select a valid and reliable instrument for collecting data (Caruth, 2013). The tool's validity will determine whether its constructs accurately measure the variables in the study that address the questions posed by the researcher (Koskey, Sondergeld, Stewart, & Pugh, 2018). The reliability of the tool establishes whether the data is consistent over repeated uses of the instrument (Elvén, Hochwälder, Dean, Hällman, & Söderlund, 2018). A quantitative researcher must also understand the data generated by the study (Martin & Bridgmon, 2012).

I have a relationship with the topic of my research because I am a practicing, certified project manager (PMP) on an IT project. I have acquired experience, knowledge, and expertise in IT and project management over a career that spans more than 30 years. As a project manager, I engage in aspects of project management, which include project risk management. My relationship with survey participants derives from

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being an active member of my local chapter of the Project Management Institute and attending chapter events.

Egregious research practices that violated the rights of human subjects resulted in guidelines and codes to protect classes of participants in research. The researcher's role with the Belmont Report ("The Belmont Report," 1979) protocols is to know, understand, and apply the ethical guidelines of respect, beneficence, and justice throughout the research cycle to protect human subjects used in the study (Kawar, Pugh, & Scruth, 2016). The population for this study was adult practitioners of project management. I administered a survey to participants who provided informed consent. In this non-experimental study, there was no direct contact with the participants, who could withdraw participation at any time.

Participants

The participants in this study are certified PMPs and managers of projects. The project manager is the main decision-maker for projects (Jałocha, Krane, Ekambaram, & Prawelska-Skrzypek, 2014; J. Pinto, 2014). The eligibility standard that participants be PMPs and managers of projects supports external validity (Cor, 2016). Knowledge of risk management is a component of the certification process for PMI. Establishing that the study participants be PMPs and managers of projects meets an assumption of the study regarding knowledge of risk management and aligns the participants with the research questions.

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With approval from the Walden Institutional Review Board, I was able to access my participants via an introductory e-mail. E-mail contact with participants to initiate communication and provide instructions is a common approach for survey-based research (Bhattacherjee, 2012; Sutherland, Amar, & Laughon, 2013). I established credibility with the group as a fellow certified project management professional. Risk management, as the focus of the study, was the means of gaining interest in participating in the study. When participants understand a study's relevance to them, they are more likely to participate (Patel, Doku, & Tennakoon, 2003).

Research Method and Design

In this section, I describe the research method and design for this study. The purpose, study questions, and the applied business problem statement justify the method and design (Beauvais, Stewart, DeNisco, & Beauvais, 2014). The method and design were appropriate for researching the problem statement because the intent of the study was to examine whether there is a significant correlation between two processes of risk management and project success (Yilmaz, 2013). The statistical analysis approach of multiple linear regression was appropriate for the research methodology and design (Pandis, 2016).

Research Method

The method for this study was quantitative. I selected the quantitative method over a qualitative or mixed-method approach to study relationships between variables, which is a strength of quantitative research. Quantitative methods seek to find objective

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relationships between variables by using statistical analysis, thereby removing the researcher from direct involvement with research participants (Queirós, Faria, & Almeida, 2017). Hypothetical relationships between variables are posed and tested by collecting data on the hypotheses and using appropriate statistical techniques to analyze the data (Bryman, 2016).

The qualitative method is appropriate for research studies in which the objective is to examine the lived experience of participants through direct interviews, case studies, action research, and grounded research (Rahman, 2016). Qualitative research is beneficial for a deeper understanding of the behavior of communities of practice (Rahman, 2016). The questions posed in this research study subject themselves to a quantitative approach because I was not seeking an understanding of behavior. Instead, in this research, a prediction of outcomes based on relationships between variables was the goal.

Research literature supports the benefits of mixed-method approaches as mitigating the weaknesses of the quantitative and qualitative methods (Palinkas et al., 2019). The use of mixed-method was not necessary for this study. The mixed-method approach may provide more substantial findings, but the complexity of the research, wherein neither quantitative nor qualitative adequately addresses the research questions, was considered an essential factor in choosing this method (Levitt et al., 2018). The research questions proposed for this study did not reach the level of complexity to justify the mixed-method approach.

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Research Design

Correlational research was the design used in this study. I selected this design to investigate the strength of the relationship between the two sub-processes (X_{1-2}) of the PMBOK model of risk management and project success (Y1). Correlation is a non-experimental design within the quantitative approach (Bryman, 2016). A correlational design was the best-fit approach for analyzing relationships between independent (predictor) and dependent (criterion) variables (Queirós et al., 2017). A correlational design was appropriate because the objective of this study was to examine the strength of the relationship between the risk variables and project success.

Experimental and quasi-experimental designs are also quantitative approaches. These approaches are more appropriate when a study is attempting to find a cause and effect relationship between variables, and the independent variable is under research control (Cor, 2016). There are additional logistics and time and effort issues that are characteristic of experimental designs (Bryman, 2016). Identifying the causes of project success was not the purpose of this study.

Population and Sampling

I surveyed a sample of project managers from the population of members of the PMIWDC for this research. With approximately 10,000 members, the PMIWDC is the largest chapter of the Project Management Institute in the world (D. Lepore, personal communication, January 5, 2017). Members of the chapter represent the three states in

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the metro area of Washington, DC: Project managers in Maryland, Virginia, and the District of Columbia.

Project managers are the appropriate and logical group to ask the research question. This population aligns with the research question because project managers are the decision-makers who initiate and execute project risk management (Carvalho & Junior, 2015). Project managers also manage time, scope, and budget (Cagliano et al., 2015). Project success was measured by the project manager's control of these variables to stay within the boundaries established for these targets (Too & Weaver, 2013).

The nature of this study makes a nonprobability, purposive sample acceptable. Researchers often use non-random, purposive samples with null hypothesis statistical testing (NHST) (Wellington & Szczerbiński, 2007). Also, the aim of this study was not to find causality. Therefore, a probabilistic, random sample was not justified as it would be in a quantitative experimental design. Another motivation for using a nonprobability, purposive sample is when time and budget are limited (Uprichard, 2013). The tradeoff for using a nonprobability, purposive sample is the introduction of bias when participants are not randomly selected (Barratt, Ferris, & Lenton, 2015). Cokley and Awad (2013) also identified the inability to make generalizations to the target population as a limitation of nonprobability samples.

A G*Power analysis (Faul, Erdfelder, Buchner, & Lang, 2009) was conducted to determine the minimum sample size for this study. G*Power, version 3.1.9.2, is a statistical tool for discovering the apriori sample size for a study (Bosco, Aguinis, Singh,

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Field, & Pierce, 2015). For this analysis, a medium effect size of 0.15 (f^2 = .15), a power level of 0.80, a statistical significance level of 0.05 (α = .05), with two predictor variables. The power level of .80 was chosen as the maximum probability to reject the null hypothesis. The level of statistical significance measures the probability of committing a Type 1 error. These parameters produced a minimum sample size of 68 participants. A power level of .99 would require a sample size of 146. A power level of .80 was selected to identify the minimum sample size to ensure the reliability of the findings. A power level of .80 means this study has an 80% chance that the findings are correct (Button et al., 2013). Power levels greater than .80 should return even more reliable findings, so .99 or 99% would be at the top of the range of power levels.

Based on the outcome of the G*Power analysis, a sample size range of 68 and 146 was an appropriate size for the study. This sample size makes sense for the medium effect size of f^2 = .15 (Cohen, 1992) using linear multiple regression statistics. Further justification of the power analysis was that it was conducted before an experiment to identify a sample size that has statistical power to control for Type I and Type II errors (Amiri, Saghaei, Mohseni, & Zerehsaz, 2014). An insufficient sample size could result in a false negative (Type 1 error) or a false positive (Type II) finding (Button et al., 2013). Alpha is the level of significance at which a Type 1 error would not be committed. Alpha also indicates whether the results are statistically significant. The effect size establishes statistical significance. A statistically significant finding does not imply that the findings

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are meaningful. Effect size sets the level at which the findings can be said to be meaningful.

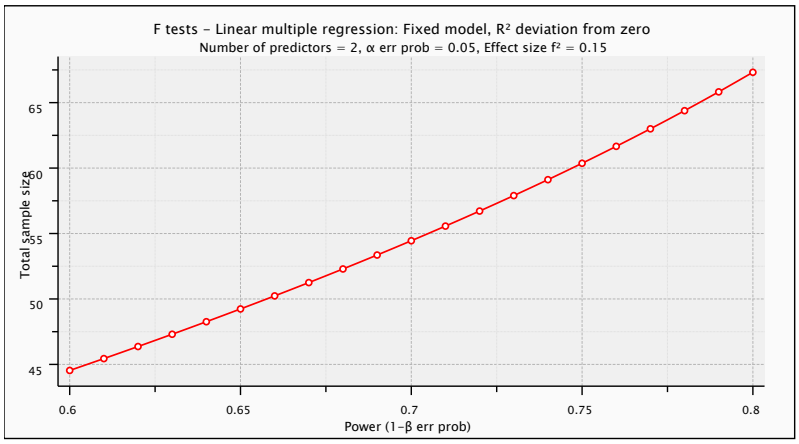

Figure 1. Apriori sample size by power.

Ethical Research

As a social science researcher, I hold the treatment and rights of human study participants in the highest regard. The protection of participants in research is a paramount concern (Lange, Rogers, & Dodds, 2013) due to past abuses against human subjects (Guta, Nixon, & Wilson, 2013). Doctors take a similar oath not to harm. This claim is especially valid for vulnerable populations such as children, the elderly, inmates, the homeless, and the indigent (Lange et al., 2013). I followed practices of responsible research by informing the research participants of the purpose of the study, their rights as participants, and the protection of their privacy. These were best practices of ethical research (Mouton, Malan, Kimppa, & Venter, 2015). Anonymity was the primary

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protection for participants in this study. There was no need for any identifying information in this study.

Participants were not required to participate in this study. No attempt was made to get participant names or other identifying information on the survey. I informed participants that they could withdraw from the study at any time by sending me an e-mail, even those with a completed survey. I destroyed surveys from any participants who opted out of the study.

Acquiring informed consent is a requirement for participation in social science research (Hernández, Nguyen, Casanova, Suárez-Orozco, & Saetermoe, 2013). I provided each participant with a consent form outlining the conditions of participation. Informed consent also aids participants in deciding to engage in the study (Drazen, Solomon, & Greene, 2013). Protection of participant rights was a primary reason that consent forms are used (Rowbotham, Astin, Greene, & Cummings, 2013). Clancy, Balteskard, Perander, and Mahler (2015) used written consent forms in a study on fall prevention. I expected professional project managers would not have any issues that would prevent giving their informed consent. I am maintaining all data in a password-protected cloud-based database for not less than five years. It was not necessary to collect personally identifiable information for this study.

Data Collection Instruments

The project success assessment questionnaire (PSAQ) (see Appendix A) was used to measure project success, the criterion variable. The PSAQ was developed by Shenhar,

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Dvir, Levy, and Maltz (2001) to identify the characteristics and constructs of project success. Shenhar et al. developed PSAQ in 2001 to provide a multidimensional framework for measuring project success. Five dimensions of project success were identified: project efficiency, impact on the customer, impact on the team, business and direct organizational success, and preparing for the future.

I selected this instrument because of its use in other research studies. PSAQ was developed and used in the Shenhar et al. (2001) study. Nwagbogwu (2011) used PSAQ in his dissertation and, Palcic and Buchmeister (2012) made use of PSAQ in their research. I used the PSAQ to measure the dependent variable.

The PSAQ has a high Cronbach alpha average score of .905 across the dimensions of the survey (Serrador & Turner, 2014). This high Cronbach alpha supports the reliability of PSAQ as a measure of project success. Internal validity, which is concerned with causal relationships, was not addressed in this study. The use of the PSAQ in other studies, identified in the previous paragraph, confirms its construct validity for measuring project success.

The PSAQ is a survey-based instrument that measures the construct of project success. Project managers accessed the survey using an online survey distribution system called SurveyMonkey®. Survey participants chose responses from a 4-point Likert scale with 1 being “strongly disagree” to 4 being “strongly agree.” This scale was appropriate because it measures the criterion value on the dimension of project efficiency, which are time, cost, and scope. Four questions assess project efficiency: a) project completion on

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time or earlier; b) project completion within or below budget; c) minor changes in the project; and d) achievement of other efficiency measures.

The collected data were ordinal as typical for Likert scale surveys. Responses generated a composite score for each question. The composite score of each respondent measures project efficiency or success. A composite score of 4 indicates the respondent rated the project as unsuccessful. Likewise, a composite score of 16 indicates the respondent rated the project as successful. This scale was appropriate for the current study because it measures project success as defined for this study.

Javani and Rwelamila (2016) created a risk management questionnaire (RMQ) for their research on the use of risk management in IT projects. The survey (see Appendix B) was created in 2014 and was used to measure the predictor variables in this study. Javani and Rwelamila provided permission (see Appendix C) to use their survey, which measured three dimensions of risk management in the survey: risk management as a knowledge base, risk management in current projects, and risk management, and project clients. The Javani and Rwelamila study was only the second time for the instrument's use.

Javani and Rwelamila (2016) distributed 130 surveys to a population of 500 South African public sector employees. The return rate of surveys was 102 or 78% response rate. Javani and Rwelamila assessed the reliability of the survey using Cronbach's alpha. Overall, Cronbach's alpha for the risk management dimensions was 0.887. The cutoff level for the threshold of construct reliability is 0.70 (Schmitt, 1996). Javani and

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Rwelamila assessed the validity of the survey constructs using exploratory factor analysis.

The Javani and Rwelamila survey was delivered simultaneously with the PSAQ to the study sample of project managers using an online survey distribution called SurveyMonkey®. Survey participants chose responses from a 5-point Likert scale and yes/no responses. Section C on risk management in current IT projects includes 15 questions on the application of risk management. There was a question for each predictor variable, which makes this survey appropriate for this study. Also, question 21 was: Risk management has an impact on IT project success. This question was the cornerstone of my survey.

The collected data for the risk management survey was ordinal and nominal. The composite score of each respondent measures the application of risk management. A composite score of 11 indicates the respondent rated the use of risk management low. Likewise, a composite score of 55 indicates the respondent rated high usage of the risk management process. This scale was appropriate for the current study because it measured the application of risk management as defined for this study.

Data Collection Technique

The PSAQ and the RMQ (see Appendices A and B) were used to collect data. The distribution medium was SurveyMonkey®. SurveyMonkey® is a third-party commercial tool for the creation, distribution, and analysis of surveys (Anderson, 2014; Herreid, Schiller, Herreid, & Wright, 2014; Nwagbogwu, 2011). I made a link to the survey and

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consent form available on LinkedIn, a professional social networking platform that has been used by other quantitative studies (Badewi, 2016; Serrador & Pinto, 2015). Participation in the study was voluntary, and consent was acknowledged by clicking on the link to the survey. The link to the survey was made available to PMI Washington, DC chapter. The initial timeframe for completing the survey was two weeks with a reminder post after one week.

Online distribution of surveys permit an objective approach to data collection (Bhattacherjee, 2012) and is appropriate for quantitative studies. I stored the collected data on an encrypted hard drive in a password-protected folder and kept the drive in my home office. I am the only person with access to the data.

Advantages of online surveys are their efficiency, low cost of distribution, speed of collection, and administration (Gill, Leslie, Grech, & Latour, 2013). Participation in online surveys can be affected by the technical skills of subjects and the availability of computer equipment (Szolnoki & Hoffmann, 2013). Another disadvantage is low completion if the respondents perceive the survey as too long or lose interest (McPeake, Bateson, & O'Neill, 2014). I did not conduct a pilot study before Institutional Review Board approval because of the time factor involved and the identification of existing instruments. I was also able to find survey instruments to measure the variables in the study that had been used in other research.

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Data Analysis

The research question was analyzed using multiple linear regression. The question stated in the MLR form reflects the variables of the study. The question I addressed in this study was: Was there a relationship between risk identification, risk response, and project success? Risk identification and risk response were the predictor variables, and project success was the criterion variable.

The hypotheses for this correlation study are listed below:

Null Hypothesis (H_0): There is no statistically significant relationship between risk identification, risk response, and project success.

Alternative Hypothesis (H_1): There is a statistically significant relationship between risk identification, risk response, and project success.

I associated the identification of risk and responses to risks with the EUT decision theory. To answer associational questions about two or more variables, a statistical analysis called correlation is used. Pearson's product-moment correlation (r) measures the strength and direction between two variables (Chen, 2012). However, for this study, I want to go beyond simple correlations or covariation between two variables to predictive analysis of the data. For this reason, multiple linear regression (MLR) was used to address whether there is a predictive relationship between the predictor variables and the criterion variable. Pandis (2016) stated when there are two or more predictor variables in a study; multiple regression statistical analysis can be used. Multiple regression was well

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suited to answer research questions that explore the influence of a set of variables on a single dependent variable (Casson & Farmer, 2014; Nathans, Oswald, & Nimon, 2012).

This study design was a single group, non-experimental approach. The study's design and the research question eliminate statistical analyses more suited for experimental and quasi-experimental studies that compare groups and attempt to establish causality. For example, researchers use analysis of variance (ANOVA) or t-tests in studies to compare groups on select variables before and after an intervention (Aguinis & Bradley, 2014). A condition of experimental and quasi-experimental studies is that the intervention is under the control of the researcher (Aguinis & Bradley, 2014). Controlling independent variables is a characteristic of experimental and quasi-experimental studies research (Deck & Smith, 2013).

Data Cleaning and Screening

An online survey was used to collect data. Data collected through surveys is the most common form of data collection due to the speed, efficiency, and lower cost of capture (DeSimone, Harms, & DeSimone, 2015). However, these advantages can lead to poor quality and untrustworthy data when survey participants do not provide all the data in completing surveys (Barratt et al., 2015). Data screening and cleaning techniques can be used to improve data quality by identifying missing data and outliers. DeSimone et al. identified three methods of data screening: direct screening, archival, and statistical. Direct and archival methods embed questions in the survey tool to find patterns of response that indicate a lack of attention in completing the survey. These methods are not

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available to me as I did not create the survey instruments. A statistical approach of timing the completion of the survey may provide insight into how much attention the respondent applied to answering the questions.

Missing data is an aspect of data screening with implications for the quality of the data. Missing data can reduce statistical power if there is considerable missing data (Roda, Nicolis, Momas, & Guihenneuc, 2014). Some researchers exclude surveys with missing data (Button et al., 2013). I excluded surveys with missing data from the analysis.

I used SPSS 25.0 statistical software for data analysis. SPSS is a widely used tool for quantitative data analysis (Bhattacherjee, 2012). SPSS is also integrated with SurveyMonkey to facilitate data importation from the survey (Gill et al., 2013). SPSS has an extra benefit of providing functionality such as EXPLORE for checking normality and missing data (Hayes & Preacher, 2014).

Assumptions of MLR

Four common assumptions of MLR are linear relationship, multivariate normality, low or no multicollinearity, and homoscedasticity (Martin & Bridgmon, 2012). Violation of these assumptions degrades the findings and validity of the study. Clarification of each of the assumptions was spelled out in the following paragraphs.

The relationship between the independent variable and the dependent variable (DV) is required to be a straight line (Kim & Lee, 2014). I tested for the linearity of the relationships between predictor and criterion variables with a scatter plot. Violations of

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linearity jeopardize the predictive quality of the research findings. Transformations of the data may be used to deal with nonlinearity (Spiller, Fitzsimons, Lynch Jr., & McClelland, 2013).

Normal distribution of data indicates multivariate normality. I tested this assumption using the goodness of fit test, Kolmogorov-Smirnov (Martin & Bridgmon, 2012). The assumption of normality is essential to statistical conclusion validity, which judges relationships between variables (Cor, 2016).

The assumption of multicollinearity is that there is no interdependency between the independent variables (Zainodin & Yap, 2013). A correlation coefficient of greater than .08 indicates a correlation between the IVs (Alcock, Vanicek, & O'Brien, 2013; Chen, 2012). A correlation matrix shows the correlation coefficient between two variables (Bosco et al., 2015). The independent variables must not have a high correlation with each other (Nathans et al., 2012). If the dataset is cross-sectional, as opposed to longitudinal, multicollinearity is assumed (Chen, 2012).

Homoscedasticity requires the variance between the independent variable and the dependent variable be the same across values of the independent variables. A scatter plot can also be used to show that the variance is equal along the regression line. Homoscedasticity can also be tested using the Bartlett test

I evaluated the data for the presence of violations of the assumptions identified in the preceding paragraphs. Transformations of data are a recognized approach for data that violate linearity, multicollinearity, and normality (Hassan, Farhan, Mangayil, Huttunen,

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& Aho, 2013; Rucker, McShane, & Preacher, 2015; Zainodin & Yap, 2013). I followed the method of data transformation in the event of MLR data violations. Square root conversions of data are used to correct for data that do not meet the homoscedasticity assumption (Yuan & MacKinnon, 2014). I used this method for the homoscedasticity violation.

Interpretation of Inferential Results

Inferential statistics were used to analyze the data. Inferential statistics tests a null hypothesis that is rejected or not based on the findings of the study (Na, Yang, Bae, & Lim, 2014). I interpreted the results of this study based on the strength of the relationship between the predictor and criterion variables. In multiple linear regression studies, the combined score of the independent variables was used to predict the dependent variable (Nathans et al., 2012). Multiple R^2 reflects the combined score of the predictor variables. A high multiple R^2 approaching +1 should be interpreted as a strong relationship between the predictor and criterion variables (Alcock et al., 2013).

Study Validity

In this quantitative study, I tested a hypothesis about the relationship between risk management and project success. The validity of the research design and methods used in the research supported the integrity of the findings from the research. The importance of research validity in quantitative studies focuses on the generalizability of the research findings. Bhattacherjee (2012, p. 35) identified four research design characteristics: external validity, internal validity, construct validity, and statistical conclusion validity.

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External Validity

External validity refers to the generalizability of the findings (Barratt et al., 2015; Cor, 2016; Yilmaz, 2013). Another term for generalizability is the treatment effect, defined as the ability of a treatment to transfer across models (Henderson, Kimmelman, Fergusson, Grimshaw, & Hackam, 2013). Valid survey instruments were used on a large sample of project managers across a three-state geographical region to support generalizability. The sample size has been calculated using the G* Power analysis tool. A threat to external validity for this study was the limited scope of the geographical area of the survey. I do not claim generalizability of the findings of this study beyond this geographical area. A caution related to online purposive sampling used in this study was that unknown biases threaten generalizing to broader populations (Barratt et al., 2015).

Internal Validity

Internal validity threats to validity are factors that undermine the findings of the research (Henderson et al., 2013). If the findings of the research are not reliable, the research provides no value to the research domain. I collected data from a sample size sufficient to obtain reliable findings. Internal and external validity are subject to sample size adequacy (Uprichard, 2013). I used a correlational design for this study, which obviates the threat of internal validity.

Statistical Conclusion Validity

Statistical conclusion validity assesses whether the conclusions of a study based on particular statistical processes are valid (Bhattacherjee, 2012). Empirical studies based

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on hypotheses testing can produce Type 1 or Type 2 errors. In the absence of a sufficient sample size, a finding of a false negative (Type I error) or false positive (Type II error) could result (Button et al., 2013). For this study, a G*Power analysis found that a sample size range of 68 and 146 was an appropriate size for the study. I used linear multiple regression statistics with a medium effect size of $f^2 = .15$. This a priori analysis justifies a sample size that has statistical power to control for Type I and Type II errors (Amiri et al., 2014).

I do not make any claims that this study can be generalized to larger populations or in different settings. The sample size was constrained to a small geographical area. Also, control of unknown biases in the purposive sample threatens generalization to a larger population (Uprichard, 2013).

Transition and Summary

Section 2 started with a re-statement of the purpose of the research. The researcher is essential in social science research, so I included a discussion on the crucial role of the researcher. Further, I discussed the criteria for the selection of the study participants. This section identifies the research method and design used in the study. This study was a quantitative, correlational study of the role of risk management in project success. I cover the population of the study and the sampling approach used to identify the estimated number of participants for multi-linear analysis. I included information on ethical research and how I would implement best practices of ethical research in my study. I discussed data collection instruments, techniques, and analysis. I

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concluded the section with a review of external, internal, and statistical conclusion validity.

Section 3 presented the findings of the research and how these findings apply to professional practice. I discussed implications for social change and the actionable form those social changes could. I reflected on my research experience and my recommendations for future research. Finally, I ended with a conclusion of the study.

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Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. The independent variables were risk identification and risk response. The dependent variable was project success. The sample size for two independent variables was calculated using G* Power arriving at a minimum sample of 68 respondents.

I used an anonymous electronic survey to collect data from project managers and analyzed the data using multiple linear regression. The null hypothesis was not rejected, and the alternative hypothesis was rejected. The linear combination of risk identification and risk response did not significantly predict project success. Risk identification was a statistically significant predictor of project success at $p < .02$.

Presentation of the Findings

The following is a discussion about the testing of the assumptions, descriptive statistics, inferential statistics results, a theoretical discussion of the findings, and a concise summary. I employed bootstrapping, using 2,000 samples to address the possible influence of assumption violations. Thus, bootstrapping at 95% confidence intervals are presented when appropriate. I used simultaneous multiple linear regression, $\alpha = .05$ (two-tailed), to test the prediction model of risk identification, risk response, and project success. The software used for this study was SPSS version 25.

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Participants were recruited using LinkedIn, a professional social media platform. I used SurveyMonkey™ to create a survey consisting of sections on risk management and project success. I distributed the online survey to the local chapter of an international project management association, PMIWDC, the largest chapter of the Project Management Institute. A parametric assumption of the use of MLR is an appropriate sample size. A G*Power analysis calculated a minimum sample of 68 and a maximum of 146 respondents to achieve statistical power between 80 and 99%. I received 81 responses, of which I used 71 completed surveys.

Hypotheses are formal, empirical statements of the relationship between variables (Bhattacherjee, 2012). I tested the following hypotheses using MLR in this study:

H_0: There is no statistically significant relationship between risk identification, risk response, and project success.

H_1: There is a statistically significant relationship between risk identification, risk response, and project success.

I initiated data analysis with preparation and cleaning of the data in Excel before importing it to SPSS. In addition to demographics and risk practices, the survey collected data on time, cost, and scope, the components of project success. I created a single composite variable for the dependent variable. I removed 10 surveys with missing data for the independent and dependent variables.

Before running the MLR, researchers conduct several statistical tests to ensure that data does not violate the assumptions of multivariate analysis (Osborne & Waters,

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2002). To satisfy the assumption of adequate sample size, I collected data until there were enough cases to meet the required sample size. Anonymous surveys distributed on LinkedIn were collected until I received the needed sample size.

The coronavirus pandemic and social unrest in the geographical location of the study slowed data collection. Numerous reminders were sent to the study population to take the survey. Ultimately, the most reliable collection method was direct messaging to the search results in LinkedIn for target sample members. A Durbin-Watson statistic of 2.307 indicated the independence of survey observations. The closer the statistic is to 2 means the absence of a relationship between survey responses (Hashim & Nawawi, 2014).

Tests of Assumptions

The assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were evaluated. Bootstrapping, using 2,000 samples, enabled combating the influence of assumption violations. I tested for multicollinearity (see Table 3) by using a bivariate correlation of the two independent variables. When independent variables are highly correlated, it is difficult to determine which variable contributes to the highest variability to the dependent variable (Baird & Bieber, 2016).

The multicollinearity assumption is that independent variables cannot be highly correlated (Baird & Bieber, 2016). If the correlation coefficient between independent variables is ≥ .9, the individual contribution to the criterion variable cannot be

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determined. The correlation of r = .639 between the independent variables did not violate the assumption.

Table 3

Multicollinearity Coefficients

		RMId	RMRsp
Risk Identification	Pearson Correlation	1	.639
Risk Response	Pearson Correlation	.639	1

Note. *N = 71*.

Another method for testing multicollinearity in SPSS is to regress the independent variables and test for collinearity. The test results provide a variance inflation factor (VIF), as shown in Table 4. A high correlation between the independent variables indicates that their contribution to the criterion variable cannot be discerned. A VIF of one indicated the multicollinearity assumption was met (Alcock et al., 2013).

Table 4

Multicollinearity Statistics

Variable	Tolerance	VIF
Risk Identification	.592	1.690
Risk Response	.592	1.690

Outliers, normality, linearity, homoscedasticity, and independence of residuals were evaluated by examining the normal probability plot (P-P) of the regression

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standardized residuals (Figure 1) and the scatterplot of the standardized residuals (Figure 2). The examinations indicated there were violations of homoscedasticity and normality. The tendency of the points to deviate from the straight line (Figure 2), diagonal from the bottom left to the top right, provides supportive evidence that the assumption of normality was violated. The lack of a clear or systematic pattern in the scatterplot of the standardized residuals (Figure 3) supports that the assumptions were not met. However, 2,000 bootstrapping samples were computed to combat any possible influence of assumption violations, and 95% confidence intervals based upon the bootstrap samples are reported where appropriate.

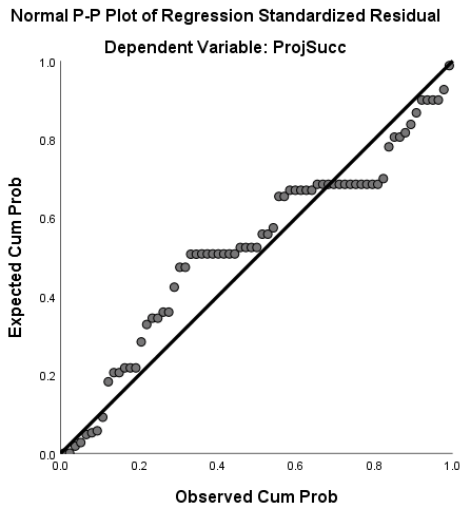

Figure 2. P-P scatter plot of project success.

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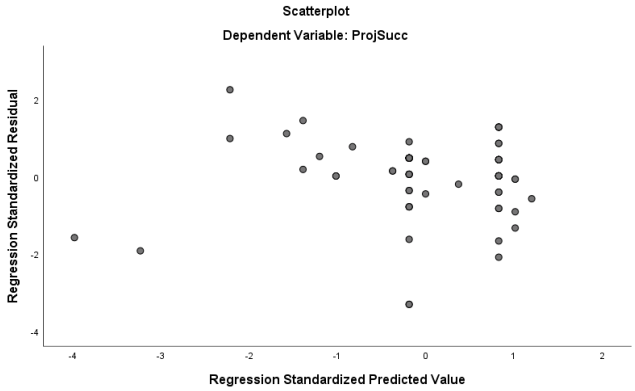

Figure 3. Scatter plot of standardized residuals.

Descriptive Statistics

I received 81 surveys. Ten of the surveys were eliminated due to missing data, resulting in 71 records for analysis. Table 5 includes descriptive statistics of the study variables.

Table 5

Means and Standard Deviations for Quantitative Study Variables

Variable	*M*	*SD*	Bootstrapped 95% CI (*M*)
Project Success	8.06	2.58	[7.44, 8.61]
Risk Identification	3.17	.93	[2.94, 3.37]
Risk Response	3.08	1.038	[2.83, 3.31]

Note. *N = 71*.

Inferential Results

Standard multiple linear regression, α = .05 (two-tailed), was used to examine the efficacy of risk identification and risk response in predicting project success. The

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independent variables were risk identification and risk response. The dependent variable was project success. The null hypothesis was that risk identification and risk response would not significantly predict project success. The alternative hypothesis was that risk identification and risk response would significantly predict project success. Preliminary analyses were conducted to assess whether the assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals were met. I found violations of homoscedasticity and normality. The model as a whole did not significantly predict project success, $F(2, 70) = 7.260$, $p < .001$, $R^2 = .18$. The R^2 (.18) value indicated that approximately 18% of the variation in project success is accounted for by the linear combination of the predictor variables (risk identification and risk response). In the final model, risk identification was statistically significant with project success ($t = 3.262$, $p < .002$), accounting for a higher contribution to the model than risk response ($t = -.568$, $p > .572$, which did not explain any significant variation in project success. The final predictive equation was Project Success = 4.557 + 1.301 (Risk Identification) -.202 (Risk Response).

Risk identification. The positive slope for risk identification (1.301) as a predictor of project success indicated there was about a 1.301 increase in project success for each one-point increase in risk identification. Therefore, project success tends to increase as risk identification increases. The squared semi-partial coefficient (sr^2) that estimated how much variance in project success was uniquely predictable from risk identification was .368, indicating that 14% of the variance in project success is uniquely

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accounted for by risk identification when risk response is controlled. Table 6 illustrates the regression summary table.

Table 6

Regression Analysis Summary for Predictor Variables

Variables	*B*	*SE B*	*β*	*t*	*p*	*B* 95% Bootstrap CI
Risk identification	1.301	.399	.467	3.262	-.02	[-.092, 2.037]
Risk Response	-.202	.355	-.081	.568	.572	[-.798, .698]

Analysis summary. The purpose of this quantitative correlational research was to examine the relationship between risk identification, risk response, and project success. I used standard multiple linear regression to examine the ability of risk identification and response to predict the value of project success. Assumptions surrounding multiple regression were assessed with homoscedasticity and normality noted as violations. The model as a whole, $F(2, 70) = 7.260$, $p < .001$, $R^2 = .18$, did not significantly predict project success. Risk identification provided useful predictive information about project success, but risk response did not. The conclusion from this analysis is that risk identification is associated with project success, even when risk response is controlled (e.g., held constant).

Theoretical conversation on findings. I chose expected utility theory as the theoretical framework for this study. Project risk management has been conceptualized as a rational decision-making process (Didraga, 2013; Moeini & Rivard, 2019b). Expected

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utility theory is a theory of decision-making under conditions of uncertainty and is considered the underpinning of project risk management (E. Kutsch & Hall, 2005). Two of the primary decisions project managers make are the identification of risk and the responses to those risks. A central assumption of EUT is that the decision-maker is rational. Project managers engage in decision-making to identify risk and responses to risk (Sato, 2014). The project manager uses the Axioms of EUT to identify risks and responses and assigns a weighted utility to each risk (E. Kutsch & Hall, 2005). The risks and responses with the highest probability have the most significant impact on project success, defined as time, cost, and scope.

The findings of this study were consistent with Didraga's (2013) results, where two hypotheses were tested. The two hypotheses were divided into 16 sub-hypotheses. All but two of the hypotheses were rejected. As in this study, risk response planning was rejected in Didraga's study. Kutsch and Hall (2005) suggested that identifying risks may receive more attention than resolving risks. They also suggested that intervening conditions that affect the application of risk management are not explained by EUT.

Applications to Professional Practice

This quantitative, correlational study examined the relationship between risk identification, risk response, and project success. The independent variables were risk identification and risk response. The dependent variable was project success. The linear combination of the two independent variables resulted in a partial finding for a significant

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relationship between risk identification and project success. No relationship was found between risk response and project success. Based on this research, leaders in organizations can focus on risk identification as a path to project success. Although this study did not support risk response as a significant contributor to project success, I am not suggesting that this process should not be practiced. Organizational leaders should identify risks and use other risk management processes to respond to and mitigate risks to protect project performance. The specific business problem of this study is that project managers do not understand the relationship between risk identification, risk response, and project success. The findings of this study underscore the validity of that statement. Project managers may not know or understand how a decision-making theory, such as EUT, can be applied to risk management.

Implications for Social Change

The cost of project failure is high for organizations. Companies and organizations rely on projects to implement strategies to achieve goals (Löwstedt et al., 2018). When projects fail, companies lose competitive advantage (Javani & Rwelamila, 2016) and the ability to pursue new business. The ripple effect is the loss of people and the ability to attract new talent. The findings of this study can provide evidence-based support to project managers who want to use risk management to give their projects a higher chance to succeed.

Successful projects can result in jobs, innovative products and services, and lower prices to contribute to positive social change (Sirisomboonsuk et al., 2018). The jobs and

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opportunities that derive from successful companies can contribute to societal prosperity, well-being, and social justice. Successful companies are more likely to create a strong economy and low unemployment rates by providing opportunities for employment and social stability.

Recommendations for Action

I plan to disseminate the findings of my research and continue to conduct research in project management. I will also seek speaking engagements to have a more interactive forum to discuss these research results. I will continue to build my base of project managers on LinkedIn. During data collection, I found that LinkedIn is a vital social media community, and I will continue to reach out to project managers through this medium. My goal is to use this research's findings as a change agent for project risk management planning and practice.

A recommendation to action for organizations is for organizational leaders and project managers to identify and act on any risks that could negatively impact a project. Organizational leadership can require risk planning with particular emphasis on the threats existing in their field. Corporate culture can be designed to proactively respect the role of risk management in projects to ensure that project managers actively manage risks. Project managers can be encouraged to be open, vocal, and transparent about risks to ensure projects have the best chance for success.

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Recommendations for Further Research

Future research should focus on expanding to a larger target population and sample size. I would conduct the same study to cover a larger geographical area. The search function of LinkedIn allows for the recruitment of project managers throughout the United States. Limiting the sample size to a small geographic area is not necessary. More extensive sampling may provide a better normal distribution of the data because risk management practices may be geographically different. Targeting IT, project managers was another limitation of my study. Future iterations of this study could include project managers from other industries. The assumption of a rational decision-maker was a limitation of this research. Future research could consist of an instrument to test that assumption.

There are additional risk management processes that could be used to predict project success. Studying risk management processes in isolation may be counterproductive to understanding the impact of risk management on project success. The PMBOK of the Project Management Institute (Project Management Institute, 2017) lists risk mitigation and risk monitoring that might have a higher correlation with project success. These processes could replace the two independent variables used in this study for research on the impact of risk management on project success. An expanded study of all of the risk management processes regressed against project success may provide insight into which risk management processes significantly affect project success. It may also be useful to test attributes of project managers for their effect on the practice of risk

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management. More extensive research on uncertainty is a promising direction for future research. Risk management may become uncertainty management as executives and project managers seek a better understanding to operationalize the knowledge in the environments for implementing projects.

Reflections

The paper by Otniel Didraga (2013) influenced my decision to study risk management and project success. I am also a practicing risk and project manager and can anecdotally vouch for risk management positively contributing to project success. Opinions, however, do not replace research.

I am an advocate of risk management. My preference was for this research to show a strong, positive relationship between risk identification, risk response, and project success. This research did not find evidence of a relationship between the combined variables, but several factors may have contributed to that. Limiting the study to a geographic area may have affected the findings. Project managers in a geographic location may inadvertently adopt risk management behaviors as a result of job changes.

The years I have been involved in the DBA program have been a unique experience that I enjoyed. I found the DBA rubric to be a great asset and contribution to my progress. An aspect of the DBA program that I recommend for attention is the Internal Review Board, which I found frustrating because of the shortage of resources.

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I am a passionate practitioner of project management. The DBA experience has contributed to my expanded capability as a project manager. I gained knowledge, skills, and abilities beyond my reach if I had not stayed the course and completed this program.

Conclusion

The study of the performance of IT projects and the factors that lead to their success is essential to social and economic progress. During the COVID-19 pandemic, the rapid digital transformation of companies and organizations has prevented an even more significant economic effect than there could have been. IT has allowed a large number of employers to implement remote work programs. Business leaders quickly mobilized IT projects to provision employees with the tools and equipment to work from home. Some organizations undoubtedly failed in their efforts, but many others succeeded. Projects must have a clearer path to success. Achieving project success continues to be elusive, and a patchwork of trial and error approaches. There is too much at stake for this to continue. To support the success of all projects, I continue to work as a project management researcher.

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Appendix A: Project Success Assessment Questionnaire

Project Efficiency

The project was completed on time or earlier.

The project was completed within or below budget.

The project had only minor changes.

Other efficiency measures were achieved

Impact on the Customer/User

The product improved the customer's performance.

The customer was satisfied.

The product met the customer's requirements.

The customer is using the product.

The customer will come back for future work.

Impact on the Team

The project team was highly satisfied and motivated.

The team was highly loyal to the project.

The project team had high morale and energy.

The team felt that working on this project was fun.

Team members experience personal growth.

Team members wanted to stay in the organization.

Business and Direct Organizational Success

The project was an economic business success.

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The project increased the organization's profitability.

The project has a positive return on investment.

The project increased the organization's market share.

The project contributed to shareholder's value.

The project contributed to the organization's direct performance.

Preparing for the Future

The project outcome will contribute to future projects.

The project will lead to additional new products.

The project will help create new markets.

The project created new markets.

The project created new technologies for future use.

The project contributed to business processes.

The project developed better managerial capabilities.

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Appendix B: Risk Management Questionnaire

Section A - Demographics

1. Please select which best fits your job function or title

Group Executive	
Executive	
Senior Project Manager	
Project Manager / Specialist	
Operational Specialist: Projects	
Business Analysts	
Consultant	
Other: Specify	

2. Please indicate the number of years of experience you have in IT project management

1 - 5 years	
6-10 years	
11-20 years	
More than 20 years	

3. Please indicate the number of years of experience you have in risk management in IT projects

1-5 years	
6-10 years	
11-20 years	
More than 20 years	

4. Gender

Male	
Female	

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Section B - Risk Management as Knowledge Base

To what extent do you agree or disagree with each of the following. 1 = Strongly Disagree (SD); 5 = Strongly Agree (SA)

	SD	D	N	A	SA
1. Risk management as a knowledge base is important in IT projects.					
2. Risk management as a knowledge base assists in mitigating risks in IT projects.					
3. In our organisation there are databases containing information on risk management in IT projects.					
4. In our organisation, there are tools for managing knowledge of risk management in IT projects.					
5. In our organisation, knowledge of risk management in IT projects is readily available.					
6. Knowledge sharing on risk management in IT projects is important.					
7. Knowledge sharing assists in identifying IT project risks.					
8. Knowledge sharing on risk management increases the chances of IT project success.					
9. Knowledge sharing on risk management in IT projects accelerates the relationship between project clients and project team.					
10. Knowledge pertaining to risk management in IT projects needs to be managed centrally.					

Section C - Risk Management in Current IT Projects

To what extent do you agree or disagree with each of the following. 1 = Strongly Disagree (SD); 5 = Strongly Agree (SA)

	SD	D	N	A	SA
11. In our organisation, risk management is practised on every IT project.					
12. In our organisation, risk management is done taking a systematic approach on IT					
13. In our organisation, we use an internally developed risk procedure on IT projects.					
14. In our organisation, risk management on IT projects is done internally.					
15. At the commencement of each IT project, a full risk assessment is done.					

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Appendix C: Permission to Use Risk Management Questionnaire

marsha.marinich@waldenu.edu

From: Blessing Javani <javanib@yahoo.com>
Sent: Monday, April 17, 2017 2:44 PM
To: Marsha Marinich
Subject: Re: Survey in Risk Management in IT Study

Good day Marsha,

In light of your request, permission is granted for you to use the survey instrument for your Doctoral studies at Walden University.

As an international practice, I therefore request that you acknowledge me as the originator of the instrument.

All the best with your Doctoral studies.

Kind Regards
Blessing Javani

On Monday, April 17, 2017 12:13:42 AM, Marsha Marinich <marsha.marinich@waldenu.edu> wrote:
Dr Blessing,

I am a Doctoral Student in the School of Business and Management at Walden University.I am also doing research in risk management and my doctoral study is "The Effects of Risk Management on Project Success". In my quantitative study, I am investigating the relationship between project success and the sub processes in the the risk management process.

As I was reading your paper on risk management, I was excited to see the survey at the end of the paper. It is perfect for the survey tool for my research. I will be using SurveyMonkey to distribute a survey to project managers. I am working with the Washington DC chapter to see if I can distribute the survey the chapter members.

I are requesting permission from you and Dr Rwelamila to use and upload the survey you developed to SurveyMonkey. Your permission to use your survey is required by Walden University. I would be so grateful if you would reply to my e-mail with your permission to use your survey so I can complete my dissertation.

Thank you for your consideration

--
Marsha

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www.manaraa.com

Appendix D: Permission to Use Project Success Assessment Questionnaire

DvirD@som.bgu.ac.il

Mon 2/10/2020 5:03 AM

To: Marsha Marinich

Dear Marsha,

You can use the survey.

Dov Dvir

From: Marsha Marinich <marsha.marinich@waldenu.edu>

Sent: Monday, 10 February 2020 6:08

To: Dov Dvir

Subject: Request to use the Project Success Assessment Questionnaire (PSAQ)

Dr Dvir,

I am a Doctoral Candidate in the School of Business and Management at Walden University doing research in project and risk management. In my quantitative study, I am investigating the relationship between project success and the sub processes in the the risk management process.

I are requesting permission to use the PSAQ to measure project success. I would be so grateful if you would reply to my e-mail with your permission to use your survey so I can complete my dissertation. I hope I have used the correct e-mail for you and look forward to hearing from you.

Thank you for your consideration

www.manaraa.com

Marsha

Marsha Marinich, PMP

Doctoral Candidate, Doctor of Business Administration

Walden University

www.manaraa.com