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Strategic Alignment of Information Technology Projects and Project Success

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Abstract

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MBA, University of Phoenix, 2002

BS, Arizona State University, 1998

Doctoral Study Submitted in Partial Fulfillment

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Abstract

Alignment of information technology (IT) projects remains a concern for business executives and negatively impacts IT investments through failed projects. Drawing from the theory of systems thinking and the concept of holism, the purpose of this correlational study was to provide executive leaders with information about influences associated with the independent variables of project alignment and performance outputs, and the dependent variable, project success rates. Accordingly, the research question addressed the relationship between the 2-predictor variables and the outcome variable. Data collection involved a nonprobability, purposive sample of 49 credentialed project managers from Arizona who completed an online survey. Results from multiple linear regression analysis indicated statistically significant relationships between the predictor variables (F (2, 46) = 111.08, $p < .001$). The regression model predicted 82% of the variation resulted from the independent variables. The study's findings provide corporate leaders with a better understanding of project alignment, performance outputs, and project success rates from the operations perspective of project management professionals who contribute to the organization's competitive advantage through the implementation of strategic IT projects. The positive social change implications of this study include increased organization benefits, such as substantiated IT investments and higher profits. Increased project success rates substantiate IT investments through improved customer satisfaction and financial performance. Improved financial performance leads to higher profits, which leads to higher wages. Higher wages contributes positively to society-at-large through an enhanced quality of life.

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Dedication

Jesus is Lord! I will lift up mine eyes unto the hills, from whence cometh my help (Psalm 121:1). My help cometh from the Lord, which made heaven and earth (Psalm 121:2). Giving all glory and honor to God, Jesus Christ who provided physical and mental strength, time, funding, perseverance, and people of encouragement during this challenging journey. God is my Strength and Power (2 Samuel 22:33). Without God, I can do nothing. Further, dedication of this dissertation acknowledges the love of my family. I thank my daughter, Yumeka Rhodes, who supported me throughout this experience with encouragement, belief, love, and numerous instances of solitude needed for critical thinking and conducting research. I thank my sister, Linda Ross, whose own doctoral journey opened the door to this opportunity of continued learning, professional growth, and an experience of personal capability and enhanced confidence. Thank you.

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Section 1: Foundation of the Study

In this study, I examined the relationship between project alignment, performance outputs, and project success rates. Projects represent a primary element in the design and execution of corporate strategies, expose optimal value from investments, and provide the mechanisms for change needed to achieve competitive advantage (Sheykh, Azizi, & Sobhiyah, 2013; Too & Weaver, 2014). Less than one-third of information technology (IT) projects result in a business benefit (Young, Young, Jordan, & O'Connor, 2012). Additionally, misalignment between IT projects and business strategy contributes to 30% of all project failures (Alsudiri, Al-Karaghouli, & Eldabi, 2013). The definition of project serves as an indicator that projects differ in context (Chih & Zwikael, 2015; Klein, Biesenthal, & Delhin, 2015) necessitating new approaches to thinking about project success.

IT strategic alignment remains a key concern for business executives (Vermerris, Mocker, & van Heck, 2014; Walsh, Renaud, & Kalika, 2013). Findings from this study may contribute to existing business practice by providing business leaders with the capability to select and implement strategic IT projects based on project alignment attributes and organizational performance outputs. Such capability may improve the success rates of business and industry projects and reflect positively on IT investments.

Background of the Problem

Project success and failure represent an important consideration for organizational success, growth, and competitiveness (Chillingworth, 2015; Patanakul, Shenhar, & Milosevic, 2012). Current research contributions to project success mirror the iron

triangle of cost, schedule, and quality. However, project success represents a much broader concept than this triple constraint, highlighting the need for success measures associated with business outcomes (Alsudiri et al., 2013).

Creating value from projects requires linking to the corporation's business strategy. The achievement of alignment between the organization's strategic goals and the project is critical to the organization's competitiveness and performance (Chillingworth, 2015). My search through current literature revealed misalignment between projects and business strategy and organizational goals contributes to 30% of all project failures as this misalignment contributes to wasted financial assets of IT investments (Alsudiri et al., 2013). In a study conducted by Chillingworth (2015), the researcher revealed project investment decisions failed to reflect the favorable alignment of the considered project to organizational strategic goals. Often the lack of attention to the scope of project alignment with the firm's objectives precludes the possibility of project success and negatively affects organization performance targets (Chillingworth, 2015).

The alignment concept characterizes an integration of organizational, business, and well-designed strategies that reflect all functions of the organization working to achieve a central goal or objective (Alsudiri et al., 2013). Alignment of project and program management and business strategy require exposing hidden management ideologies and practices unique to the organization that informs the structure, context with the inclusion of strategic formulation, and implementation (Ritson, Johansen, & Osborne, 2012). IT projects as complex adaptive systems (CAS) require a broader, more

comprehensive set of outcome success processes (Muller & Jugdev, 2012), making systems thinking an important concept in project implementation (Sheffield, Sankaran, & Haslett, 2012) and success.

Problem Statement

Less than one-third of IT projects result in a business benefit (Young et al., 2012). Misalignment between IT projects and business strategy contributes to 30% of all project failures (Alsudiri et al., 2013). The general business problem was some IT business leaders are impacted negatively by investments in IT projects that fail to align with organizational goals. The specific problem was some IT business leaders have limited information about the relationship between project alignment, performance outputs, and project success rates.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between project alignment, performance outputs, and project success rates. The independent variables were project alignment and performance outputs, and the dependent variable was project success rates. The targeted population was comprised of 157 project managers in strategic planning roles from the state of Arizona. Integration of the two independent variables at the operational level may increase project success rates, which in turn, substantiates investment capital expended on IT projects and contributes to positive social change through the reduction of failed IT projects, increased stakeholder satisfaction, and enhanced competitive advantage locally and globally.

Nature of the Study

In this quantitative study, I examined the relationship between independent and dependent variables. The core of quantitative research involves examining and measuring how variables change, interact, or relate to one another (Yilmaz, 2013) making the quantitative method appropriate for this research study. Conversely, the qualitative research approach was inappropriate for this study because it is best used when investigating a unique event or phenomenon that requires understanding people's perceptions of the incident (see Fassinger & Morrow, 2013; Shelton, Smith, & Mort, 2014). The research question under investigation negated the use of the qualitative method, thereby also making the mixed methods approach inappropriate for this study (see Yilmaz, 2013).

The correlational design I chose for this study signaled my intent to establish a relationship between two or more variables. Variables, within the correlational design, are not manipulated, only measured (Cokley & Awad, 2013), making the design appropriate for this study. Experimental and quasi-experimental designs negate random selection through control or manipulation of variables (Bettany-Saltikov & Whittaker, 2014) which was not reflective of my goals with this study.

Research Questions and Hypotheses

The central research question was: What information do IT business leaders need to understand the relationship between project alignment, performance outputs, and project success rates? To examine the relationship between independent variables of

project alignment and performance outputs relative to the dependent variable project success rates I developed the following research question and associated hypotheses:

RQ1: What is the relationship between project alignment, performance outputs, and project success rates?

$H_0$1: There is no statistically significant relationship between project alignment, performance outputs, and project success rates.

H*a*1: There is a statistically significant relationship between project alignment, performance outputs, and project success rates.

Theoretical Framework

The theoretical framework I used in this quantitative study encompassed systems thinking. Systems thinking originated from the general theory of systems advanced by von Bertalanffy in the 1940s (Laszlo & Krippner, 1998). Systems theory, the transdisciplinary study of phenomena complexity, focuses on the relationships between the individual parts that connect and make up the whole and represented as a system (Ing, 2013). The framework of systems thought revolves around the premise that similar to natural systems, social systems or human activity systems exchange matter and energy making the complex and dynamic interactions and interrelationships of people and organizations understandable for solving complex problems (von Bertalanffy, 1972).

Systems thinking is an application of seeing wholes and focuses on relationships instead of parts, underscores the interactions of lower elements of a system, and represents an approach to problem solving (Monat & Gannon, 2015). The components of holism, interrelationship, interconnectedness, and emergence represent four key concepts

of this study (see Checkland, 2012). My use of systems thinking concepts in this study involved considering both the parts and the whole and reflected a holistic method aimed at understanding how aligned IT projects, as subsystems, affect organization performance. Understanding the interrelationships and interconnectedness concepts of systems thinking serve to promote collective intelligence for problem-solving (Checkland, 2012). Emergence properties, a form of system behavior, underscores the organizational system's ability to adapt for goal achievement of IT project alignment, the generation of organizational performance outcome measures, and project success.

Operational Definitions

Project alignment: The strategic alignment of projects to organizational goals from the operational level of day-to-day operations and IT departments (Vermerris et al., 2014).

Strategic alignment maturity model (SAMM): Six measures of communication, value, governance, partnership, technology scope, and skills developed to assess the strategic alignment maturity of organizations (Luftman, 2003).

System knowledge: The understanding of dynamic interactions between all of the systems' parts, including human and technological aspects (Sheffield et al., 2012).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions represent items that may affect the researcher's understanding of the study (Lips-Wiersma & Mills, 2014). I identified five assumptions that I held concerning this study. First, the adequacy of the literature review portrayed the study's objectives

accurately. My second assumption was that the research instrument of an online survey appropriately addressed concerns of participant privacy and autonomy. Another assumption was that the number of members within the identified groups was suitable for response saturation. Fourth, the selected instruments appropriately aligned to the research method and design of the study and represented adequate tests for addressing the purpose of the study. My final assumption was that the selected data collection instruments properly aligned to the objectives of the study.

Limitations

Limitations represent factors beyond the researcher's control (Brutus, Aguinis, & Wassmer, 2013). There were two limitations of this study. The first limitation involved the exclusion of other project success factors. The second was that study participants were not representative of all possible participants.

Delimitations

Delimitations affect the study's scope (Fan, 2013). One delimitation of this study was the limited population of credentialed project managers employed within the state of Arizona. A second delimitation of the study involved the purposeful nonprobabilistic sampling strategy I employed consisting of credentialed project managers from a LinkedIn group. As such, study results may only apply to the identified LinkedIn group as opposed to credentialed project managers from other groups or populations. Additionally, the alignment literature I reviewed focused on alignment at the organizational and executive levels of decision-making. Another delimitation involved

the fact that the study results were based on alignment feedback from project managers involved in the operational level, day-to-day activities of their companies.

Significance of the Study

The results of this study are of value to businesses through their ability to aid in the potential improvement of project success rates of strategic projects. Understanding the relationship between alignment attributes and performance outputs may provide new critical success factors or substantiate IT investments, thereby aiding business leaders in the evaluation and selection of projects that exhibit a greater chance of success. Information provided within this study could enhance business leaders' knowledge about alignment and performance output methods, strategies, and developments that aid decision-making and improve business performance attributable to competitive advantage.

Contribution to Business Practice

The results of this study may increase project success rates through sharing the insights gained on the interconnectedness of project attributes and performance outputs versus traditional scoring methods that align projects with project portfolio management. Currently, little research exists in aligning projects to organizational goals based on performance outputs. Insights from this study may help corporate leaders define criteria based on project and organizational context reflective of desired business outcomes (see Alsudiri et al., 2013). The results of this study may contribute to business practice by providing business leaders with the capability to select and implement strategic IT projects based on project alignment attributes and organizational performance outputs.

Such capability may improve business and industry IT project success rates, reflect positively on the funding of IT investments, and enhance stakeholder satisfaction.

Implications for Social Change

IT strategic alignment remains a key concern for business executives (Vermerris et al., 2014; Walsh et al., 2013). The continued high failure rates of IT projects indicated a need for attention to strategic alignment at varying business and organizational levels. The results of this study reinforced the argument that project alignment at the operational level directly influences project success and the overall performance of the organization. The social implication of these findings is that if organizational project success rates increase, the organization will benefit from the enhanced business performance. Enhanced business performance leads to successful organizations. Successful organizations positively affect local and global economies through higher profits and higher wages, which in turn, ultimately positively affects society-at-large.

A Review of the Professional and Academic Literature

The purpose of this study was to determine the relationship between project alignment, performance outputs, and project success rates. The null hypothesis was that no relationship exists between project alignment, performance outputs, and project success. The following review of the literature will encompass all of the study variables.

For this review, I accessed the following databases: ABI/INFORM Complete, JSTOR, ProQuest, Business Sources Premier, Emerald Insight, Sage Journals, EBSCOhost, Thoreau, and Web of Science. Additional resources included scholarly

books and dissertations. Table 1 indicates the amounts and publication date ranges of the literature I reviewed for this study.

Table 1

Literature Review Source Content

Reference Type	Total	< 5 Years	> 5 Years	% Total < 5 Years Old
Peer-reviewed journals	163	154	9	94%
Dissertations	3	0	3	0%
Books	9	4	5	44%
Nonpeer-reviewed journals	5	2	3	40%
Total	180	160	20	89%

The review consists of 180 total resources: 168 journal articles, three dissertations, and nine scholarly books. One hundred and sixty-three of the 180 sources (90%) were peer-reviewed, and 156 (87%) reflected publication dates between 2013 and 2017, less than five years from the completion of this study. My initial search of databases using the keywords of *general systems theory, alignment,* and *performance* exposed millions of articles. Refinement of search criteria involved keywords of *systems thinking, system dynamics, emergence, holism, holistic, reductionism, IT alignment, strategic alignment, project alignment, project strategy, performance measures,* and *project success.* Moreover, an examination of resources not cited in the study aided me in further defining the parameters of the study (see Trusty, 2011).

Consideration of current trends in general systems theory principles helped me to establish and identify practices that link project alignment and organizational

performance to project success. My determination of these associations in the use of the systems approach within the literature review included the theoretical framework of von Bertalanffy's 1940s general systems theory and the contributions of multiple seminal researchers whose work accumulates to present day systems thinking or the systems approach.

I organized the literature review around achieving four objectives. My first objective will be to link the findings of systems thinking theorists to current practices. The second will be to discuss how the identification of alignment, performance, and success variables in the research augment the quality, validity, and reliability of the survey instruments. Thirdly, I will establish basic definitions for terms and ideas to foster a common understanding of this study and the results. My final objective involves the evaluation of the significant ways in which theorists of systems thinking have helped hone the underlying principles of systems thinking in various organizational systems. The literature review will encompass the theoretical framework; systems theory; the independent variables of project alignment and performance outputs; and the dependent variable, project success rates. This literature review represents my critical analysis and synthesis of dominant content themes explored and balanced against conflicting theories and assertions to underscore an in-depth inquiry of the researched material.

Systems Science

Systems science reflects several research traditions generated from varying disciplines, academic societies, and seminal theorists (Hieronymi, 2013; Ing, 2013). In this field, researchers have collaborated on real-life issues and examined general

principles and theories of how systems function. The resulting collaborations have revealed principles of systems and system approaches aimed at understanding how different types of systems work to deal with complex problems and scenarios while decreasing adverse side effects (Hieronymi, 2013).

Contributors of traditional systems theories include many seminal thinkers, such as Whitehead, Rapoport, Weiss, Gerard, Lewin, Boulding, Grinker, Gray, Rizzo, Menninger, and Arieti (Laszlo & Krippner, 1998). In the 1920s, while von Bertalanffy explored the various levels of organization in natural systems and the theory of open systems, Whitehead established the philosophy of organism concept, and Weiss began development of a system approach to conceptualizing the integration of knowledge (Laszlo & Krippner, 1998). In the early 1950s, economist Boulding, mathematician Rapoport, and physiologist Gerard advanced the concept of systems theory albeit from their perspective disciplines (Laszlo & Krippner, 1998). However, von Bertalanffy, Whitehead, and Weiss, lacking complete knowledge of the others' research, became mindful of the possible development of a general science of organized complexity (Laszlo & Krippner, 1998).

System Dynamics

During this same period in the 1950s, Forrester developed system dynamics (Whitehead, Scherer, & Smith, 2015). System dynamics represents a methodological approach to solving complex problems (Cosenz & Noto, 2016). This approach consisted of combined concepts of control engineering, cybernetics, and organization theory that accumulated into a perspective and conceptual tools used to frame the structure of the

system for identification of behavioral patterns and tendencies exhibited over time (Cosenz & Noto, 2016).

System dynamics, frequently referenced as the hard systems approach, encompasses three characteristics of feedback loops, computer simulation, and mental mode engagement to mimic the interactions and functions of dynamic systems over time and for predicting system functions in the future (Monat & Gannon, 2015). The concept of feedback refers to any reciprocal flow of stimulus; the stimulus mirror cause and effect and influences both positively and negatively (Gash, 2016). Negative feedback denotes the adjustment of processes and prevention of damaging acceleration, whereas positive feedback represents acceleration or increases in performance (Gash, 2016).

Computer-based modeling systems or computer simulation represent tools used to explore scenarios that aid management action decisions. Computer simulations produce more systematic decisions than traditional approaches and are usable within a participatory process that enables knowledge capturing, testing, and scenario refinement by multiple stakeholders (Bosch, Nguyen, Maeno, & Yasui, 2013). Computer-based modeling systems allow for flexible modeling environments and expression of knowledge uncertainty derived from probabilistic relationships (Bosch et al., 2013). Further, Bosch et al. (2013) asserted the capability of computer simulation models includes the representation of relationships amongst quantitative or qualitative variables and encompasses easily understood graphical interfaces that can facilitate communication among stakeholders. As new knowledge evolves, the capability exists to remove or update information as well as probabilities.

Causal loops reflect the qualitative analysis of a system, whereas quantitative analysis of a system includes stock and flow diagrams (Monat & Gannon, 2015). Stock and flow diagrams, similar to causal loops, represent precursors to system dynamics modeling (Prusty, Mohapatra, & Mukherjee, 2017; Sheffield et al., 2012). Causal loops, a graphical representation of a system, aid understanding of the interrelationships underlying a problem (Black, 2013). The application of causal loops function to overturn deeply entrenched ideas through interpretative tools needed for self-adaptation (Prusty et al., 2017). The objective of causal loop development lies in understanding the fundamental dynamics of the system for development of procedures that govern variations caused by the interaction of system components (Sheffield et al., 2012). Causal loop diagrams display information link arrows, accumulations, and flows that indicate underlying dependencies among problem elements (Black, 2013). Facilitators add to or modify the diagrams based on discussions for enhanced understanding of the problem (Black, 2013). User development of a causal loop diagram can stimulate understanding of issues that plague IT projects and project management.

Mental models represent principles, values, and assumptions retained within our minds that motivate the reasons for the decisions we make. An assertion results from known facts or relationships amongst facts (Rook, 2013). Mental models represent everyday clarifications for dealing with complexity, activate in response to mental and physical stimuli, and are adaptive and continuously formed by new experiences, and personal interpretations (Sax & Clack, 2015). Rook (2013) added mental models

represent internally held constructs of personal experiences, knowledge, and concepts that affect an individual's understanding, decisions, and actions.

System dynamics understanding is applicable in multiple contexts and specific tasks (Bendoly, 2014). IT projects exhibit typical characteristics identified in system dynamic concepts as they are continuous and exhibit alternating input and feedback modes and changes in data, resources, and connections. The multitask nature of IT projects makes system dynamics useful for the integration of project activities (Cosenz & Noto, 2016). Using a qualitative research approach, Bendoly (2014) evaluated the question of how understanding system dynamics affects project performance. The author referred to system dynamics modeling as the extent to which individuals are familiar with and capable of describing real world systems using system dynamic concepts. The ability to identify feedback loops and understand how they influence or impact system behavior is representative of systems thinking (Arnold & Wade, 2015).

Archetypes function to aid understanding of system dynamics concepts, promote systems thinking, and resolve complexity (Bagodi & Mahanty, 2015; Dowling, MacDonald, & Richardson, 1995). Research efforts from Richmond et al. in the year 1988 yielded system dynamics archetypal structures currently in use today. In 1990, Senge described 10 archetypes, and in 1993, Wolstenholme and Corben proposed reducing Senge's archetypes to a set of four, each exhibiting one of four possible combinations for ordering a feedback loop pair (Dowling et al., 1995). System archetypes reflect problem-causing, recurring patterns of behaviors frequently observed in decision-making context that result in negative consequences to organizational

performance (Prusty et al., 2017). Pattern classifications include accidental adversaries, fixes that fail, limits to growth, shifting the burden, the tragedy of the commons, drift to low performance, escalation, the rich get richer, rule beating, and seeking the wrong goal (Monat & Gannon, 2015). Use and identification of archetypes serve to reveal unwanted results decipherable through systems thinking (Monat & Gannon, 2015). Each pattern features a structural diagram, symptom description, early warning indicator, associated management principle, business storyline, and additional examples that prompt the archetype's behavioral occurrence (Dowling et al., 1995). System archetypes represent powerful tools that aid in identifying and solving problems that are unsolvable by traditional methods and reductionist thinking (Monat & Gannon, 2015).

Cybernetics

Cybernetics, inspired by Wiener and developed from self-directing missiles, represented parallel concepts in solving problems of organization and teleological behavior (von Bertalanffy, 1972). Cybernetics, a subdiscipline of systems science and critical component of systems thinking, typifies the science of information management, communication, and processing that allows for decision making in complex systems (Schwaninger, 2015). Cybernetics characterizes the flow of information within a system and the way in which the system uses the information to control itself (DeYoung, 2015). All cybernetic systems receive feedback, indicating the degree to which they move towards their goals. Finally, they are adaptive and modify their behavior based on acquired feedback, to pursue their aims (DeYoung, 2015). Cezarino, Junior, and Correa (2012) claimed the concepts of cybernetics constitute a theoretical archetype that aid

understanding, evaluation, and measurement of organizational performance using the systems thinking viewpoint.

Recent developments in cybernetics stem from work conducted by Stafford Beer, acknowledged as the first researcher to apply cybernetic principles to management through the manifestation of the viable systems model and team syntegrity. The primary manifestation of Beer's work, the viable systems model, represents an abstract model that specifies the minimum functional criteria needed for an organization to retain the capability of independent existence in a changing environment, with the prime objective of survival through learning (Schwaninger, 2015). Through the team syntegrity concept, Beer explored the integration of distributed knowledge to develop the concept of shared understanding as a means of guiding actions (Schwaninger, 2015).

Soft Systems Methodology

Drawing a distinction between hard and soft systems approaches, Checkland perceived hard systems as distinct systems of making choices among alternatives for goal achievement, whereas soft systems represented a chaotic, complex environment requiring and susceptible to inquiry and learning associated with human activity and social systems (Monat & Gannon, 2015). Monat and Gannon further stated the key to systems thinking is thinking in terms of systems instead of about actual systems and thinking about the world external to ourselves. Checkland (1981) along with Wilson, developed soft systems thinking tools that aid with the problem solving of messy, complex issues caused by varying perceptions of people (Hanafizadeh & Vali Zadeh, 2015; Kish, Bunch, & Xu, 2016). The conceptual models of soft systems thinking allow for comparison of

recommendations and judgments as a response to solving complex problems. A learning methodology, soft systems methodology (SSM) reveals an understanding of different perspectives for addressing challenges and situations through knowledge sharing (Hanafizadeh & Vali Zadeh, 2015). Checkland hypothesized SSM represents a problem-solving approach developed from system engineering (hard systems thinking) to handle the dynamic, ill-defined problems managers deal with daily.

SSM encompasses four general features consisting of seven stages including systems thinking activities (Checkland, 1981). First, SSM represents a process for managing change. Change involves problem perception, evaluation, and action of ongoing ideas that perpetuate new perceptions, evaluations, and actions; identified as the problem situation in Stage 1. Secondly, SSM leads to different assessments and procedures based on the autonomous interpretations of individuals and groups developed through the creation of rich pictures. Consciously articulating the process of perception, evaluation, and action, over time, leads to emergent properties. The third feature and stage of SSM underscores components of customers, actors, transformation, worldview, owner, and environment. The third stage of SSM is conceptual in nature, and aids acceptance of the problem situation identified in Stage 1 (Kish et al., 2016). The fourth feature of SSM, systems thinking, maps human activity systems into real-world action. Derived from the concepts of natural systems, systems created by nature, and designed systems created by man; the human activity system links a set of ideas in a logical structure to establish a purposeful whole. SSM symbolizes a probing process that expands the interpretation or point of view of a purposeful action within the human

activity system. For example, a prison as a human activity system described as rehabilitation or punishment system illuminates an individual interpretation and assumptions of the person's worldview. Steps 5 through 7 of the process involves comparison of models to the real work, a definition of changes, and allowance for improvements to the problem situation (Hanafizadeh & Vali Zadeh, 2015; Železnik, Kokol, & Vošner, 2017).

SSM reflects an inquiring process where assumptions, interpretations, and worldviews stand compared, challenged, and tested (Checkland, 1981). Pereira, Montevechi, Miranda, and Friend (2015), concurred stating one attractive point of SSM is the structuring of conversations and debates of complex or ill-defined problems. Further, the authors suggested soft systems thinking allows for the attainment of knowledge from different individuals who represent or make up the system or subsystems. Through dialog between the individuals, the knowledge extraction process is advanced. Neither right nor wrong answers result from the SSM process of knowledge extraction, but rather the identification of themes and subsystems existent in models of human activity systems. The models represent a basis for comparison against real world situations where debate and change provide insight about problems under investigation (Kish et al., 2016). The four features of SSM outline the foundation for a sequence of seven distinct stages that serve as a means to generate discussion, knowledge, and understanding of complex problems for action taking that improves the situation under investigation (Hanafizadeh & Vali Zadeh., 2015).

SSM is the most widely used application of systems thinking. The method represents the possibility of change, through focus placed on the stakeholder's view and the learning process. Recent development in SSM involves adaptation by multiple organizations, integration of other approaches, growing interest in understanding and exploring the design, and mediation of complex organizational problems (Pereira et al., 2015).

In 1925, von Bertalanffy studied the various levels of organization in natural systems and the theory of open systems (Laszlo & Krippner, 1998). Today, four categories represent distinct types of systems; natural systems, defined physical systems, defined abstract systems, and human activity systems (Frank & Kordova, 2015). Natural systems, for example, the water cycle, result from forces of the universe. Defined physical systems, such as a railway, arise from human-made designs having a specified purpose. Defined abstract systems, devoid of physical objects represent human-made designs that serve an explanatory objective. Poems, philosophies and mathematical descriptions describe examples of defined abstract systems. Human activity systems represent an observable set of ordered human activities, such as project implementation, undertaken for the achievement of a purpose or goal (Frank & Kordova, 2015).

Definition of a System

The concept of a system is multidimensional, widely used in system science, and referenced by multiple definitions (Hieronymi, 2013). A system, in the broadest perspective, typifies a combination of components exhibiting relationships within a boundary-maintained unit or process. A system also signifies a CAS consisting of

multiple interrelated subsystems, components referred to as agents that interact, adapt, and learn (Davis & Stroink, 2015; Hieronymi, 2013). Seminal systems thinking theorists Meadows (2008) and Checkland (1981), defined a system as a natural or human activity component consisting of multiple elements, connected, and organized to achieve a specific function, goal, or objective. The general systems theory advanced by von Bertalanffy in the 1940s reflected open and closed systems. Characterized by a set of features and rules, open systems accept external information whereas closed systems prohibit alternative systems as a control mechanism for maintaining system stability (Gash, 2016).

Multiple systems approaches exist for dealing with complexity, each exhibiting strengths, and weaknesses. Within the past 30 years, the development of integrative, multi-methodological frameworks reflects a combination of system methods (Hieronymi, 2013). For example, Loosemore and Cheung (2015) established that SSM and the system dynamics approaches complemented each other through syntheses of system dynamic concepts from a positivist paradigm to an interpretivist paradigm associated with soft systems methodology. Similarly, Pereira et al. (2015) conducted research integrating SSM and simulation in a manufacturing project. Described as a systematized, flexible, process for dealing with challenging problems and circumstances, SSM tools aid identification of modeling objectives used to develop the simulation model.

Systems Thinking

Definitions of systems thinking include (a) the broad array of methods, which adopt a holistic approach to analysis: (b) SSM, the detailed objectives, assumptions and

operation defined by Checkland (1981); and (c) qualitative portions of system dynamics modeling (Lane, 2016). Systems thinking originates from the general systems theory advanced by von Bertalanffy in the 1940s (Laszlo & Krippner, 1998; Ngana, 2015), as pundits sought to overcome the boundaries within academia and link theories with practice. Systems thinking as described by Monat and Gannon (2015), accounts for a school of thought focused on identifying the interconnections between parts of a system and combining them into a unified whole. Further, Stacey (2013) described systems thinking as an approach to inquiry with a focus on how a system and its subsystems interconnect and interact over time. Systems thinking is representative of contextual configurations of organization instead of specific content.

Bendoly (2014) declared that real world systems encompass hard and soft elements of systems thinking. The personalities and motivations of people (soft systems) in conjunction with coding structures, computer simulations, and operations (hard systems) resonate within effective systems thinking. Lane (2016) reiterated stating, systems thinking considers multiple perspectives that balance the focus of the whole and its parts. The concept symbolizes a cognitive endeavor consisting of levels, laws, rules, tools, and a language that introduces self-organization, system consequences, archetypes, feedback loops and delays, and other system structures. The dynamic nature of systems reflects multiple definitions and views of systems thinking (Monat & Gannon, 2015).

Emergence

Emergence, a concept of systems thinking and form of system behavior, aids understanding of self-organization. The writer Alexander and biologist Morgan inspired

the theory of emergence, although the use of the term originally appeared in work by Lewis (Loosemore & Cheung, 2015). Pigliucci (2014) stated emergence results from multiple and simultaneous interactions of parts within a complex system. Emergence exemplifies synergy, suggesting the system is greater than the sum of its parts. A function of emergent properties is the prevention of components in isolation and simplification of parts to their lowest level that serves to eliminate essential properties of the system (Laszlo & Krippner, 1998). Emergent properties result as a consequence of the relationships between system elements. Self-organization denotes the ability of a system's connections and interdependencies to change, adapt, and develop without the influence of external interference (Loosemore & Cheung, 2015).

General systems theory characterizes a platform for studying human behavior. The concept represents the systems approach framework; a holistic method for perceptual inquiry, and the foundational concept of open systems (Laszlo & Krippner, 1998). Although systems thinking has roots in biology and thermodynamics, von Bertalanffy's contribution defined general principles of open systems (von Bertalanffy, 1972). As such, systems thinking is recognized as a platform for the study of human behavior in disciplines such as social sciences, mental health sciences, and the political and behavioral sciences (Laszlo & Krippner, 1998). The theoretical perspective of this study; systems thinking, represented as the systems approach involves four attributes. The first attribute comprises viewing the situation holistically. The second attribute involves recognizing the importance of interrelationship and interconnectedness. Recognizing a hierarchy of system levels and the emergent properties generated within and across the

levels represents a third attribute of the systems approach. Finally, the systems approach involves accepting that people act according to different purposes and rationalities (Chen, 2016; Loosemore & Cheung, 2015).

System thinking stems from the idea that any system is viewable as a component of a larger system. Treating an event as a system requires understanding the systemic influences of both the larger system and its associated subsystems. Systems of interest likely exhibit complexity as different people define the system in dissimilar ways. Our mental models determine acceptance or constraint for how we engage with systems as our understanding and observations of systems are interrelated (Rook, 2013; Sax & Clack, 2015). Our understanding of a system determines what type of observations we make of it, and our observations define our understanding of the system. Individual views reflect the concept of emergence as a complementary view develops. From this point, we can explore how best to handle the system under investigation.

Rival Theories

Systems thinking represent a concept of great power in solving complex problems and is fundamentally different from traditional forms of thinking. The analysis model aligns to machine-age thinking (Ing, 2013) whereas, systems thinking characterizes a perspective, language, set of ideas, and tools (Monat & Gannon, 2015). The action of analysis reveals how a system works, the behaviors of its parts; system dismantling occurs, its individual parts analyzed, and understanding of whole develops from aggregating the individual parts. Instead of studying the parts of a system in isolation like in traditional linear thinking (Ing, 2013), systems thinking aids understanding of how

the system's parts interact. Systems thinking results from focusing on the relationships within a system rather than the individual system parts (Janssen, Van der Voort, & Fluer van Veenstra, 2015).

Similarly, the reductionist approach simplifies the problem through the elimination of variables to control the environment of the entity under investigation. While the reductionist approach, or the scientific method, is highly useful for analyzing a particular form of problem, a false assumption arises in the belief that revealing the whole results from the isolated examination of its parts (Webb, 2013). Furthermore, reductionist thinking is in opposition to the concept of emergence. When examining problems that exhibit complexity, the whole results from understanding the connections between the parts, as well as, understanding the interactions among the parts. Such connections and interactions may exhibit characteristics unidentifiable through isolated examination of an individual part (Webb, 2013). In environments consisting of emergent behaviors; uncertainty, and complexity, reductionist thinking inhibits the ability to depict fully or understand multifaceted, dynamic, fluid scenarios (Davis & Stroink, 2015; Ngana, 2015). The reductionist approach ignores system complexity (Chen, 2016). Words like mechanistic thinking, linear thinking, and reductionist thinking indicate the failure to comprehend the multifaceted interchange of components thereby inferring these approaches are in direct opposition to systems thinking (Neumann, 2013; Ngana, 2015).

Project Alignment

The concept of alignment appears numerous times in the research literature as scholars and pundits endeavor to link the three levels of corporate, business, and

functional strategy. Referred to as terms of strategic alignment, synchronization, linkage, fit, integration, or bridge (Karpovsky & Galliers, 2015; Ullah & Lai, 2013), alignment involves optimization of communication among corporate decision makers and IT leaders who oversee operations. Authors Abu, Esmadi, and Salim (2013) declared alignment a process of change and continuous adaptation. Agnihotri (2013) stated fit must be elastic to address the company's macro and micro environmental issues, resources, competencies, and rapid change of the business environment. Further, alignment is the extent to which the requirements, demands, goals, intents, and structures of an element are consistent with the requirements, demands, goals, intents, and structures of other elements (Gerow, Thatcher, & Grover, 2015).

The alignment concept characterizes an integration of organizational, business, and well-designed strategies that reflect all functions of the organization working to achieve a central goal or objective (Alsudiri et al., 2013). The strategic alignment model (SAM) represents the traditional perspective and is the most widely accepted model of alignment. The model consists of four domains (a) business strategy, (b) business infrastructure, (c) IT strategy, and (d) information system infrastructure (Coltman, Tallon, Sharma, & Queiroz, 2015). The objective of each domain is the creation of functional, organizational, and strategic alignments (Alsudiri et al., 2013; Ullah & Lai, 2013).

A review of IT strategy approaches to alignment based on SAM reflects the integration of business and IT components at three levels. The intellectual element alignment; Level 1, represents an infrastructure-to-infrastructure orientation that links business strategy and IT strategy to reflect the external environment. Level 2, the

strategy-to-strategy construct, reveals the operational alignment of human resources, procedures, policies, systems, structure, and activities. Lastly, identification of multivariate relationships across the four levels of strategy, technology, infrastructure and service representing cross-domain integration occurs at Level 3 (Gerow et al., 2015).

Conversely, Walsh et al. (2013) and Reynolds and Yetton (2015), stated SAM characterizes a prearranged, rational, top-down, executive approach to strategy. Built on mechanistic principles, SAM excludes a bottom-up, social emergence strategy involving organizational members and their day-to-day activities. Alsudiri et al. (2013) concurred stating project alignment research places focus on alignment at the company or corporate level. To date, little research exists on alignment at the operational level in the day-to-day operations and IT departments (Karpovsky & Galliers, 2015; Vermerris et al., 2014). Further, attainment of optimal project investment value requires a clear link of project outputs to organizational business strategy requirements. Organizations with policies, procedures, and processes in place for alignment of project deliverables to organizational goals stand positioned to realize the value of investments in projects and succeed in accomplishing defined strategic goals (Too & Weaver, 2014). The achievement of alignment between the organization's strategic goals and the project is critical to the organization's competitiveness and performance (Walsh et al., 2013). However, failing to consider all organizational actors and their day-to-day processes and perspectives promotes alignment as a remote, leadership exclusive, undertaking.

Vermerris et al. (2014) argued the need for a project-level alignment focus. The pundits evaluated six cases to determine when alignment practices influence the value

delivery of individual IT projects. Project phases of IT planning, IT conversion, and IT use represented alignment timing roles. Vermerris et al. revealed business value creation occurs during the early stages of the project, during planning and conversion. Applying alignment methods during the use phase of a project is insufficient for the creation of high business value. Additionally, employment of all alignment practices at project start eliminates the inclusion of important decisions not easily reversed in later phases.

Projects and Alignment

Projects represent a primary element in design and execution of corporate strategies, offer optimal value from project investments, and provide the mechanisms for change needed to achieve competitive advantage (Sheykh et al., 2013; Too & Weaver, 2014). The definition of project serves as an indicator that projects differ in context (Chih & Zwikael, 2015; Klein et al., 2015). Alignment of projects to corporate business strategy in normal business operations is accomplished through elements of project selection, project portfolio management (PPM), and the project management office (PMO) (Alsudiri et al., 2013). Projects, programs, and business strategy link through a system integration of business processes, project management processes, and organizational goals (Too & Weaver, 2014). Project management methodologies expose integration of projects sharing a similar business objective. PMOs centralize and coordinate four activates, including project governance processes, resource and knowledge sharing efforts, management support functions, and facilitation of project tools, techniques, and methodologies (Jalal & Koosha, 2015; Kutsch, Ward, Hall, & Algar, 2015).

Creating value from the PMO requires linking projects to the corporation's business strategy (Biesenthal & Wilden, 2014; Kaiser, Arbi, & Ahlemann, 2015). Similarly, PPM reflects a decision-making vehicle that aids strategic alignment of projects to corporate strategy (Martinsuo, 2013). Portfolio management includes choosing the right project, decision-making across the entire portfolio of projects, and accumulation of all project information to include existing, new or recently initiated, and future anticipated projects. Additionally, organizing of project information, presenting the information to decision makers for review, and use of a communication and implementation structure of decisions aimed at strategic alignment represent portfolio management activities (Kaiser et al., 2015). Successful PPM comprises appropriate project selection techniques (Kaiser et al., 2015; Sheykh et al., 2013) and value maximization of projects within the portfolio (Martinsuo & Killen, 2014).

Project selection, a significant activity within organizations, allow for prioritization of scarce resources, mitigation of risk, identification of short and long term opportunities, and other strategic concerns (Pedersen, 2016). A wide variety of project-selection tools exists for business use; however, all models fall into the two general categories of quantitative and qualitative (Dutra, Ribeiro, & Monteiro de Carvalho, 2014). Quantitative or numeric models represent profitability or scoring methods. Numeric profitability models are used to evaluate a single criterion, the financial feasibility of the project. Scoring models allow for evaluation of multiple criteria, reflect an organizational policy, and are easily structured and altered.

Proponents of quantitative models enhance project selection accuracy with high-level mathematical methods or algorithms that produce multiple combinations of projects simultaneously aimed at simplifying decision-making (Chiang & Nunez, 2013). Benaija and Kijiri (2014) and Cho and Shaw (2013) used the effective frontier method and a mathematical algorithm to calculate the strategic value, cost, and completion time for optimization of project selection. However, Li, Fang, Tian, and Guo, (2014) asserted existing PPM mathematical models fail to consider reinvestment, scheduling and precedence relationships over time. To reflect the reality of decision-making in project selection; project interruption involving time factors of an insufficient budget, project set-up costs, resource utilization in the event of limited or competing resources, and the precedence relationship between projects require consideration. However, techniques such as mathematical programming reveal occasional use due to the diverse nature of the projects. Model complexity and the problems associated with application reflect deterrents of use (Martinsuo, 2013).

The scoring method denotes a simpler and less cumbersome method of project selection and prioritization (Khalili-Damghani & Tavana, 2014; Kipper, Nara, Siluk, & Mendes, 2014). Scoring methods allow for project decomposition, evaluation of uncertainty elements and within project and organization context. The scoring method easily aligns with organizational strategy and allows managers to think symmetrically in consideration of the right project (Khalili-Damghani & Tavana, 2014). The scoring method functions as a tool that allows strategic managers to identify, define, and rank projects with greater corporate strategic relevance. Managers assign a value consistent

with project context, score projects relative to its organizational relationship, and prioritize projects based on a total of previous scores with the scoring method. Research and analysis of the scoring method reveal a tool capable of aiding managers in the identification of a sequence of projects that align with organizational goals (Kipper et al., 2014). Conversely, some areas included in scoring methods, such as general business criteria, financial criteria, risk, legal system compliance requirements, human resource analysis, marketing criteria, and technical criteria, fail to consider the preferences of the decision-makers (Nowak, 2013).

Qualitative selection methods represent a decision-making process. Qualitative, nonnumeric project selection models include sacred cow, operating necessity, competitive necessity, product line extension, comparative benefit model, and the q-sort method (Meredith & Mantel, 2012). Although various methods exist for nonnumeric project selection, the q-sort method is the most widely used and straightforward method. Within the q-sort method, categorized projects represent selections based on metric or strategic relevance, ordered from best to worst, and ranked per specific criteria or by evaluator judgment (Meredith & Mantel, 2012). While traditional methods of analysis measure and relate objective variables of budgets, schedules, and quality figures, q-methodology supports the analysis of subjective perspectives for common factors and interrelationships (Doherty, 2014). Through the q-sort method of project selection, differing perspectives reveals the viewpoint of the individual based on Q-sort statements.

A complex and knowledge intensive process, project selection involves investment distribution, identification of risk levels, resource needs, and interaction

amongst selected or planned projects. Optimizing the project selection process requires allocation decisions and significant long-term organizational commitments (Yang, Chiang, Huang, & Lin, 2013). Dutra et al. (2014) maintained failure to make correct decisions regarding project selection and prioritization could result in failure of obtaining strategic objectives.

PPM has merits; however, the call for additional evidence reveals limitations (Martinsuo, 2013). Limitations of PPM include assumptions that projects exist for strategic purposes only, that the organization has knowledge of all relevant resources and controls the resources, and that the organization knowledge consists of all internal and external factors influencing projects. An assumption of knowledge about execution contexts around projects that represent potential embeddedness into frameworks that create strategy represents another limitation of PPM (Martinsuo, 2013). Similarly, managerial lack of PPM process understanding and daily practices indicates that managers fail to follow predefined processes, structures, and measures. Analysis of PPM in practice revealed PPM is less planned and more political. Managers' traits, dispositions, and leadership styles influence project and strategy selection, negatively affecting individual and multiple projects as managers act on information that they have at the time versus applying PPM selection concepts (Martinsuo, 2013).

The importance of undertaking projects as a means of implementing organizational and business strategies resonates in studies conducted by Alsudiri et al. (2013), Chih and Zwikael (2015), and Young and Grant (2015). Case study research conducted by Alsudiri et al. revealed the involvement of project managers and team

members in strategy formulation positively contributes to the implementation of the business strategy. Chih and Zwikael added that projects must exhibit a specifically targeted value, measurable results, achievability, relevance, and adherence to a specific timeline based on strategic goals. In a study, discerning whether projects affect strategy, Young and Grant found the strategic methodology and selected metrics contributed positively or negatively to successful strategic results.

Systems Thinking and Project Alignment

Systems theory aids in understanding and recognition that the project is a system embedded in the larger system of the organization (Kapsali, 2013). In systems thinking, the top-down approach characterized in traditional SAM represents a closed systems approach. Closed systems reveal an ontological view, for example, the organizational structure is correct with emphasis on control. From this viewpoint, the perception of projects is as isolated systems whose functions represent defined plans, procedures, and performance criteria. Ignored are the facts that projects are complex, social, open systems of production, governance, and efficiencies. In the open systems view, projects represent a system structure that spans other projects, negotiate through boundaries, and consist of flexible routines, relationships, and knowledge transfer that conceptualize the system's complexity and wholeness (Kapsali, 2013). Open systems represent an epistemological point of view thereby accommodating varying perspectives. Although the larger system of organization exerts influence, the control is not deterministic.

More importantly, senior management affects strategic fit thereby indicating an indirect relationship between executive level involvement and strategic fit. Alignment of

projects and business strategy require exposing hidden management ideologies and practices unique to the organization that informs structure and context with the inclusion of strategic formulation and implementation (Ritson et al., 2012). Paraphrasing Allen, Alleyne, Farmer, McRae, and Turner (2014), organizational culture often dictates project organization and the project manager's level of authority and influence. Top-level managers develop corporate strategies that fail to align at the operational level where projects implementation occurs. Subsequently, the project manager and team formulate project strategies based on project objectives often leading to a lack of alignment, wasted resources and missed opportunities (Ansari, Shakeri, & Raddadi, 2015). Vermerris et al. (2014) conferred stating a shared understanding of alignment between non-executive level members, and business executives may positively affect alignment efforts.

Performance Outputs

Improving performance represents a common theme in performance measurement literature. Business performance results from the measured outputs of organizational strategy, operations, business structures, divisions, procedures and workflows (Haji-Kazemi & Andersen, 2013). Performance measure outputs indicate how well an organization's strategic objectives meet the organization's business objectives. Numerous methods exist for measuring and evaluating organizational performance including balance scorecards, benchmarking, and strategic planning.

Balance scorecards, a widely distributed method, includes several organizational dimensions. Balance scorecard components of customer perspective, internal processes, growth, and financials represent comprehensive depictions of business performance and

areas for monitoring organizational strategic goals (Brezuleanu, Brezuleanu, Brad, & Iancu, 2015; Martz, 2013; Ullah & Lai, 2013). Benchmarking, a quality initiative, associates organizations within services or industries using standard measurements. Benchmarking represents a process of learning from competitors by exposing leaders to new and different approaches and procedures for achieving greater performance. To assess transformation of an organization's alignment maturity level over time, Luftman, Wander, Nathan, and Sutaria (2013) benchmarked past maturity scores against present maturity scores using the strategic alignment model. The benchmarking process revealed the level of alignment improvement. Strategic planning represents an organizational-wide process used to identify and solidify strategic direction based on action plans, multiple goals, and timelines. Khalili-Damghani and Tavana (2014) posit strategic planning encompasses analysis of both internal and external environments. Strategic planning reveals required accomplishments to realize the organizational vision (Kipper et al., 2014). Each of the performance methods contributes to increasing corporate performance and represents a form of planning or use financial measures as an indication of success.

Systems Thinking and Performance Outputs

The purpose of performance measurements is changing with less emphasis on control, more focus on learning, and requiring a holistic, integrated, and progressive view of handling the complexities of performance measurement (Haji-Kazemi & Andersen, 2013). Traditional measures of financial performance and productivity reflect historical and retrospective views that limit indication of future performance. Further, they inhibit

innovation and negate the roles and contributions of employees. Consequently, a growing realization in the 1980s exposed traditional measures of organizational performance as insufficient for handling today's rapidly changing and highly competitive markets (Haji-Kazemi & Andersen, 2013; Ramezan, Sanjaghi, & Rahimian Kalateh Baly, 2013).

Combining systems thinking and organization performance concepts appear documented in numerous organizational settings. Davis, Dent, and Wharff (2015) synthesized systems thinking and organizational performance in healthcare and higher education CAS organizations drawing a parallel for determination of systems thinking use in community colleges. Similarly, Skarzauskiene (2010) examined the relationship between systems thinking and organization performance from a leadership competency perspective. Five leader skills of dynamic thinking, interactivity or system logic, process orientation, continuous learning, and the understanding of mental models, represent systems thinking concepts and constructs that indirectly influence organizational performance. The researchers found higher organization performance associated with systems thinking. For example, enhanced leader/follower relationships influence leadership performance, which in turn affects organizational climate, which affects business performance. Multiple authors underscore the importance and significance of systems thinking in organization management; however, philosophies are difficult to summarize as each pundit characterize different attitudes to both systems thinking and the meaning of organization performance thereby negating comparison of the two concepts (Skarzauskiene, 2010).

Organizational performance best understood from the perspective of the organizational system as management's ability to control the environment (Martz, 2013). Organizations, by definition, represent a set of components connected for and to a specific purpose (Robinson, 2013). Therefore, as an organization system interacts with its environment managers should seek to manage change systematically to understand the issues associated with parts of the system (subsystems) relative to the whole system for transformation that enhances performance (Robinson, 2013). Further, managers and leaders make decisions based on their mental models, these models should foster analysis (dynamic systems thinking), synthesis (soft systems thinking), and a combination of the two concepts for generation of ideas, information, and knowledge essential to the enhancement of organizational performance (Schwaninger, 2015).

Project Success

Project success is critical for organizations. However, a significant proportion of projects continues to miss due dates, exceed budgets, fail to deliver per specifications, and unsuccessfully provide customer satisfaction (Allen et al., 2014). Project success is one of the most frequently discussed and rarely agreed upon topics of project management (Anantatmula, 2015). It involves numerous and various critical success factors (CSF) and key performance indicators (KPIs) and is, therefore, a high priority for executives, business owners, project managers, and other stakeholders. However, the definition of project success is subjective and exhibits ambiguity (Rolstadas, Tommelein, Schieflore, & Ballard, 2014) thereby preventing a generally accepted definition of project success measures. Project complexity, organizational context and maturity, industry, and

several other factors affect project performance. Scholars of project management literature agree project success represents a much wider concept than the triple constraint of cost, schedule, and quality (Mir & Pinnington, 2014; Serrador & Turner, 2014). Such acknowledgment and agreement indicate the need for alternative success measures (Muller & Jugdev, 2012); highlight success measures associated with business outcomes (Alsudiri et al., 2013), and give rise to the consideration of new approaches to thinking about project success. Extensive research conducted by organizations such as Gartner, Forrester and the Standish Group reveal only one-third of IT projects complete successfully on time while the other two-thirds are late or over budget (Bouras & Bendak, 2014).

Additional evidence includes success literature that spans four distinct periods of time (Mir & Pinnington, 2014). Early project research representing years 1960s-1980s, revealed a focus on project implementation and measurements based on the iron triangle. The iron triangle of scope, cost, and quality, Berssaneti and Carvalho (2015) affirmed, concerns project efficiency rather than project success. Echoing this sentiment, Davis (2014), Ramos and Mota (2014), and Serrador and Turner (2014) included stakeholder satisfaction as a success factor.

Emphasis on project success efforts during the years 1980s-1990s, exposed lists of CSF, case studies, and movement toward a single success measure: failure or success. Multiple lists, CSF modeling function to aid understanding of how various factors influence success (Mir & Pinnington, 2014). CSFs require identification of associative influences attributable to project success (Allen et al., 2014; Gingnell, Franke,

Lagerstrom, Ericsson, & Lillieskold, 2014; Serrador & Turner, 2014). However, concern over the usefulness of CSF calls into question whether factors contribute to process success and performance improvements (Ram & Corkindale, 2014).

The late 1990s through 2000s exposed the emergence of integrated frameworks as contributors to success factor identification (Davis, 2014). Researchers Fayaz, Kamal, Amin, and Khan (2017), and Ram and Corkindale (2014) explored multiple project success factors. Fayaz et al. (2017) listed 15 CSF of IT projects whereas Ram and Corkindale reviewed 627-refereed documents on CSFs. Inputs, activities, and variables from the project, project manager, team members, internal and external stakeholders, and organizational leaders define appropriate success factor framework outputs. While project management frameworks are viable solutions for demonstrating project performance, project stakeholders determine different factors, success factors differ across industries (Davis, 2014), and project success depends on the selection of the appropriate factors (Mir & Pinnington, 2014).

Current research contributions to project success measures reflect three major themes; the iron triangle, CSF modeling and CSF frameworks, all intended to advance the enhancement of project success rates. The iron triangle, an efficiency measure, revealed success literature focused on operations, and the project implementation phase. Project linkage to strategic goals remains overlooked, leaving success criteria selection dependent on project manager subjectivity (Davis, 2014). CSF when incorrectly selected failed to function as viable contributions to project success or effectively reveal constructs representative of organizational and project context.

IT projects are CAS that require a broader, more comprehensive set of outcome success measures (Muller & Jugdev, 2012), making systems thinking an important concept in successful project implementation (Sheffield et al., 2012). Sheffield et al., further stated projects considered as systems reveal four attributes. The first attribute involves boundaries that change as the scope of interest changes. The interaction between and amongst team members and stakeholders within the project boundaries represents the second attribute. The third attribute of projects as complex adaptive systems involves deriving inputs from the project system's internal and external environments. The fourth and final characteristic is the transformation of inputs into project deliverables of product, services, and processes. Reiterating this position, Laszlo and Krippner (1998) posit an individual project or project group represents a system as characterized by interconnected elements or tasks, coherently organized to achieve an objective.

CAS are systems that respond to internal and external changes by altering its behavior or structure to maximize defined criteria or value (Janssen et al., 2015). During project implementation, unforeseen events arise that contributes to the inability to predict and anticipate all project progressions and concerns, resulting in unintended or unanticipated consequences of individual-level behaviors. Project changes and emergent behaviors reflect a project's dynamics to influence its management making it difficult to follow a predefined plan. Davis and Stroink (2015), agreed CAS are not isolated entities governed by authority; CAS exhibits emergent behaviors reflective of the interactions of agents within other CASs bound by the system. For example, the scope of a project

initially defines its boundary; however, as parts of the system interrelate with each other as well as internal and external environments, the scope changes as does the boundary (Sheffield et al., 2012). Traditional methodologies and patterns of thinking are inadequate for dealing with the nonlinear interactions prevalent to complex systems (Davis & Stroink, 2015; Janssen et al., 2015).

Systems Thinking and Project Success

Surrounded by and a part of systems we as humans are not in the habit of thinking systematically. In the rare instances where we see and understand errors or issues within the system, we continue to analyze and seek resolution by breaking the system down into smaller parts often losing sight of the interactions amongst the components. If actions are difficult to understand then, interactions increase that difficulty, making it easier to mentally examine the individual element rather than simultaneously study the element, its relationship, and interaction with other components (Nguyen & Bosch, 2014). Monat and Gannon (2015) surmised the concept of systems thinking as powerful, of value and containing a collection of tools for solving complex problems and explaining non-linear behaviors.

Extolling systems thinking in project management, Sheffield et al. (2012) applied systems thinking concepts to the project development lifecycle of concept, implementation, and evaluation. The researchers explain using the iceberg analogy how systems thinking exposes hidden events, patterns, systems structures and mental models and application of rich pictures reveals insights and learning of organizational routines. Similarly, during the implementation phase, the use of causal loops and archetypes

encourage big-picture thinking, while simulation modeling converts causal loop diagrams into action learning at the evaluation phase.

In a study conducted by Bendoly (2014) to discern the impact of systems thinking on project performance, 572 individual project team members representing 331 projects across multiple companies summarized their project and team member's expertise in the context of the project and understanding of system dynamics. Bendoly assessed numerous measures of project performance and system dynamics understanding. The researcher found system dynamics understanding positively and significantly affected the quality of information shared by individuals and across groups thereby mediating the link between system dynamics and project performance outcomes.

The underlining concept of systems thinking relative to organizational projects reflects a project as an adaptive whole capable of adjusting in its organizational environment as the environment changes. In the organizational system, each functional project and its associated parts or processes are interrelated and interconnected to other organizational elements, projects, project members, departments, managers, executive leaders, and the external environment. The interconnectedness supports feedback that enables emergence or self-adaptation for responding to performance monitoring (Checkland, 2012).

Systems thinking is essential for perceiving and understanding the behavior of CAS (Davis & Stroink, 2015). However, few managers or organizational leaders understand or have knowledge of systems thinking (Sheffield et al., 2012). Further, project managers fail to use simple system thinking tools or concepts remaining trapped

in patterns of linear thinking for solving complex projects (Sheffield et al., 2012). The rapid rate of technological advancements encompasses systems that increase dependence on other systems thereby calling for systems thinking knowledge and a paradigm shift in thinking (Arnold & Wade, 2015).

Determination of systems thinking knowledge, capability, and practice are widely addressed in popular literature (Henning & Chen, 2012). Henning and Chen (2012) further stated the knower possesses a knowledge domain and cognitive skills that focus their understanding. Use of the individual's knowledge domain, cognitive skills formed by values, beliefs, information transference and goals, and systems thinking knowledge build the foundation of characteristics that system thinkers must recognize. Systems thinkers recognize that systems hold a purpose based on its objectives and leave evidence of their existence. Systems thinkers know that members need each other to accomplish goals. Systems thinkers understand member models are more important than understanding the members. Systems thinkers recognize that system organization is a result of member interaction. Finally, systems thinkers acknowledge consideration of both parts and wholes. In essence, systems thinkers have six orientations of connectedness, reason, data foundations, clear and understood arrangements, subjectivity, and self-reflection (Henning & Chen, 2012).

Building on the mixed methods research conducted by Henning and Chen (2012) of what constitutes a systems thinker; Burnell (2016) developed the Systems Thinking Orientation Assessment Framework to discern elements of systematic behavior and systems thinking capability. Using the framework's thinking survey scored against the

six orientations; Burnell conducted a mixed methods research study to sample, isolate, and control for systems thinking education. The scholar concluded the education of systems thinking instilled a systematic outlook.

Arnold and Wade (2015) provided three conditions for systems thinking education, understanding, and intuition in the systems test. The first condition of the systems test encompasses function, purpose or goal; secondly elements or characteristics, and thirdly interconnections or interrelationships. Randle and Stroink (2012) conceived the Systems Thinking Scale-Revised to assess the capability to think in systems and recognize CAS. The STSR represent systems thinking as a cognitive pattern involving the recognition of various phenomena as a grouping of interconnected elements interacting with each other to constitute a whole. Further, Jaradat, Keating, and Bradley (2017) advanced seven characteristics of the system thinker. Jaradat et al. stated systems thinkers expect uncertainty, preserve global integration, lean towards global interactions, and identify and accept multiple perspectives. Recognition and debate the existence of emergent properties, assurance of work that exemplifies the adaptive whole concept, and accommodation of change through flexibility round out the remaining seven characteristics of systems thinkers.

Strategic leaders understand and view the organization as a complex and never stagnant entity. They see the organization as a holistic system encompassing interrelated elements that contribute negatively as well as positively to the organization's success and competitive advantage. Applicability of systems thinking to the organizational and project context provides leaders an opportunity to see the interconnections of a problem,

generate modified behavior, and use systems thinking to their advantage (Senge, Smith, Kruschwitz, Laur, & Schley, 2010). Systems thinking represent a potential means to help leaders respond to growing organizational complexities and move leadership to a more adaptive model better suited for today's organizations (Davis et al., 2015).

Transition

Section 1 included preliminary information on the specific business problem under examination in the proposed study. The research question addressed whether project alignment and performance outputs are statistically significant predictors of project success rates in IT projects. Furthermore, Section 1 included certain assumptions, limitations, and delimitations of the study and supported the study's purpose and relevance to the stated business problem with a literature review. Section 2 will be comprised of detailed information of how this study commenced, including a discussion of the research strategy, the researcher's role, study participants and associated ethical issues, the study population with sampling methods, and how reliability and validity elements were defined and met. Section 3 will include the findings of this study, discussion, and a summary of the results of the study. Section 3 will also include my recommendations for future study and personal reflections of the doctoral journal.

Section 2: The Project

Section 2 will be comprised of information on the research strategy of this study. I will reiterate the purpose statement of the study, which will be followed by a definition of the researcher's role and details of the study participants. In the Research Method and Design section of the section, I will expand on the Nature of the Study information provided in Section 1 and will include my justification of design selection over alternatives. Clarification of population and sampling, organization, and analysis techniques, reliability, and validity of instruments will conclude the subsections in Section 2.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between project alignment, performance outputs, and project success rates. The independent variables were project alignment and performance outputs, and the dependent variable was project success rates. The targeted population was comprised of 157 project managers in strategic planning roles from the state of Arizona. The implication for positive social change was the understanding gained of the interrelated and interdependent relationships between project alignment, performance outputs, and project success rates by studying the insights of credentialed project managers.

Role of the Researcher

The role of the researcher is multifaceted (Kyvik, 2013). Researchers select the research method and design and collect, organize, and interpret the obtained data. A primary role of the researcher involves adherence to strict ethical guidelines outlined in

the *Belmont Report* (Adams & Miles, 2013). My review of the *Belmont Report* protocol and completion of Protecting Human Research Participants training (Certification Number 1546451) reflected an understanding of the importance of rigorous adherence to the *Belmont Report*. To meet these requirements, I obtained informed consent and ensured respectful treatment of all participants and adherence to the principles of beneficence and justice (Adams & Miles, 2013; Zuraw, 2013).

An equally important role of the researcher relates to providing an accurate representation of the research problem as it exists to the participants within the study under investigation (McCusker & Gunaydin, 2015; Yilmaz, 2013). As a former assistant director of a business and planning department with the Project Management Professional (PMP) designation, I oversaw the strategic alignment of departmental projects to the organization's high-level objectives. I became familiar with project scoring methods and generated and provided a prioritized listing of projects to executive leaders on a quarterly basis. After submission of the prioritized list, my involvement diminished relative to decisions of project evaluation and selection for implementation. The possibility existed that I had knowledge of or acquaintance with participants of the study as a member of the credentialed PMP LinkedIn group, Arizona State University (ASU) Project Manager (PM) Network Group, and the Project Management Institute (PMI) Phoenix Chapter. However, the research method, design, and data collection process defined within this study negated the identification of individual study respondents. Additionally, to avoid subjective bias and a conflict of interest, I worked to ensure my role as the researcher did not affect the outcome of the study through anonymous data collection techniques.

Before data collection, I ensured qualified participants understood the purpose of the study, their participation, and role in the study (see Zuraw, 2013).

Participants

Participant eligibility for this study comprised of project managers whose job functions included implementation of strategic IT projects and initiatives. Participant eligibility criteria included PMP certification, 3 or more years of project management experience, implementation of projects spanning 3 or more years in duration, and implementation experience of enterprise-wide strategic projects within the past 5 years. Additional eligibility criteria reflected employment within an Arizona organization consisting of 500 or more employees and with 5 years or more of business longevity.

The project manager, a key person on any project, often leads multiple and varied projects and accepts accountability for project success/failure (Zahra, Nazir, Khalid, Raana, & Majeed, 2014). Anantatmula (2015) asserted project managers are accountable for meeting stakeholder expectations and project success. Moreover, research supports internal factors; such as leadership of the project manager contributes to the alignment of projects to business strategy (Alsudiri et al., 2013). As such, querying the insights of certified project managers on how their organizations define, cultivate, and interpret project success seemed appropriate to my objectives with this study.

A professional social networking site, LinkedIn, reflects more than 175 million users spanning 200 countries (Claybaugh & Haseman, 2013; Hands, 2013), allowing me access to a diverse population of respondents having an equal opportunity to participate (see Acharya, Prakash, Saxena, & Nigam, 2013). Strategies for establishing a working

relationship with the LinkedIn PMI credentialed PMP group, of which I am a member, included collaboration through the response of online surveys; blogs; and providing opinions on uploaded presentations, documents, and other requested insight from group members. Similarly, as a member of the ASU PM Network and PMI Phoenix Chapter, I have contributed to the LinkedIn PMP group via online surveys and presentations.

Research Method and Design

The research approach I took in this study was quantitative correlational. Research design encompasses the logical structure of the inquiry. For example, experimental, case study, or correlational are possible research structures whereas each design defines the type of evidence needed to answer the stated problem. Research methods, on the other hand, encompass the approach applied to research questions or a technique for gathering data (Sandelowski & Boshamer, 2014). Research strategies and designs aid in problem solving (Pathak, Jena, & Kalra, 2013). The three methods of research--qualitative, quantitative, and mixed methods--influence the researcher, participants, and problem under investigation (Christenson & Gutierrez, 2016). No one method is superior to another (Lederman & Lederman, 2013). Each method exhibits advantages and disadvantages that make it appropriate for certain circumstances and inappropriate for others (Sandelowski & Boshamer, 2014).

Research Method

The purpose of this quantitative study was to determine if a relationship exists between the independent variables of project alignment and performance outputs and the dependent variable of project success rates. Quantitative research involves examining

and measuring how variables change, interact, or relate to one another (Yilmaz, 2013). Measured variables represent a continuous scale indicating an appropriate use of the quantitative correlational approach.

The quantitative research approach examines relationships amongst variables and allows researchers to acquire a large representative sample of a community to emphasize relationships amongst concepts (Christenson & Gutierrez, 2016). Hypothesis testing provides the process for conducting statistical analysis of a research problem (Fassinger & Morrow, 2013; Trusty, 2011). Quantitative research makes available an alternative hypothesis, a speculative statement concerning the relationship between two or more variables (Christenson & Gutierrez, 2016; Fassinger & Morrow, 2013). The alternative hypothesis reflects the changes in the outcome (in this study, project success rates, and the *criterion variable*) attributable to a change in another variable (project alignment and performance outcome criteria, the *predictor variables*). The quantitative methodology confirms and disconfirms theoretical hypotheses and summarizes numeral data as persuasive statistical evidence collected as truths (Fassinger & Morrow, 2013).

In contrast, the qualitative research approach highlights answers to *what*, *why*, and *how* questions about the phenomena addressed (Kemparaj & Chavan, 2013; McCusker & Gunaydin, 2015). Researchers seek to understand events in their natural environment through the qualitative research approach with a goal of gaining insight and exploring a depth, richness, and complexity inherent in a phenomenon (Yilmaz, 2013). Qualitative strategies include variation, convenience, purposive, key-informant, and maximum variation sampling (Shelton et al., 2014). Data collection consisting of small sample

sizes and flexible analysis aids generation of outputs representative of classifications, typologies, descriptions, patterns of associations, and explanations (Kemparaj & Chavan, 2013). Characteristics of the qualitative approach include subjective, individual, and shared interpretation with words as the primary element of analysis (Christenson & Gutierrez, 2016; Kemparaj & Chavan, 2013), thereby negating its use in this study.

Researchers use the mixed-methods research approach to collect, analyze, and mix quantitative and qualitative research methods in a single study (Christenson & Gutierrez, 2016; Lederman & Lederman, 2013; Venkatesh, Brown, & Bala, 2013). Incorporation of both quantitative and qualitative research methods within the mixed methods approach allows researchers to gain a better understanding of a research problem. When one method is insufficient to address the problem, the second method reinforces the data and study results. As I deemed a quantitative approach, reflecting relationship-orientated inquiries the appropriate method for this study, the mixed methods approach including qualitative aspects was not suitable for this study.

Research Design

The quantitative approach emphasizes the answers to four types of research questions: descriptive, correlational, quasi-experimental, and true-experimental (Cokley & Awad, 2013). Both descriptive and correlational quantitative methods represented appropriateness for use in this study. Descriptive research reveals answers to questions of a nonnumeric nature and report the findings, negating inferences or predictions about the data (Cohen, Manion, & Morrison, 2015). I selected a correlational design for this study as correlation measures the relationship between two variables and quantifies the

degree to which they are related (Casson & Farmer, 2014; Hess & Hess, 2017). Conversely, inferential problems reflect the quasi-experimental and true-experimental quantitative type of investigative design used for making predictions or inferences from data (Cohen, Manion, & Morrison, 2015). Use of quasi-experimental research designs aid researchers in uncovering the state of a phenomenon using statistical techniques (Cohen, Manion, & Morrison, 2015). Researchers use experimental quantitative research methods to test hypotheses and explain relationships among variables or phenomena (Bettany-Saltikov & Whittaker, 2014).

Researchers use the true experiment design for manipulation of independent variables to view the effect on the dependent variable (Cohen, Manion, & Morrison, 2015). In this research study, I did not seek the effect caused by movement of another variable but rather the determination of a relationship between variables. Nonmanipulation of independent variables prevented my use of the true experiment design. Similarly, the quasi-experimental design includes the use of control variables or treatment conditions to determine study outcomes (Cokley & Awad, 2013). Quasi-experimental and true experimental methods were inappropriate for this study as each method negates random selection.

Population and Sampling

The population of this study consisted of 157 individuals designated as credentialed project managers from the LinkedIn PMI Credentialed PMP group, ASU PM Network, and the PMI Phoenix Chapter. Each identified group represents a membership of professional project managers holding the title of PMP and other project professional

designations. The premise of group formulation was the discussion, development, and promotion of significant updates, technological innovations, and other technology and project management related topics.

Projects are strategically and operationally managed (Ahmed, Azmi, Masood, Tahir, & Ahmad, 2013). Davis (2014) noted the perceptions of project success differ across executive leadership, project manager and team members, and stakeholders groups. Managers and leaders make decisions based on their mental models (Schwaninger, 2015). Project managers stand at the forefront of project implementation where each of the variables in this study affects and determines project failure or success (see Zahra et al., 2014). The project manager population aligned with the overarching research question of whether a relationship exists between project alignment, performance outcomes, and project success rates assert their wisdom to make leadership decisions relative to project context (see Ahmed et al., 2013).

I used an expert sampling model, a form of nonprobability purposive sampling, to ensure adherence and relevance to the research questions. Purposive sampling represents the most common method of sampling and reflects low cost, ease of use, and convenience for the researcher to select participants as needed (Acharya et al., 2013). Expert sampling, a subset of purposive sampling, exhibits a benefit of identifying members with acknowledged experience and insight about the topic of the study (Zafar, Bhattacharya, Ganguly, Gummadi, & Ghosh, 2015). Additionally, participants were self-selected for study inclusion, thereby allowing all members of the groups to participate. However, control and measurability of data variability and bias reflect disadvantages of the

convenience/purposive sampling approach (Acharya et al., 2013). Additionally, the use of the convenience/purposive sampling method prevented generalization of the results beyond the sample in this study.

Conversely, random sampling represents a straightforward method of sampling in survey research that reduces bias by allowing inclusion of all participants who meet the study's criteria (Wilson, 2014). Quan et al. (2014) concurred stating compared to nonprobability or convenient sampling, random sampling represents the desired choice of researchers as it allows for a more representative sample of the population, which in turns enhances generalized results. However, a differentiated target population based on a professional title and other designations of project-level decision-making capability preclude the use of the random sampling approach. Palinkas et al. (2015) stated generation of quantitative data using a purposeful sampling strategy reflects a study's objective, assumptions, and requirements. Furthermore, purposive sampling is appropriate when samples must meet specific criteria. Researchers use this method to select participants with anticipation of acquiring distinctive and rich information that contributes value to the study (Suen, Huang, & Lee, 2014).

Ensuring an adequate sample size is critical to the statistical power of a study. A small sample size could result in a reduced chance of detecting statistical significance of a true result. Too many participants in a study can represent expense and extend study procedures (Button et al., 2013; Hayat, 2013). Three factors require consideration when calculating the sample size. First, the power of the statistical analysis ($1 - \beta$) denotes the likelihood of correctly rejecting the null hypothesis that sample estimates do not

statistically vary between groups in the population. Second, the level of significance (α) denotes the probability of rejecting the null hypothesis when it is true. The third sample size factor, effect size (f^2), represents the magnitude of the relationship between the independent and dependent variables and detectable with power probability (Hayat, 2013). Hayat (2013) reported large values of power 80% or higher are typical and deemed desirable, and the alpha value (α) or accepted risk of Type 1 error frequently reflects .05. Cohen (1992) stated the effect size is imperative for determination of sample size in quantitative analysis. The researcher analyzed various effect sizes and sample sizes to determine the effect sizes for a power statistic of .80. Results revealed small (.02), medium (.15), and large (.35) effect sizes.

G*Power, a noncommercial, free downloadable software application is an invaluable tool for researchers and students conducting statistical research. Kang, Yeon, and Han (2015) stated G*Power 3 is the most widely used software application for calculating sample size. Power level assessment represents one form of determining sample size (Hayat, 2013; Meurs, 2016). I conducted a priori power analysis using G*Power 3.1.9.2 to aid determination of sample size. The multiple linear regression, random model statistical was employed using a power level of .8 (1 - β), significance level ($\alpha = .05$), medium effect size ($f^2 = .15$) detected with (1 – β) probability and 2 predictors revealed sample size ($N = 61$). A sample size of 61 produced 80% power using a one-sided hypothesis test given these parameters (Appendix I). If the true population correlation between project alignment or project performance and project success were .15 or greater, then this study would have an 80% of chance of detecting

variable relationship at the .05 level of statistical significance. Increasing the power to 99% increases the sample size to 131. As such, a sample size between 61 and 131 was appropriate for the proposed study. The final count of collected surveys numbered 79. Removal of disqualified responses and surveys with missing data resulted in 49 completed surveys. For the calculated sample size of $N = 61$, 49 collected survey responses constitutes an 80% power level $\alpha = .05$.

Ethical Research

A reflective process and communal exercise, ethics comprise complex ideas, applications, and understanding about not only what is right and wrong, but also why events and actions are deemed right and wrong (Bishop, 2013). Four major areas of ethical behavior in research put forth by Miracle (2016) included (a) ethical treatment of study participants, (b) obtainment of informed consent, (c) maintenance of participant privacy, and (d) avoidance of deception. Cugini (2015) and Miracle reiterated stating ethical research involves respect, beneficence, and justice.

Voluntary participation, informed consent and the ability to withdraw from participation reflect the fundamental principle of autonomy and respect (Zuraw, 2013). Beneficence refers to the maximization of benefits and minimization of potential harms essentially, ethical protection of vulnerable populations, avoidance of harm, and confidentiality. Justice, similar to respect, reflects informed consent (Cugini, 2015; Miracle, 2016).

Research often encompasses human involvement that requires researchers seek and acquire participant informed consent (Mandal & Parija, 2014; Miracle, 2016). The

Belmont Report translates the concept of informed consent as honoring and preserving individual autonomy. The informed consent process allows participants the choice of study involvement based on information, understanding of research intent, and personal goals. Full disclosure and transparency of the study's objectives and intents sanctions human respect, enhances participant knowledge for informed decision-making regarding his/her role in the study, and allows for voluntary or nonparticipation (Wang & Kitsis 2013; Zuraw, 2013).

The anticipated risk to study participants was minimal or nonexistent. Participation was voluntary. Data collection involved no personal identifiers. Data encryption commenced on an electronic device. Data storage comprises containment within a locked cabinet at my place of residence. Only I have access to the locked cabinet. Data disposal will start after 5 years and involve electronic data disposal protocols as defined by the National Institute of Standards and Technology (Kissel, Regenscheid, Scholl, & Stine, 2014). Participants opted out of the study by withdrawing from the survey before engagement. Participants choosing to complete the study questionnaire received the Participant Consent Form that outlined participant rights and study information. Additionally, participants received notification that clicking the survey hyperlink denoted participatory consent in the study. This study included no incentives for participation. Survey participation commenced after receiving formal permission to collect data, evidenced by approval number 02-13-17-0429708 obtained from the Walden University Institutional Review Board (IRB).

Data Collection Instruments

The purpose of this study was to examine the relationship between project alignment, performance outputs, and project success rates. Data collection encompassed the use of three instruments (Appendix H), the Luftman strategic alignment maturity model (SAMM), the organizational performance (OP) tool, and the Project Success Assessment Questionnaire (PSAQ). Analysis of Likert items reflected each of the study's survey questionnaire formats (Harpe, 2015). The Likert scale is a set of statements used to evaluate a real or hypothetical situation under study. Participants provided their level of agreement with the statement on a 5-point metric scale through responses ranging from *strongly disagree* to *strongly agree*. The combined statements reveal a specific dimension of the respondent's attitude towards the issue (Joshi, Kale, Chandel, & Pal, 2015).

Strategic Alignment Maturity Model

Luftman's (2003) SAMM measured the independent variable of project alignment. Selection of the instrument resulted from prior validation and wide acceptance in the research community (Alaeddini & Salekfard, 2013; Luftman et al., 2013; Vermerris et al., 2014). Based on the strategic alignment model advanced by Henderson and Venkatraman (1993), SAMM represents a descriptive and prescriptive tool that segments alignment attributes into maturity levels for the purpose of extending strategic alignment to the operational level (Luftman et al., 2013). Luftman identified six alignment components. The components consist of communications, value measurements, IT governance, partnership, IT scope, and human resource skills.

Five communications alignment questions relate to the respondents' understanding of collaboration and synchronization amongst the organization and IT. The value measurement component encompasses five questions to identify the existence of metrics attributable to linking IT contribution to the business. Governance questions shape the degree to which IT and management define and share decisions. The partnership component reflects five questions on the level of trust exhibited by IT and business members relative to risk and reward sharing. The component of information technology scope references flexibility and transparency provided to the business by IT. Lastly, the human resource skills component underscores a maturity level of change readiness, innovation, and organizational effectiveness (Alaeddini & Salekfard, 2013; Luftman et al., 2013; Reynolds & Yetton, 2015). Forty-one business practices segmented into 30 survey questions measured on a 5-point Likert scale ranging from 1 indicating an unknown alignment maturity level to 5 as the highest level of maturity for that question functioned to reveal the organization's alignment maturity level.

Alaeddini and Salekfard (2013) assessed the Luftman (2003) SAMM instrument for reliability and validity within their qualitative study of 31 enterprise architecture projects on business IT alignment. The pundits redesigned the qualitative study questions to reflect a quantitative format mimicking a Likert score structure. The pundits solicited an individual score of 1 to 5 for each question where 1 indicated the lowest maturity level up to 5 as the highest maturity level. Respondents selected options mapped to scores of 1 to 5 within the Luftman tool. Cronbach's alpha values, a measure of internal consistency or reliability, revealed values of .9272 pre-survey and .9209 post survey indicating values

above the acceptable .8 thresholds. The successful application of the SAMM instrument in similar studies revealed construct validity.

Administration of the SAMM instrument to Guardian Life Insurance Company in 2005 and again in 2011 identified changes in organization performance (Luftman et al., 2013). Alignment scores significantly increased over the five-year period for each of the six dimensions with a significant increase in the skills dimension score of 1.79 in the year 2005 and 3.56 in the year 2011. The organization's average score for maturity alignment of 1.74 in the year 2005 increased to 3.10 in the year 2011 indicating the capability of use for leaders desiring to enhance business performance.

Luftman et al. (2013) stated one-third of the Global 1000, organizations reside in the SAMM repository. Furthermore, Alaeddini and Salekfard (2013) found the multi-level assessment, based on conducted literature research, more highly cited when compared to other business to IT alignment models. During data collection within the Alaeddini and Salekfard study, the pundits isolated IT projects and the organization's operations associated with SAMM criteria, in instead of using all of the organization's business processes. Therefore, the applicability of SAMM to the proposed study is the identification of project alignment maturity on business IT alignment, at the operational level.

Administration of the SAMM (Appendix A) occurs in conjunction with the OP and PSAQ instruments. The SAMM represented the first section of data collection after the qualification questions. Written permission validated originator authorization for the

use of the instrument *as is* and without revision (Appendix B). Raw data will be provided upon request.

Organizational Performance Instrument

The OP questionnaire measures the independent variable, organization performance. Ramezan et al. (2013) employed six dimensions, derived from literature research conducted by Lee (2008), to define the instrument's application for measuring organizational performance. The OP instrument consists of 36 nonfinancial questions with a focus on internal processes, strategy, and stakeholders (Ramezan et al., 2013).

Lee (2008) defined stakeholder satisfaction as the first dimension relating to making stakeholders happy and meeting their needs, Ramezan et al. (2013) modified the dimension to reflect employee satisfaction. Organizational communication, the second dimension, denotes information, motivation, control, and emotional expression within the environment. Team collaboration represents group collaboration for success and goal achievement (Ramezan et al., 2013). Strategic performance relates to the alignment of managerial practices to organizational strategic practices. Knowledge management involves concentrating on capturing and sharing knowledge. Lastly, organization growth refers to flexibility and support of investing in new opportunities (Ramezan et al., 2013). The OP questionnaire consists of a 5-point Likert scale representing the rankings of 1 to 5 where scores indicate 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), and 5 (*strongly agree*). Respondents evaluated the organizational performances of their companies on each of the six dimensions. Application of the OP instrument to the

proposed study involved identification of organizational performance from the operations perspective derived from the study's participants.

Cronbach's alpha evaluated by Lee (2008) revealed instrument reliability with a score of .823. In a quantitative study examining the relationship between organizational capacity and organization performance Ramezan et al. (2013) surveyed 130 employees of a knowledge-based organization. Cronbach alpha scores across the six dimensions range from .788 to .877.

Das and Ara (2015) evaluated the relationship between human resource information system and organizational performance using a mixed methods approach. Quantitative data collection involved the distribution of 380, 5-point Likert scale questionnaires across 38 industries. Administration of a pilot study validated and tested the questionnaire for reliability with organizational performance reflecting a Cronbach alpha score of .7429. Similar to Lee (2008), in the studies conducted by Ramezan et al. (2013), Das and Ara OP represented the dependent variable.

Administration of the OP (Appendix A) occurs in conjunction with the SAMM and PSAQ instruments. The OP represented the second section of data collection after the SAMM section. Written permission validated originator authorization for the use of the instruments *as is* and without revision (Appendix C). Raw data will be provided upon request.

Project Success Assessment Questionnaire

The PSAQ (Shenhar & Dvir, 2007; Shenhar, Dvir, Levy, & Maltz, 2001) includes 28 questions developed to measure various aspects of the dependent variable, project

success. The PSAQ consists of five dimensions of project success, project efficiency, customer impact, team impact, organizational success, and future preparation. Project efficiency measures the triple constraint of on time finishes, within budget, and management of resources during execution. Although the triple constraint indicates an efficient project, assurance of project success remains uncertain (Shenhar et al., 2001). Customer impact addresses meeting customer needs and requirements. Team impact, the third dimension, assessed team learning, growth, and newly acquired skills. Organizational success reflects how the project influences the organization. Finally, preparation for the future involves the organization's capability of developing new technologies and competencies from the implementation of projects. The PSAQ is a 5 point Likert-type instrument encompassing answer selections that range from 1 to 5 identified as 1 (*strongly disagree*), 2 (*disagree*), 3 (*neutral*), 4 (*agree*), and 5 (*strongly agree*). Respondents evaluated project success for their organization's projects.

Shenhar et al. (2001) tested and validated the PSAQ instrument. Cronbach alpha ranged from .78 to .93 indicating sufficient reliability for the PSAQ in a quantitative study completed by Nwagbogwu (2011). In Nwagbogwu's quantitative research on the relationship between project managers, leadership practices, and project success, project success represented the dependent variable. The applicability of the PSQA to the proposed study is the identification of major dimensions attributable to the entire project lifecycle versus planning and execution; inclusion versus the singular use of the triple constraint; applicability at the organization level; and over short and long-term projects (Shenhar et al., 2001).

Administration of the PSQA (Appendix A) occurred in conjunction with the SAMM and OP instruments. The PSQA represents the last section of data collection after the OP section. Written permission validated originator authorization for the use of the instruments as designed and without revision (Appendix D). Raw data will be provided upon request.

Each of the data collection tools, SAMM, OP, and PSAQ consisted of a 5-point Likert scale to measure data at the interval measurement scale. Raw data were continuous in nature for each instrument. Data calculation of survey responses involved totaling the number of responses acquired from each instrument per respondent. Participant responses represent individual statement scores, summed and averaged, that result in a single score per instrument for that participant. Aggregation of individual questions into a single score defines the overall alignment maturity level of projects (SAMM), evaluation of their organization's performance (OP), and the individual's evaluation of project success for their organization's projects (PSAQ). The result was an average score acquired from and attributable to each survey respondent for each of the instruments. The use of an average score aligns with research conducted by Harpe (2015) and Joshi et al. (2015). Harpe and Joshi et al. inferred the combined items provide a quantitative measure of the respondent's perceptions. Additionally, the researchers confirm Likert scale data created by calculation of a sum or mean score characterizes data measured at the interval measurement scale.

Survey uploading encompassed the combined instruments. Uploading of the three-part survey to the LinkedIn, ASU PM Network, and PMI Phoenix Chapter group

sites commenced with participants asked to complete within the allocated timeline. Selection of a provided hyperlink initiated the survey. Survey questions appeared individually allowing respondents to make a selection. Survey completion resulted in downloading of responses via Excel into the Statistical Package for Windows (SPSS) software for analysis.

Data Collection Technique

The proposed study encompassed the use of an online survey tool, Survey Monkey, for administration and data collection of three 5-point Likert scale questionnaires and study criteria information. No demographic information collected. Survey Monkey, founded in 1999 by Finley, is the front-runner in web-based survey solutions. The online web portal allows educational and business professionals the ability to design and distribute surveys to a custom audience or general list of respondents (Survey Monkey.com, 2014).

The survey questionnaire incorporated a hyperlink that uploaded to the web page of the PMI credentialed PMP group, ASU PM Network, and PMI Phoenix Chapter of which I am a member. Members received a preliminary invite to participate (Appendix E). I provided access the survey link after IRB approval. Respondents choosing to participate acknowledged the consent to participate form and acquired access to the study survey through Survey Monkey. Each survey item was short, focused, and delivered in a consistent question format. Scoring the provided number of statements involved the use of response indicators that reflected rankings of *strongly disagree, disagree, neutral, agree, or strongly agree* indicating a score of 1 through 5 respectively.

The combined Likert scale survey questionnaires represented one survey instrument consisting of 100 questions divided into three sections. Grouping related questions by plainly recognizable sections aid respondents in survey completion by providing a clear sense of what being asked (Lauer, McLeod, & Blythe, 2013). Each section represented one study variable. Survey questions appeared one by one until all questions exhibited responses. The entire survey took less than 30 minutes to complete. Lauer et al. (2013), posit survey research indicated shorter timed surveys have a higher completion rate, as respondents are more likely to complete a shorter timed survey. Additionally, survey research supports the inclusion of process indicators. The Survey Monkey tool included a process bar that indicated the total number of questions completed, thereby providing participants an indication of survey status (Survey Monkey.com, 2014). The survey questionnaire remained online until the participant sample reached, approximately 3 months. Participants received a Thank You salutation upon survey completion, and the survey window closed. The application allows for automatic closure once the required number of responses reached. Responses collected through Survey Monkey online survey system were downloaded directly to SPSS via Excel for analysis.

Technological advancements in web and programming knowledge contributes to the use and popularity of online surveys. Online surveys represent fast, efficient modes of collecting data, offer benefits of low cost, quick response times, and reflect the norm for conducting research (Roberts & Allen, 2015). Conversely, use of online surveys for data collection includes disadvantages of poorly designed surveys or lack of Internet access,

which contributes to diminished participant engagement and low response rates (Sanjeev & Balyan, 2014).

Data Analysis

What information do IT business leaders need to understand the relationship between project alignment, performance outputs, and project success rates, reflects the question under examination for the proposed study. The research question and hypotheses follow.

RQ1: What is the relationship between project alignment, performance outputs, and project success rates?

$H_0$1: There is no statistically significant relationship between project alignment, performance outputs, and project success rates.

H_a1: There is a statistically significant relationship between project alignment, performance outputs, and project success rates.

Quantitative research involves studying and measuring how variables change or relate to one another (Bettany-Saltikov & Whittaker, 2014; McCusker & Gunaydin, 2015). I selected multiple linear regression as a criterion for examining the correlations between two independent/predictor variables and one dependent variable. I disqualified bivariate linear regression as it predicts the effect of one variable on another variable versus the effect on multiple variables. Similarly, I negated partial correlation because the statistical test measures the linear relationship between two variables within the same set thereby failing to meet the requirements of my study. The quantitative research method, correlational design, and interval Likert scale data collection format aligns

appropriately to the statistical analysis tools of the proposed study; means, standard deviation, Pearson's *r*, *t* test, ANOVA, and multiple linear regression.

Missing data is unavoidable (Newman, 2014) and may introduce bias estimates of parameters, decreased statistical power, increased standard errors, or weaken generalization of study findings (Bannon, 2015; Cheema, 2014; Dong & Peng, 2013). Therefore, visual data assessment and editing of missing values formulated a complete data set suitable for statistical procedures, analysis, and the enhancement of confidence in survey results (DeSimone, Harms, & DeSimone, 2015; Dong & Peng, 2013). The preliminary analysis involved the use of descriptive statistics, such as, measures of central tendency and variance. The use of tables and graphs aided summarization and clarification of data information. Collected data were interval making correlation tests appropriate. Correlation coefficients functioned to assess the relationship of the independent/dependent variable(s) for linearity and independent/independent variables to determine if the variables exhibited high correlation to each other. Pearson Product Moment Correlation Coefficient or Pearson's *r,* a statistical measure of association defined the strength of the relationship. Graphing of data followed analysis. Calculation of a regression equation resulted from the obtained data. I calculated tests of statistical significance for each coefficient and for the equation as a whole that assisted in rejecting the null hypothesis.

To ensure the data analysis using correlation, linear regression, procedures within the research study included adherence to assumptions associated with selected statistical techniques (Casson & Farmer, 2014; Hess & Hess, 2017; Williams, Grajales, &

Kurkiewicz, 2013). Assumptions of homogeneity of variance, homoscedasticity, and Multicollinearity represent statistical procedures identified in quantitative research (Hess & Hess, 2017). Verification of homogeneity of variance included the graphical representation of data using scatter plots. Scatter plot creation of residuals aided detection of any suspected nonlinearity of relationships. Evaluation of homoscedasticity involved visual evaluation and use of Durbin-Watson's test within the SPSS software. Multicollinearity refers to correlation of independent variables to other independent variables within the regression model. Correlation represents an objective of the proposed study thereby indicating an expectation of multicollinearity.

Licensed by IBM Corporation, SPSS is a stand-alone software application. The IBM SPSS application aids in the execution of general statistical procedures of (a) means, (b) proportions, (c) correlations, (d) ANOVA, (e) ANCOVA, and (f) multiple regression (Field, 2013). In addition to integration to the online survey tool, Survey Monkey, SPSS functions include generation of multiple and varied charts and graphs; use and modification of the syntax, output reporting, and the capability to export and import data (Field, 2013; Green & Salkind, 2014). The various functionality of IBM SPSS made the tool an invaluable application for conducting data analysis.

Study Validity

Validity denotes the accuracy of collected research data (Yilmaz, 2013). Research studies characterize tools of enhanced knowledge derived from valid and relevant data thereby making the accuracy of collected data essential (Aguinis &

Edwards, 2014; Yilmaz, 2013). There are two forms of validity in a quantitative study, internal and external.

Internal and External Validity

Internal validity functions to determine if a causal relationship exists among study variables (Aguinis & Edwards, 2014; Yilmaz, 2013). The quantitative research approach examines relationships amongst variables and allows researchers to acquire a large representative sample of a community to emphasize relationships amongst concepts. The proposed research study does not seek the effect caused by movement of another variable but rather a determination of a relationship between variables thereby negating the evaluation of internal validity within the study.

External validity represents the degree to which a study's results can be generalized beyond study testing conditions (Aguinis & Edwards, 2014; Yilmaz, 2013). Threats to external validity include people, places, and time. One strategy to mitigate external validity threats includes the use of an appropriate sampling model. Quan et al. (2014), suggested random sampling represents the desired choice of researchers as it allows for a more representative sample of the population, which in turns enhances generalized results. I identified convenience/purposive sampling as the approach thereby potentially negating generalization beyond the sample. Additionally, the use of valid and reliable instruments represented the strategy for mitigating external validity.

Statistical Conclusion Validity

In the quantitative correlational study, I sought to determine if a relationship existed between the variables of project alignment, performance measure outcomes, and

project success. The lack of internal validity indicates evaluation of statistical conclusion validity (Gibbs & Weightman, 2014; Kratochwill & Levin, 2014). Statistical conclusion validity represents the degree to which the conclusion reached about relationships in study data is reasonable, believable, or credible. Suter and Suter (2015) proposed statistical conclusion involved two possible types of errors, the conclusion that a relationship exists when one does not, or a conclusion that the relationship failed to exist when a relationship does exist. Evaluation of instrument reliability, data assumptions, and study sample size aided in determining strategies for mitigating statistical conclusion validity threats. Based on calculated reliability of prior studies and values from this study, I relied on previously evaluated studies for validity.

Reliability of the Instruments

Reliability reflects the quality and repeatability of the measurements (Field, 2013; Koo & Li, 2016) and refers to the ability to repeat the test or process in anticipation of the same result (Yilmaz, 2013). Alaeddini and Salekfard (2013) assessed the Luftman (2003) SAMM instrument for reliability and validity within their study of enterprise architecture projects and business IT alignment. Cronbach's alpha, a measure of internal consistency or reliability, revealed values of .9272 presurvey and .9209 post survey indicating values above the acceptable .8 threshold. Similarly, Lee (2008) assessed and determined the reliability of the OP tool based on Cronbach's alpha values of .823. Das and Ara (2015) evaluated validity and reliability via pilot study with OP reflecting a Cronbach alpha score of .7429. Similar to Lee (2008), in the studies conducted by Ramezan et al. (2013), and Das and Ara (2015) OP represented the dependent variable. In a quantitative study

conducted by Ramezan et al. Cronbach alpha ranged from .788 to .877 across the six dimensions of OP. Shenhar et al. (2001) tested and validated the PSAQ instrument. Additionally, in a quantitative study conducted by Nwagbogwu (2011), the researcher recorded Cronbach alpha ranges between .78 and .93 indicating sufficient reliability values for the PSAQ. I conducted Cronbach alpha test for each of the instruments to evaluate reliability. The results revealed a value of .969 for the SAMM instrument, .961 for the OP tool, and PSAQ exhibited a Cronbach alpha value of .949.

Data Assumptions

Procedures within the study included adherence to assumptions associated with selected statistical techniques (Casson & Farmer, 2014; Hess & Hess, 2017; Williams et al., 2013). Williams et al. (2013) recommended two crucial areas of multiple regression analysis include data assumptions that the variables exhibit a normal distribution and the relationship between variables exhibit linearity. Outliners, unusually high data values, affects the results of multiple regression analysis thereby requiring identification and graphing with histograms or other graphical inspection methods. Scatter plots within the SPSS served to detect any suspected nonlinearity of relationships between variables.

Sample Size

Three factors of the power of the statistical analysis, the level of significance, and the effect size require consideration when calculating the sample size. Large values of power 80% or higher are typical and deemed desirable, and the alpha value frequently reflects .05 (Hayat, 2013). Cohen (1992), identified for a power statistic of .80, effect sizes of small (.02), medium (.15), and large (.35) values, respectively. The effect size is

imperative for determination of sample size in quantitative analysis (Cohen, 1992). I used G*Power to compute a sample size of 61 participants ($N = 61$). Increasing the power to 99% resulted in a sample size of 131 participants ($N = 131$). As such, a sample size between 61 and 131 is appropriate for the proposed study. Ilieva, Hook, and Farah (2015) stated efforts in support of generalizing findings of small sample population include meeting or exceeding the significance levels. Within the study, I identified convenience/purposive sampling as the approach thereby potentially negating generalization beyond the sample. However, increasing the sample size to 131 participants may aid to mitigate external validity.

Transition and Summary

Section 2 encompassed the plan of action that I executed to complete the study. This section included a comprehensive discussion of the study participants, data instruments, data collection technique, data analysis procedures, and other specifics related to study implementation. In Section 2, I also outlined my plan for conducting the study. Section 3 will be comprised of the results of the study, a thorough discussion of the findings, application to professional practice, and the implication for social change. Section 3 will also include my recommendations for supporting research and thoughts on the doctoral study journey.

Section 3: Application to Professional Practice and Implications for Change

This section will include a discussion of the results of the study and their application to professional practice. I will discuss the findings relative to the research question and hypotheses, address the contribution of the literature review to the present research, and describe potential implications for social change and future research. Finally, I will provide recommendations for future action.

Introduction

The purpose of this quantitative correlation study was to examine the relationship between project alignment, performance outputs, and project success rates. The independent variables were project alignment and performance outputs, and the dependent variable was project success rates. The research question I developed to guide this study was as follows: What information do IT business leaders need to understand the relationship between project alignment, performance outputs, and project success rates? Testing commenced on the following hypotheses:

$H_0$1: There is no statistically significant relationship between project alignment, performance outputs, and project success rates.

H*a*1: There is a statistically significant relationship between project alignment, performance outputs, and project success rates.

To address the research question, I conducted an online survey using three project manager groups. The survey encompassed three combined instruments, the SAMM, OP, and PSAQ to explore project alignment, performance outputs, and project success, respectively. The results of my data analysis revealed findings that supported my

rejection of the null hypothesis, as there was a significant relationship between project alignment, performance outputs, and project success rates. To test the hypothesis, I also conducted a Shapiro-Wilk test for the normality of each variable followed by a Pearson correlation assessment to evaluate the relationship of the independent and dependent variables for linearity and to determine if the variables exhibited high correlation to each other. I used multiple regression analysis to calculate tests of statistical significance for each coefficient and for the equation as a whole that assisted in rejecting the null hypothesis.

Presentation of the Findings

On February 13, 2017, I uploaded the study survey to an initial LinkedIn group. Two weeks later, I sent an e-mail to the second set of potential survey respondents asking project managers to participate in the survey (see Appendix E). After 3 weeks online, I added a third group of potential participants. Upon clicking the survey hyperlink, members of each of the group initiated the information page containing the consent form. In each instance, indicating their understanding of the research and the ability to withdraw from survey participation at any time, all participants provided implied consent by selecting the button labeled "Next," thereby allowing them to complete the survey.

I employed the SAMM instrument to study project alignment to business objective, the OP tool to study performance outputs, and the PSAQ questionnaire to study the frequency of project success rates. Using G*Power, I calculated a sample size of $N = 61$. I exported 79 collected responses from Survey Monkey via Excel file into SPSS analysis software. Removal of disqualified and missing data responses yielded a dataset

of 49 completed surveys used for analysis. The number of viable responses based on the calculated sample size $N = 61$, yielded a power level of .80, $\alpha = .05$.

Descriptive Statistics

In this study, I negated the requirement and collection of gender, age, marital status, or other demographic variables. Rather, respondents answered three criteria questions. The criteria for study participation included PMP certification, 3 years of project management experience, and implementation of a strategic project spanning 3 or more years through employment at an Arizona organization employing over 500 employees and exhibiting business longevity of 5 or more years.

Data screening. The data screening for this study consisted of the visual evaluation and removal of 30 responses from the final sample dataset of 79 responses. Criteria question responses represented a yes/no format. Of the 30 data responses removed, 21 (70.0%) of the total surveyed respondents met the PMP credential holder qualification, seven (23.3%) were not PMP certified, and two (6.7%) of the respondents did not answer the question. Twenty-six or 86.7% of the total disqualified respondents exhibited three or more years of project management experience, two (6.7%) failed to meet this criterion, and two (6.7%) did not answer the criteria question. Responses to Criteria Question 3 revealed eight (26.7%) of the total surveyed respondents met the qualification of having implemented a strategic project spanning 3 years or more. However, within this dataset, 20 (66.7%) of the total respondents failed to meet the criteria and were disqualified from survey participation, and two (6.7%) of the respondents failed to answer the criteria question.

Distribution of statistic of study variables. The complete dataset for analysis consisted of 49 survey responses. The response values for the variables of the study represented the participants' responses from the three study instruments via the Survey Monkey online survey. Section 1 of the survey represented data from the SAMM instrument that I used to measure the independent variable of project alignment. Section 2 of the survey represented data from the OP instrument that I used to measure the IV of performance outputs. Section 3 of the survey represented data from the PSAQ that I used to assess the success of the dependent variable of organizational project success. To determine the general outlook of all respondents, I calculated the weighted average that resulted from a cumulative response to each of the questions for each of the instruments.

As indicated in Table 2, I computed means to reflect the statistics of the variables. Participant survey responses ($N = 49$) for project alignment to business objectives reflected a mean of 2.77 ($SD = .77$). Performance outputs for performance from operations revealed a mean of 3.53 ($SD = .586$). Project success rates had a mean of 3.70 ($SD = .63$). In each instance, the M value is larger than the value of SD, indicating tightly clustered data around the average data point.

Table 2

Descriptive Statistics of Response Distributions for Study Variables

Variable	*n*	Range	Min	Max	*M*	*SE*	*SD*	Variance
Alignment	49	3.28	1.36	4.64	2.7661	.10928	.76496	.585
Performance	49	2.69	2.31	5.00	3.5253	.08366	.58561	.343
Success	49	2.39	2.61	5.00	3.7004	.0894	.62618	.392

Note: $N = 49$.

Assessment of normality can be accomplished in a variety of ways (Bettany-Saltikow & Whittaker, 2014; Casson & Farmer, 2014). Casson and Farmer (2014) suggested coupling the Shapiro-Wilk test with examination of histograms and Q-Q plots. To determine normality of the individual variables, I conducted a Shapiro-Wilk test and generated Q-Q plots. My evaluation of the $p < .05$, identified in Table 3 and Figures 1-3, revealed nonstatistically significant findings for each variable of the study, indicating data points were normally distributed for each variable.

Table 3

Tests of Normality of Individual Study Variables

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Variable	Statistic	*df*	*p*	Statistic	*df*	*p*
Alignment	.101	49	.200*	.978	49	.469
Performance	.086	49	.200*	.981	49	.607
Success	.112	49	.162	.972	49	.280

*This is a lower bound of the true significance.

[a.] Lilliefors Significance Correction

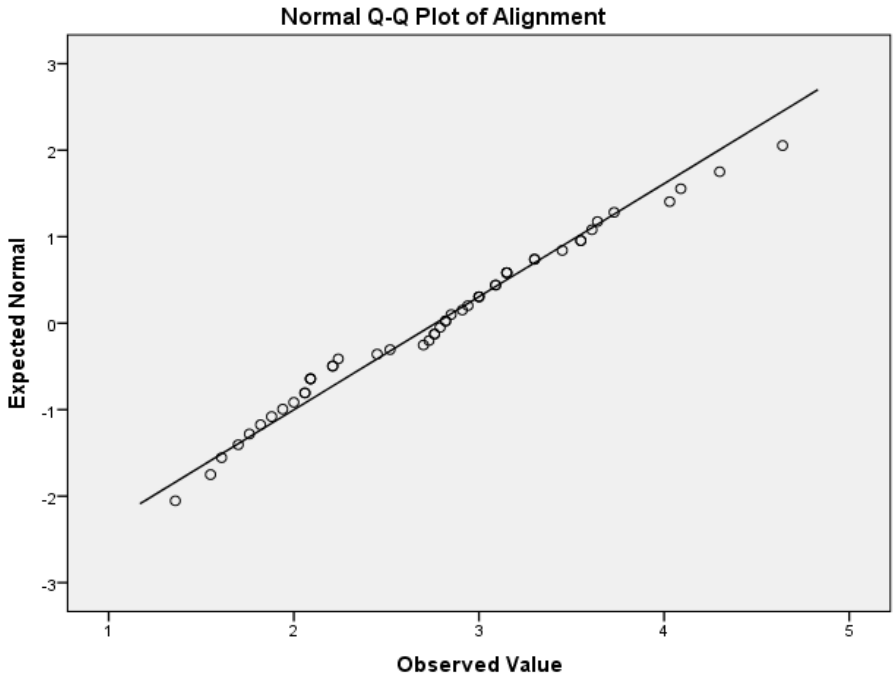


Figure 1. Normal Q-Q plot of independent variable (alignment)

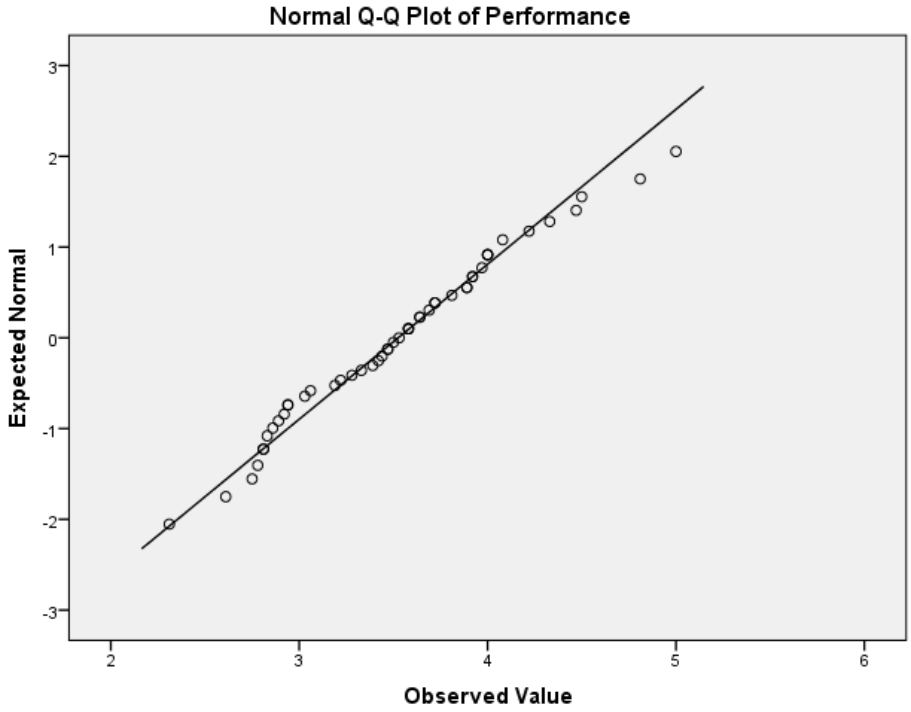


Figure 2. Normal Q-Q plot of independent variable (performance)

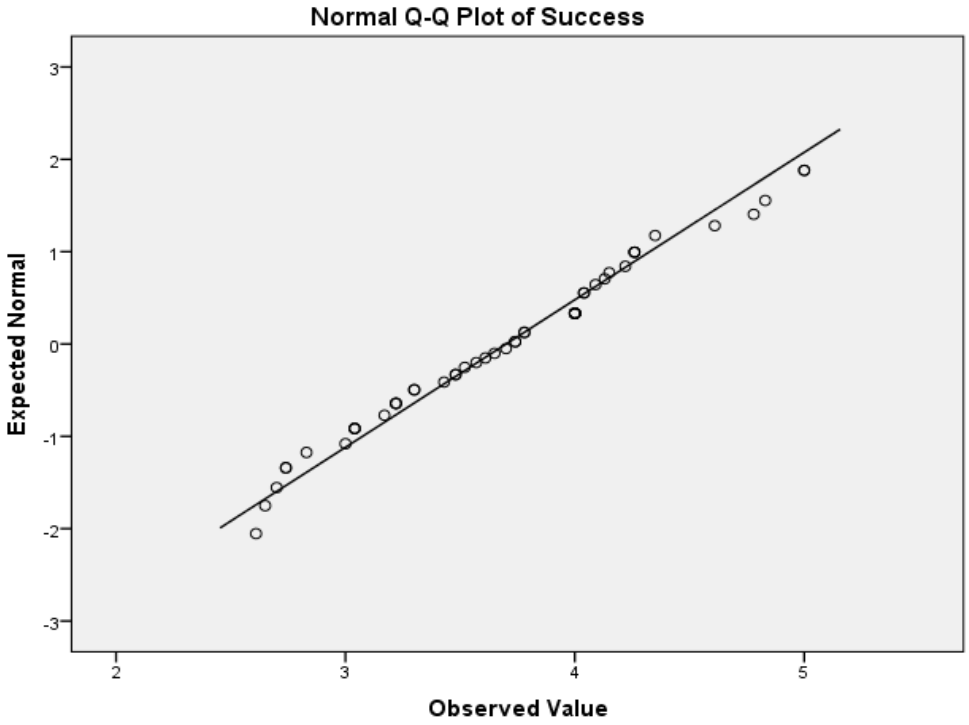


Figure 3. Normal Q-Q plot of dependent variable (success)

Pearson correlation. The Pearson correlation reveals any significant correlation between the variables (Casson & Farmer, 2014; Hess & Hess, 2017). I constructed a correlation table (Table 4) to assess the relationship of the independent/independent and independent/dependent variables to determine if the variables exhibited high correlation to each other. My correlation calculations indicated that the variable of alignment significantly correlated to both the variables of performance and success rates at a significance level of $p < .001$. Similarly, the performance variable was significantly correlated with success rates at a significance level of $p < .001$.

Table 4

Correlation Among Study Variables

Variable	Alignment	Performance	Success
Alignment			
Pearson Correlation	1.00	.727**	.654**
Sig. (2-tailed)		.000	.000
Performance			
Pearson Correlation	.727**	1.00	.910**
Sig. (2-tailed)	.000		.000
Success			
Pearson Correlation	.654**	.910**	1.00
Sig. (2-tailed)	.000	.000	

** Correlation is significant at the .01 level (2-tailed*). N* = 49.

Statistical Model Assumption Tests

As I noted in Section 2, the adherence to various assumptions is valid for linear regression analysis. Linearity, independence, homogeneity of variance, homoscedasticity, and multicollinearity represent statistical procedures identified in quantitative research (Hess & Hess, 2017). Violation of the assumptions leads to a Type 1 error of rejecting a true hypothesis or Type 2 error, failure to reject a false hypothesis (Bettany-Saltikov & Whittaker, 2014).

Test for linearity. Linearity in multiple regression involves determining whether a linear relationship exists between the predictors and the dependent variable (Williams et al., 2013). To assess linearity, I generated a regression standardized residual versus regression standardized predicted scatterplot (Figure 4). The random distribution of residual data points above and below the x-axis (y = 0) indicated the data were scattered and linear appropriate, thereby meeting the assumption of linearity.

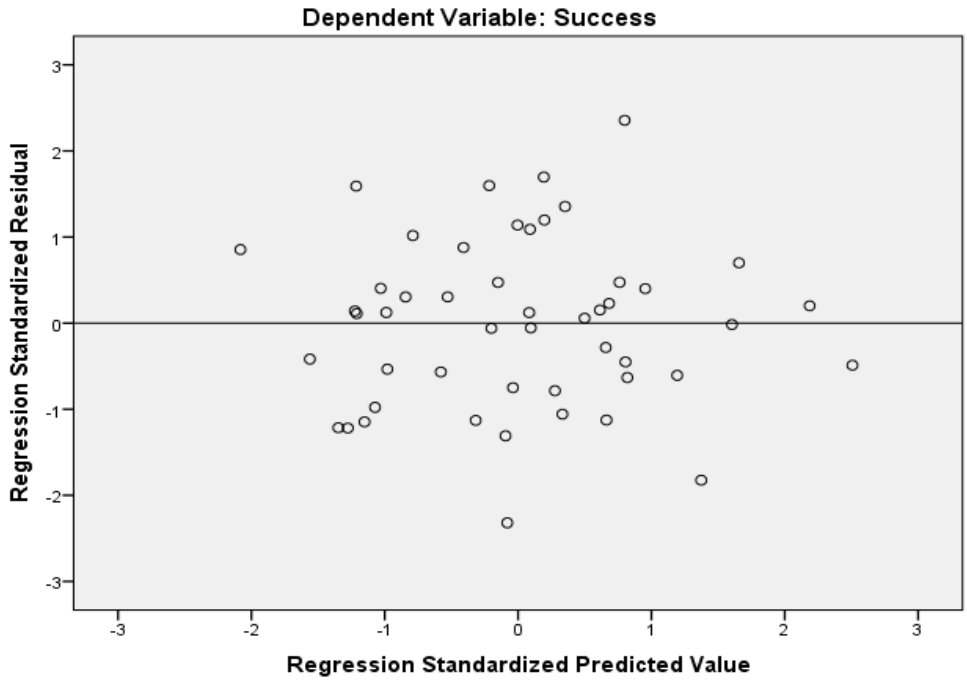


Figure 4. Scatterplot of the standardized residuals. Project success (dependent variable) and strategic alignment, performance outputs (independent variables).

Test for independent errors. To test for independence and determine the existence of a pattern within the data residuals, I used the Durbin-Watson test in SPSS to check the independence of errors assumption. The value of the Durbin-Watson statistic ranges from 0 to 4 with a midpoint of 2 (Edwards, 2015). The result of the Durbin-Watson test for the hypothesis reflects 2.16 indicating no autocorrelation exists in the sample. Further, observation of random data points exhibited on the regression standardized residual versus regression standardized predicted scatterplot supports meeting the assumption of the independent errors test.

Test for homoscedasticity. Homoscedasticity reflects the assumption that within all dataset observations, there exist consistent error variance (Aslam, Riaz, & Altaf, 2013). A visual assessment of the regression standardized residual versus regression

standardized predicted scatterplot and the Durbin-Watson test validated homoscedasticity. Field (2013) stated visual evaluation of data points and the Durbin-Watson represent an appropriate test for validating homoscedasticity. As indicated in Figure 5, the variation around the predicted values on the scatterplot are constant. The randomness of the data points indicates that the data meets the assumption of normally distributed errors. Moreover, the random pattern also indicates that the variances of the residuals are constant. A pattern within the data would indicate nonnormally distributed errors or that the variances of the residuals were not constant. The value of 2.16 compared to the S.E value within the Durbin-Watson test supports the homoscedasticity assumption.

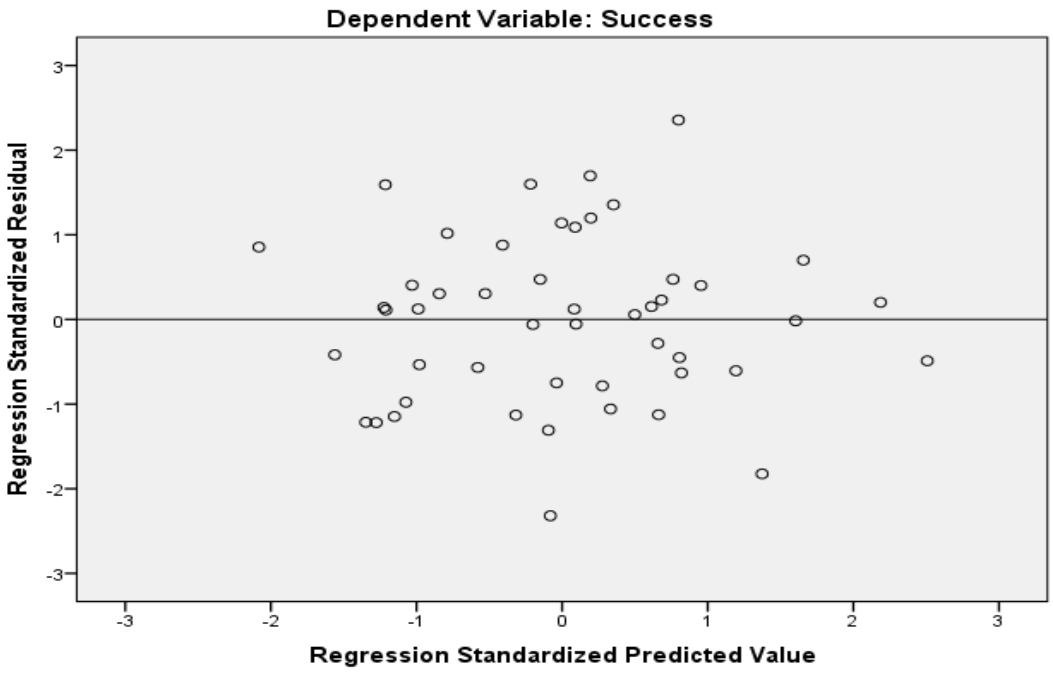


Figure 5. Residuals scatterplot for linearity. Project success (dependent variable) and strategic alignment, performance outputs (independent variables).

Test for multicollinearity. Multicollinearity refers to correlation of independent variables to other independent variables within the regression model. To test multicollinearity, I ran a multiple regression analysis to test the relationship between the independent variables of strategic alignment and performance outputs. Tolerance and the Variance Inflation Factor (VIF) represent statistics for investigating whether an independent variable has a strong linear relationship with other independent variables. When the violation of the assumption of multicollinearity is nonexistence, the tolerance should be > 0.1 and VIF < 10 for all variables (Green & Salkind, 2014). Values of tolerance less than .10 require further investigation, as this may indicate redundancy of a predictor, while VIF values greater than 10 may also warrant further investigation (Miles, 2014). Both tolerance and VIF values were within the acceptable parameters, as indicated in Table 5, thereby meeting the multicollinearity assumption for the predictors' strategic alignment and performance outputs.

Table 5

Collinearity Statistics for the Relationship between Strategic Alignment and Performance Outputs (Independent Variables) and Project Success (Dependent Variable).

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Variable	*B*	*SE*	*β*	*t*	*p*	Tolerance	VIF
(Constant)	.262	.237		1.107	.274		
Alignment	-.013	.073	-.015	-.173	.864	.472	2.119
Performance	.985	.095	.921	10.364	.000	.472	2.119

Note: Dependent variable = success.

Test for normal distribution of errors. Determination of normal distribution involves validating the normal distribution of the errors. The random distribution of data points displayed within the residuals plot serves as an indication of normally distributed data. To further test the assumption, I generated a histogram (Figure 6) and the normal P-P plot (Figure 7) of regression. The histogram displays the standardized residuals and indicates a normal distribution. The normal P-P plot displays data points on the linear lines indicating normally distributed residuals.

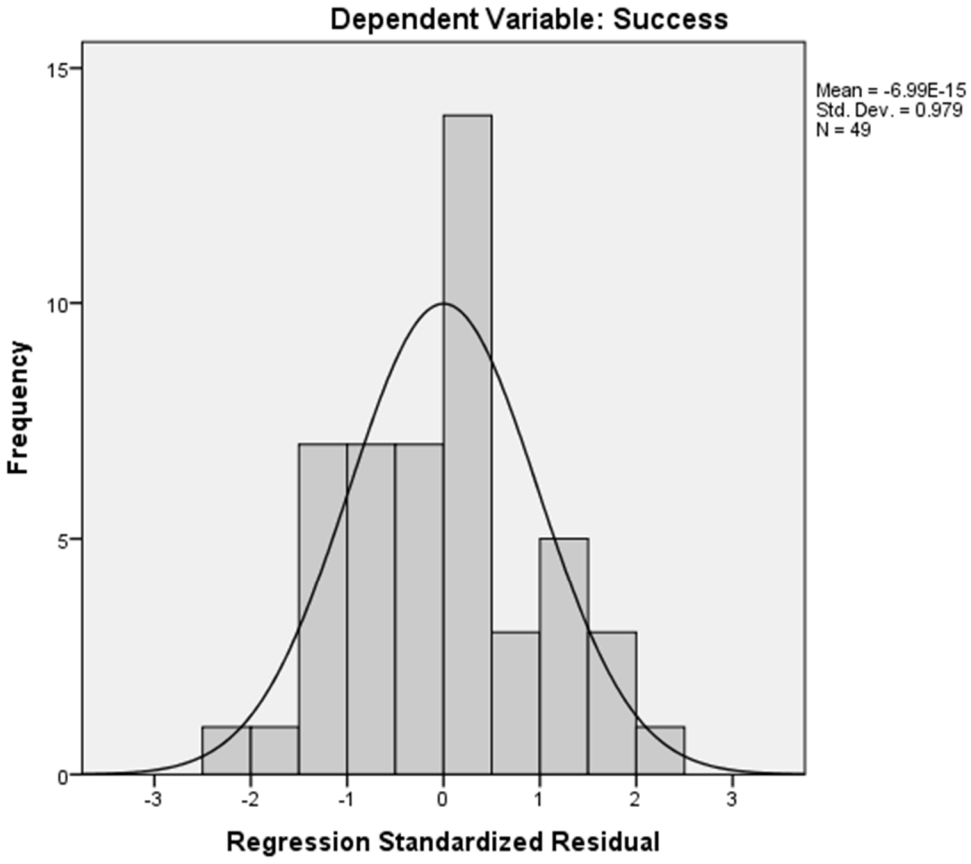


Figure 6. Histogram of data normality. Success dependent variable.

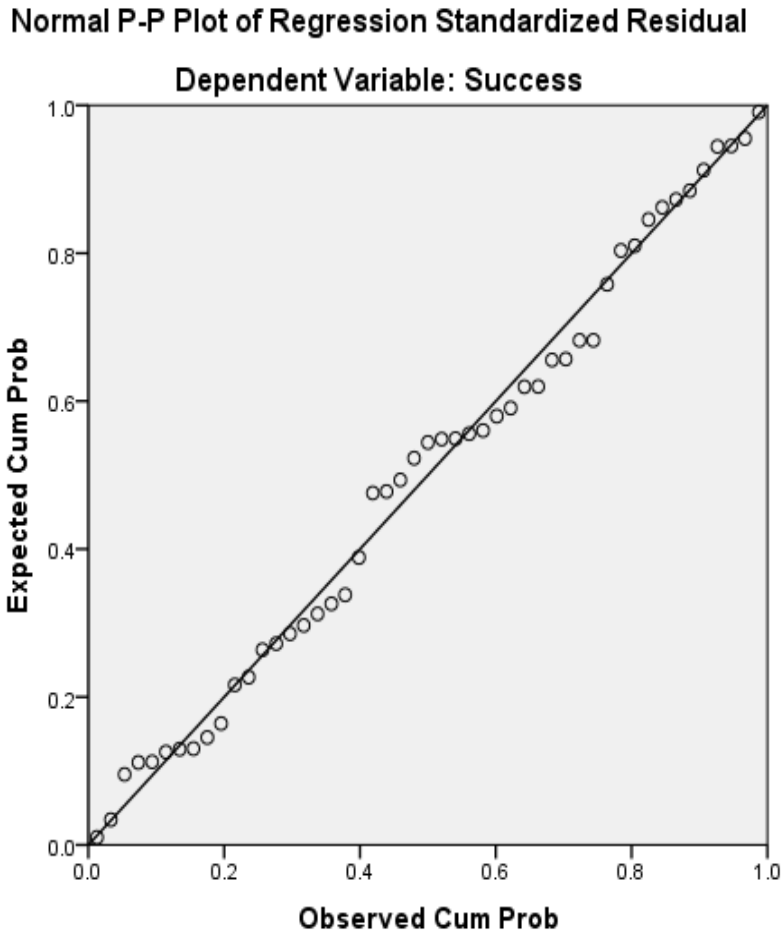


Figure 7. The P-P plot for normality. Dependent variable: success

Inferential Statistics

A multiple linear regression ensued to test the hypothesis for the relationship between project alignment and performance outputs with project success. Project alignment and performance outputs represented the independent variables. The dependent variable represented project success rates. The alternative hypothesis was that there was a statistically significant relationship between project alignment, performance outputs, and project success. The research question and hypotheses follow:

RQ1: What is the relationship between project alignment, performance outputs, and project success rates?

$H_0$1: There is no statistically significant relationship between project alignment, performance outputs, and project success rates.

H_a1: There is a statistically significant relationship between project alignment, performance outputs, and project success rates.

Multiple linear regression involved three parts, the model summary; an analysis of variance (ANOVA) test; and the coefficients table. The value R^2 from the model summary table reflects .828 and indicates how much total variation exists in the dependent variable explained by the combined independent variables. The combined independent variables could explain 83% of the variability of project success. The ANOVA (Table 6) shows that the overall regression model is a good fit for the data. The combined independent variables of project alignment and performance outputs significantly predicted project success rates revealing F (2, 46) = 111.08, $p < .001$, R^2 = .83. As indicated in Table 7, the model predicts for a one-unit increase in the independent variable, project alignment, the dependent variable, project success rates will decrease by (B = -.013) units holding all other independent variables constant. Conversely, for a one-unit increase in the independent variable; performance outputs, the dependent variable; the dependent variable, project success rates will increase by (B = .985) units holding all other independent variables constant and is statistically significant. I conducted bootstrapping with 1,000 samples (Table 8) to ensure no violation of parametric assumptions.

Table 6

Analysis of Variance Table (ANOVA)

Model	Sum of Squares	*df*	Mean Square	*F*	*p*
Regression	15.592	2	7.796	111.082	.000
Residual	3.228	46	.070		
Total	18.821	48			

Note. Dependent Variable: Success. Predictors: Alignment and Performance.

Table 7

Regression Analysis Summary for Predictors Alignment and Performance (N =49)

	Unstandardized Coefficients		Standardized Coefficients			*B* 95% Confidence Intervals	
Variable	*B*	*S.E*	*β*	*t*	*p*	Lower	Upper
(Constant)	.262	.237		1.107	.274	[-2.15 - .740]	
Alignment	-.013	.073	-.015	-.173	.864	[-.159 - .134]	
Performance	.985	.095	.921	10.364	.000	[.794 – 1.176]	

Note. Dependent Variable: Success.

Table 8

Regression Analysis Summary for Predictors Strategic Alignment and Performance Outputs (N =49) with Bootstrapping

	Unstandardized Coefficients				*B* 95% CI Bootstrap	
Variable	*B*	*Bias*	*S.E*	*p*	Lower	Upper
(Constant)	.262	-.003	.198	.190	[-1.37 - .649]	
Alignment	-.013	-.001	.075	.873	[-.158 - .140]	
Performance	.985	.000	.086	.001	[.791 - 1.153]	

Note. Bootstrap results based on 1,000 bootstrap samples. Dependent Variable: Success.

The coefficient table indicates the direction in which the variables move. In the regression model, the independent variable, project alignment moves negatively (B = -.013) and independent variable, performance outputs moves positively (B = .985). In regression outcomes, a negative correlation coefficient offers statistical proof of a negative relationship between the variables (Vatcheva, Lee, McCormick, & Rahbar, 2016). I identified no serious violations of the assumptions surrounding the multiple regression model, but reasoned multicollinearity may contribute to the negative direction of the project alignment predictor whereby prompting further regression testing by excluding the independent variable, performance outputs (Table 9). Regression testing through isolation of the independent variable, project alignment revealed in Table 10, that the variable significantly predicts project success rate as evidenced by $F\ (1, 47)$ = 35.152, p < = .001, R^2 = .43.

Table 9

Analysis of Variance Table (ANOVA) for Independent Variable: Alignment

Variable	Sum of Squares	*df*	Mean Square	*F*	*p*
Regression	8.053	1	8.053	35.152	.000[b]
Residual	10.768	47	.229		
Total	18.821	48			

Note. Dependent Variable: Success. Predictor: (Constant) Alignment.

Table 10

Regression Analysis Summary for Predictor Variable Alignment

	Unstandardized Coefficients		Standardized Coefficients		
Variable	*B*	*S.E*	*β*	*t*	*p*
Constant	2.219	.259		8.568	.000
Alignment	.535	.090	.654	5.929	.000

Note. Dependent Variable: Success.

Analysis Summary

The purpose of this quantitative correlational study was to examine the relationship between the independent variables, project alignment and performance outputs; and the dependent variable, project success rates. I used multiple linear regression to assess how project alignment and performance outputs related to project success rates. The results of the Pearson correlation revealed both project alignment and performance outputs highly correlated with project success rates. I conducted bootstrapping with 1,000 samples to ensure no violation of the parametric assumptions. The regression analysis with bootstrapping replicated the initial regression analysis with minimal change in confidence interval values thereby indicating a good fit model.

Further evaluation of the negative correlation coefficient value reported for the project alignment predictor involved multiple regression analysis that excluded the performance outputs variable. Results of the additional regression testing, by isolating the project alignment variable, revealed alignment significantly predicts project success

rate as evidenced by $F\ (1,\ 47) = 35.152$, $p <= .001$, $R^2 = .43$. The regression model as a whole (combined variables) was significantly predictive of project success rates with $F\ (2,\ 46) = 111.08$, $p < .001 < .05$, $R^2 = 0.82$. I rejected the null hypotheses, H_o and accepted H_a. There exists a positive relationship between project alignment, performance outputs, and project success rates.

Theoretical Framework

The theoretical perspective of this study; systems thinking, represented as the systems approach, involved four attributes. The first attribute comprised viewing the situation holistically. A holistic view of project success rates within this study involved responses from the operational level versus the leadership level. The second attribute involved recognizing the importance of interrelationship and interconnectedness. Recognizing a hierarchy of system levels and the emergent properties generated within and across the levels represents a third attribute of the systems approach. Finally, the systems approach involves accepting that people act according to different purposes and rationalities (Chen, 2016; Loosemore & Cheung, 2015).

The theory was optimal for explaining the relationship between project alignment and performance outputs for projects success rates from organizational members historically not included in the decision making process of selecting projects aligned to organizational goals. However, the same organizational members are deemed important and relevant for implementing projects that contribute to organizational performance. Based on the results of this study, project managers assessed the predictor variables of alignment and performance outputs, to be significant indicators of project success rates.

The involvement of team members to accomplish goals represents a systems thinking characteristic of recognizing that the organization is a result of member interaction.

The application of systems thinking to my research yielded a deeper understanding of the interrelationships between the study variables based on the internally held constructs of personal experiences, knowledge, and concepts attributable to insights of credentialed project managers. These mental models provided understanding, decisions, and actions associated with their project's alignment, organization's performance outputs, and project success rates. Mental models represent everyday clarifications for dealing with complexity, activate in response to mental and physical stimuli, and are adaptive and continuously formed by new experiences, and personal interpretations (Sax & Clack, 2015).

Applications to Professional Practice

The most widely accepted model of alignment is characterized by a prearranged, rational, top-down, executive approach to strategy (Reynolds & Yetton, 2015; Walsh et al., 2013). Top-level managers affect project strategic fit and often develop corporate strategies that fail to align at the operational level where projects implementation occurs. However, the project manager, a key person on any project, often leads multiple and varied projects and accepts accountability for project success or failure (Zahra et al., 2014). Anantatmula (2015) asserted that project managers are accountable for meeting stakeholder expectations and project success. Insight from this study provides corporate leaders information on how project managers discern information from project and organizational context to deliver the desired business outcomes.

Forty-nine PMI credentialed project managers; with expressed experience in implementing strategic projects, responded to the survey of this study, and represented the dataset. Their responses reinforced the argument that project alignment at the operational level directly influenced project success rates and enhanced the overall performance of the organization. The results of the study are relevant because the information derived from this study may involve the inclusion of project managers, their insight, and experience in aligning selected projects; promote new approaches for thinking about how project implementation enhances organizational performance outputs, project success rates, and contribute to the minimization failed IT investments.

Implications for Social Change

The results of this study reinforce the argument that project alignment at the operational level directly influences project success rates and the overall performance of the organization. The social implication of these findings is that if organizational project success rates increase the organization benefits from the enhanced business performance. Enhanced business performance leads to successful organizations. Successful organizations positively affect local and global economies through higher profits and higher wages, which in turn ultimately positively affect society-at-large. Additionally, the results of this study reflect information obtained from members involved in the day-to-day project implementation activities. The inclusion of such members, in the meetings associated with the strategic decision-making process, may increase the individual's knowledge for more effective, efficient project implementations, identification of

additional success factors based on project context, and enhance the project management career field through knowledge sharing.

Recommendations for Action

The purpose of this quantitative correlation study was to examine the relationship between the independent variables of project alignment and performance outcomes, and the dependent variable, project success. This study examined the variables from the operations perspective. Top-level managers develop corporate strategies that fail to align at the operational level where project implementation occurs. Subsequently, the project manager and the team formulate project strategies based on project objectives often leading to a lack of alignment, wasted resources, and missed opportunities (Ansari et al., 2015). One recommendation for action includes the inclusion of PMPs, who oversee projects, in the project selection meetings. The advanced knowledge, obtained from attendance at these meetings, may contribute significantly to the successful implementation of projects, manager and project manager knowledge sharing, and the systems thinking approach of identifying projects as CAS versus isolated events. The results of the study reveal a correlational connection between the variables of alignment and performance outputs to project success rates.

The second recommendation for action involves the use of systems thinking to examine the interconnections between IT projects and the organization's performance outputs for increasing project success rates. Such an action may promote improved problem-solving, better decision-making, and value-added knowledge sharing in the

organization. Leaders may benefit from findings of this study through a different way of seeing, thinking, and achieving desired organizational goals.

Recommendations for Future Research

The results of this study, based on project manager response, revealed a correlation between the independent variables; project alignment and performance outcomes, and the dependent variable, project success rates. Future researchers may want to replicate this study and include both high-level managers and PMPs from the same organization to determine the interconnections of components identified as important for project success. Future researchers may want to evaluate what specific aspects of performance primarily contributed to project success rates at the operational level. The OP instrument consisted of six main sections of employee satisfaction, communication, team collaboration, strategic performance, knowledge management, and organization growth. Evaluation of the data relative to the individual elements may contribute additional insight into increased project success rates. Similarly, evaluation of specific components of the SAMM tool relative to project success may indicate specific areas for further study.

Two limitations I identified in Section 1 included the exclusion of other project success factors and the sample participants not being representative of all possible participants. Success factors differ across industries (Davis, 2014), and project success depends on the selection of the appropriate factors (Mir & Pinnington, 2014). Further research may involve identification of the relationship between project alignment, performance outputs, and other project success factors. Such research may expand the

knowledge of the various combinations of success factors that contribute most effectively to the increase in project success rates. Future researchers can address the second limitation through replication of the study that includes an expanded PMP participant pool from a single organization or by obtaining participants of an equal sample size from various organizations. Future researchers can validate the study through replication that includes random sampling for generalization of results.

Reflections

I anticipated the coursework associated with completing a higher education degree. I did not anticipate the dissertation cycle. The dissertation cycle was frustrating and cumbersome. It represented days and weeks of continuous work that often resulted in days and weeks of waiting to move forward. However, I enhanced my time management skills; learned to work proactively; and instilled flexibility into the doctoral process through patience with myself, my time, and the doctoral process.

Of particular significance for me during the doctoral journey was the desire to conduct a quantitative study. The knowledge and experience gained through this process were both exciting and rewarding. My enhanced understanding of this process solidified my desire and doctoral purpose to conduct future research on issues related to the project management career field and apply the scantly used quantitative methodology to future studies.

Conclusion

Rejection of the null hypotheses ensued based on results of the regression model. A positive relationship exists between the independent variables, project alignment,

performance outputs, and the dependent variable, project success rates. The study involved three groups of credentialed project management professionals involved in the day-to-day implementation of strategic projects that contributed the success or failure of IT projects. Further studies that include project alignment, performance outputs, and other project success criteria associated with the IT industry may contribute to enhanced project success rates and minimize IT investment failures.

References

Abu, S., Esmadi, A., & Salim, J. (2013). A model for business-IT alignment in Malaysian public universities. *Procedia Technology, 11,* 1135-1141. doi:10.1016/j.protcy.2013.12.305

Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: Why and how of it? *Indian Journal of Medical Specialities, 4,* 330-333. doi:10.7713/ijms.2013.0032

Adams, D. P., & Miles, T. P. (2013). The application of Belmont report principles to policy development. *Journal of Gerontological Nursing, 39*, 16-21. doi:10.3928/00989134-20131028-07

Agnihotri, A. (2013). How much is strategic fit important? *Business Strategy Series, 14,* 99-105. doi:10.1108/BSS-04-2013-0034

Aguinis, H., & Edwards, J. (2014). Methodological wishes for the next decade and how to make wishes come true. *Journal of Management Studies, 51*,143-174. doi:10.1111/joms.12058

Ahmed, R., Azmi, N., Masood, M. T., Tahir, M., & Ahmad, M. S. (2013). What does project leadership really do? *International Journal of Scientific and Engineering Research, 4,* 1-8. Retrieved from http://www.ijser.org

Alaeddini, M., & Salekfard, S. (2013). Investigating the role of an enterprise architecture project in the business-IT alignment in Iran. *Information Systems Frontiers*, *15*, 67-88. doi:10.1007/s10796-011-9332-y

Allen, M., Alleyne, D., Farmer, C., McRae, A., & Turner, C. (2014). A framework for project success. *Journal of Information Technology and Economic Development, 5,* 1-17. Retrieved from: http://www.gsmi-ijgb.com/Pages/JITEDV5N2.aspx

Alsudiri, T., Al-Karaghouli, W., & Eldabi, T. (2013). Alignment of large project management process to business strategy. *Journal of Enterprise Information Management, 26,* 596-615. doi:10.1108/JEIM-07-2013-0050

Anantatmula, V. S. (2015). Strategies for enhancing project performance. *Journal of Management in Engineering, 31*, 1-8. doi:10.1061/(ASCE)ME.1943-5479.0000369

Ansari, R., Shakeri, E., & Raddadi, A. (2015). Framework for aligning project management with organizational strategies, *Journal of Management in Engineering, 31,* 1-8. doi:10.1061/(ASCE)ME.1943-5479.0000249

Arnold, R. D., & Wade, J. P. (2015). A definition of systems thinking: A systems approach. *Procedia Computer Science, 44,* 669-678. doi:10.1016/j.procs.2015.03.050

Aslam, M., Riaz, T., & Altaf, S. (2013). Efficient estimation and robust inference of linear regression models in the presence of heteroscedastic errors and high leverage points. *Communications in Statistics: Simulation & Computation*, *42*, 2223-2238. doi:10.1080/03610918.2012.695847

Bagodi, V., & Mahanty, B. (2015). Shifting the burden archetype: Developing a systems dynamics game. *Journal of Modelling in Management, 10,* 280-395, doi:10.1108/JM2-12-2013-0064

Bannon, W. (2015). Missing data within a quantitative research study: How to assess it, treat it, and why you should care. *Journal of the American Association of Nurse Practitioners, 27*, 230-232. doi:10.1002/2327-6924.12208

Benaija, K., & Kijiri, L. (2014). Project portfolio selection: Multicriteria analysis and interaction between projects. *International Journal of Computer Science Issues, 11,* 134-143. Retrieved from http://www.ijsci.org

Bendoly, E. (2014). System dynamics understanding in projects: Information sharing, psychological safety, and performance effects. *Production and Operations Management, 23*, 1352-1369. doi:10.1111/poms.12024

Berssaneti, F. B., & Carvalho, M. M. (2015). Identification of variables that impact project success in Brazilian companies. *International Journal of Project Management, 33,* 638-649. doi:10.1016/j.ijproman.2014.07.002

Bettany-Saltikov, J., & Whittaker, V. (2014). Selecting the most appropriate inferential statistical test for your quantitative research study. *Journal of Clinical Nursing, 23,* 1520-1531. doi:10.1111/jocn.12343

Biesenthal, C., & Wilden, R. (2014). Multi-level project governance: Trends and opportunities. *International Journal of Project Management, 32,* 1291-1308. doi:10.1016/j.ijproman.2014.06.005

Bishop, W. H. (2013). The role of ethics in 21st century organizations. *Journal of Business Ethics, 118*, 635-637. doi:10.1007/s10551-013-1618-1

Black, L. J. (2013). When visuals are boundary objects in system dynamics work. *System Dynamics Review, 29,* 70-86. doi:10.1002/sdr.1496

Bosch, J. H., Nguyen, N. C., Maeno, T., & Yasui, T. (2013). Managing complex issues through evolutionary learning laboratories. *Systems Research and Behavioral Science, 30,* 116-135. doi:10.1002/sres.2171

Bouras, A., & Bendak, S. (2014). Managing IT projects in public companies: A case study. *Journal of Engineering, Project, and Production Management, 4,* 74-80. Retrieved from: http://www.ppml.url.tw/EPPM_Journal/

Brezuleanu, S., Brezuleanu, C. O., Brad, I., & Iancu, T. (2015). Performance assessment in business of agricultural companies using balanced scorecard model. *Cercetari Economice in Moldova, 48,* 109-120. doi:10.1515/cerce-2015-0035

Brutus, S., Aguinis, H., & Wassmer, U. (2013). Self-reported limitations and future directions in scholarly reports: Analysis and recommendations. *Journal of Management, 39,* 48-75. doi:10.1177/0149206312455245

Burnell, D. (2016). Systems thinking orientation assessment framework (STOAF): Towards identifying the key characteristics of the systems thinker and understanding their prevalence in the layperson. *Systems Research and Behavioral Science, 33,* 471-482. doi:10.1002/sres.2347

Button, K. S., Ioannidis, J. P. A., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., & Munafò, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience, 14*, 365-376. doi:10.1038/nrn3475

Casson, R. J., & Farmer, L. D. M. (2014). Understanding and checking the assumptions of linear regression: A primer for medical researchers. *Clinical & Experimental Ophthalmology, 42,* 590-596. doi:10.1111/ceo.12358

Cezarino, L. O., Junior, F. H., & Correa, H. L. (2012). Organization performance evaluation using systems thinking: A study in Brazilian chemical organizations models. *Systemic Practice and Action Research, 25,* 81-92. doi:10.1107/s11213-001-9198-4

Checkland, P. (1981). *Systems thinking, systems practice*. New York, NY: Wiley.

Checkland, P. (2012). Four conditions for serious systems thinking and action. *Systems Research and Behavioral Science*, *29*, 465-469. doi:10.1002/sres.2158

Cheema, J. R. (2014). A review of missing data handling methods in education research. *Review of Educational Research, 84*, 487-508. doi:10.3102/0034654314532697

Chen, H. T. (2016). Interfacing theories of program with theories of evaluation for advancing evaluation practice: Reductionism, systems thinking, and pragmatic synthesis. *Evaluation and Program Planning, 59,* 109-118. doi:1016.j.evalprogplan.2016.05.012

Chiang, R., & Nunez, M. A. (2013). Strategic alignment and value maximization for IT project portfolios. *Information Technology and Management, 14,* 143-157. doi:10.1007/s10799-012-1026-9

Chih, Y.-Y., & Zwikael, O. (2015). Project benefit management: A conceptual framework of target benefit formulation. *International Journal of Project Management, 33,* 352-362. doi:10.1016/j.ijproman.2014.06.002

Chillingworth, L. (2015). Firm competitiveness and the feasibility formula: The necessary alignment of strategic goals and contemplated projects. *Vadyba, 1,* 25-33. Retrieved from http://www.ltvk.lt/en/m/departments/science-research-department/research-magazine-management-/

Cho, W., & Shaw, M. (2013). Portfolio selection model for enhancing information technology synergy. *IEEE Transactions on Engineering Management, 60,* 739-749. doi:10.1109/TEM.2013.2248088

Christenson, J. D., & Gutierrez, D. M. (2016). Using qualitative, quantitative, and mixed methods research to promote family therapy with adolescents in residential settings. *Contemporary Family Therapy, 38,* 52-16. doi:10.1007/s10591-016-9374-x

Claybaugh, C. C., & Haseman, W. D. (2013). Understanding professional connections in LinkedIn: A question of trust. *Journal of Computer Information Systems*, *54*, 94-105. Retrieved from http://iacis.org/jcis/jcis.php

Cohen, C., Manion, L., & Morrison, K. (2013). *Research methods in education*. New York, NY: Routledge

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159. doi:10.1037/0033-2909.112.1.155

Cokley, K., & Awad, G. H. (2013). In defense of quantitative methods: Using the "master's tools" to promote social justice. *Journal for Social Action in Counseling and Psychology, 5,* 26-41. Retrieved from http://jsacp.tumblr.com

Coltman, T., Tallon, P., Sharma, R., & Queiroz, M. (2015). Strategic IT alignment: Twenty-five years on. *Journal of Information Technology, 30,* 91-100. doi:10.1057/jit.2014.35

Cosenz, F., & Noto, G. (2016). Applying system dynamics modeling to strategic management: A literature review. *Systems Research and Behavioral Science, 33,* 703-741. doi:10.1002/sres.2386

Cugini, M. (2015). Successfully navigating the human subjects approval process. *Journal of Dental Hygiene, 89,* 54-56. Retrieved from: http://www.adha.org/jdh

Das, K. K., & Ara, A. (2015). Impact of human resource information systems in organizational performance: An empirical study. *Splint International Journal of Professionals, 2,* 47-64. Retrieved from http://www.splintjournal.in

Davis, A. C., & Stroink, M. L. (2015). The relationship between systems thinking and the new ecological paradigm. *Systems Research and Behavioral Science, 33,* 575-586. doi:10.1002/sres.2371

Davis, A. P., Dent, E. B., & Wharff, D. M. (2015). A conceptual model of systems thinking leadership in community colleges. *Systemic Practice and Action Research, 28,* 333-353. doi:10.1007/s11213-015-9340-9

Davis, K. (2014). Different stakeholder groups and their perceptions of project success. *International Journal of Project Management, 32,* 189-201. doi:10.1016/j.ijproman.2013.02.006

DeSimone, J. A., Harms, P. D., & DeSimone, A. J. (2015). Best practice recommendations for data screening. *Journal of Organizational Behavior, 36,* 171-181. doi:10.1002/job.1962

DeYoung, C. G. (2015). Cybernetic big five theory. *Journal of Research in Personality, 56,* 33-58. doi:10.1016/j.jrp.2014.07.004

Doherty, M. (2014). Exploring project manager insights about IT project success using Q-methodology. *Journal of Technology Research, 5,* 1-24. Retrieved from http://www.aabri.com/jtr.html

Dong, Y., & Peng, C.-Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus, 2,* 1-17. doi:10.1186.2193-1801-2-222

Dowling, A. M., MacDonald, R. H., & Richardson, G. P. (1995). Simulation of system archetypes. Paper presented at the 13th International Conference of the System Dynamics Society. Tokyo, Japan. Retrieved from: https://www.systemdynamics.org/conferences/1995/proceed/index.htm

Dutra, C. C., Ribeiro, J., & Monteiro de Carvalho, M. (2014). An economic-probabilistic model for project selection and prioritization. *International Journal of Project Management, 32,* 1042-1055. doi:10.1016/j.ijproman.2013.12.004

Edwards, S. (2015). Monetary policy independence under flexible exchange rates: An illusion? *World Economy, 38,* 773-787. doi:10.3386/w20893.

Fan, X. (2013). The test is reliable, the test is valid: Language use, unconscious assumptions, and education research practice. *Asia-Pacific Education Researcher, 22,* 217-218. doi:10.1007/s40299-012-0036-y

Fassinger, R., & Morrow, S. (2013). Toward best practices in qualitative, quantitative, and mixed methods research: A social justice perspective. *Journal for Social Action in Counseling and Psychology, 5*, 69-83. Retrieved from http://www.psysr.org/jsacp/Fassinger-V5N2-13_69-83.pdf

Fayaz, A., Kamal, Y., Amin, S., & Khan, S. (2017). Critical success factors of information technology projects. *Management Science Letters, 7,* 73-80. doi:10.5267/j.msl.2016.11.012

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Thousand Oaks, CA: SAGE Publications Inc.

Frank, M., & Kordova, S. K. (2015). Four layers approach for developing systems thinking assessment tool for industrial and systems engineers. *Industrial Engineering and Management, 4*, 1-6. doi:10.4127/2169-0316.1000178

Gash, H. (2016). Systems and beliefs. *Foundations of Science, 21,* 177-187. doi:10.1007/s10699-015-9411-5

Gerow, J. E., Thatcher, J. B., & Grover, B. (2015). Six types of IT-business strategic alignment: An investigation of the constructs and their measurements. *European Journal of Information Systems, 24,* 1-27. doi:10.1057/ejis2014.6

Gibbs, N., & Weightman, W. (2014). An audit of the statistical validity conclusion of clinical superiority in anesthesia journal. *Anaesthesia & Intensive Care, 42*, 599-607. Retrieved from http://www.aaic.net.au

Gingnell, L., Franke, U., Lagerstrom, R., Ericsson, E., & Lillieskold, J. (2014). Quantifying success factors of IT project: An expert based Bayesian model. *Information Systems Management, 3*, 21-36. doi:10.1080/10580530.2014.854033

Green, B. S., & Salkind, J. N. (2014). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (6th ed.). Upper Saddle River, NJ: Prentice Hall.

Haji-Kazemi, S., & Andersen, B. (2013). Application of performance measurement as an early warning sign: A case study in the oil and gas industry. *International Journal of Managing Projects in Business, 6,* 714-738. doi:10.1108/IJMPB-04-2012-0015

Hanafizadeh, P., & Vali Zadeh, R. (2015). Vendor selection using soft thinking approach: A case study of National Iranian South Oil Company. *Systemic Practice and Action Research, 28*, 355-381. doi:10.1007/s11213-014-9334-z

Hands, A. (2013). Tech services on the web: LinkedIn. *Technical Services Quarterly, 30,* 232-234. doi:10.1080/07317131.2013.759855

Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning, 7,* 836-850. doi:10.16/j.cptl.2015.08.001

Hayat, J. M. (2013). Understanding sample size determination in nursing research. *Western Journal of Nursing Research, 35,* 943-956. doi:10.1177/0193945913482052

Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal, 32*, 472-484. doi:10.1147/SJ.1999.5387096

Henning, P. B., & Chen, C.-W. (2012). Systems thinking: Common ground or untapped territory? *Systems Research and Behavioral Science, 29,* 470-483. doi:10.1002/sres.2155

Hess, A. S., & Hess, J. R. (2017). Linear regression and correlation. *Transfusion, 57,* 9-11. doi:10.1111/trf.13928

Hieronymi, A. (2013). Understanding systems science: A visual and integrative approach. *Systems Research and Behavioral Science, 30*, 580-595. doi:10.1002/sres.2215

Ilieva, I. P., Hook, C. J., & Farah, M. J. (2015). Prescription stimulants' effects on healthy inhibitory control, working memory, and episodic memory: A meta-analysis. *Journal of Cognitive Neuroscience, 27*, 1069-1089. doi:10.1162/jocn_a_00776

Ing, D. (2013). Rethinking systems thinking: Learning and coevolving with the world. *Systems Research and Behavioral Science, 30,* 527-547. doi:10.1002/sres.2229.

Jalal, M. P., & Koosha, S. M. (2015). Identifying organizational variables affecting project management office characteristics and analyzing their correlations in the Iranian project-oriented organizations of construction industry. *International Journal of Project Management, 33*, 458-466. doi:10.1016/j.ijproman.2014.06.010

Janssen, M., Van der Voort, H., & Fluer van Veenstra, A. (2015). Failure of large transformational projects from the viewpoint of complex adaptive systems: Management principles for dealing with project dynamics. *Information Systems Frontiers, 17,* 15-29. doi:10.1007/s10796-014-9511-8

Jaradat, R. M., Keating, C. B., & Bradley, J. M. (2017). Individual capacity and organizational competency for systems thinking. *IEEE Systems Journal*, pp 1-8, doi:10.1109/JSYST.2017.2652218

Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, *7,* 396-403. doi:10.9734/BJAST/2015/14975

Kaiser, M. G., Arbi, F. E., & Ahlemann, F. (2015). Successful project portfolio management beyond project selection techniques: Understanding the role of structural alignment. *International Journal of Project Management, 33*, 126-139. doi:10.1016/j.ijproman.2014.03.002

Kang, H., Yeon, K., & Han, S. T. (2015). A review on the use of effect size in nursing research. *Journal of Korean Academy of Nursing, 45,* 641-649. doi:10.4040/jkan.2015.45.5.641

Kapsali, M. (2013). Equifinality in project management: Exploring causal complexity in projects. *Systems Research and Behavioral Science, 30,* 2-14. doi:10.1002/sres.2128

Karpovsky, A., & Galliers, R. D. (2015). Aligning in practice: From current cases to a new agenda. *Journal of Information Technology, 30,* 136-160. doi::10.1057/jit.2014.34

Kemparaj, U., & Chavan, S. (2013). Qualitative research: A brief introduction. *Indian Journal of Medical Sciences, 67*, 89-98. doi:10.4103/0019-5359.121127

Khalili-Damghani, K., & Tavana, M. (2014). A comprehensive framework for sustainable project portfolio selection based on structural equation modeling. *Project Management Journal, 45*, 83-97. doi:10.1002/pmj.21404

Kipper, L., Nara, E., Siluk, J., & Mendes, F. (2014). The use of scoring method for prioritizing the project portfolio. *Journal of Management Research, 6,* 156-169. doi:10.5296/jmr.v6i1.4636

Kish, K., Bunch, M. J., & Xu, B. J. (2016). Soft systems methodologies in action: Environment, health & Shanghai's elderly. *Systemic Practice and Action Research, 29,* 61-77. doi:10.1007/s11213-015-9353-4

Kissel, R., Regenscheid, A., & Scholl, M., & Stine, K. (2014). Guidelines for media sanitization. *National Institute of Standards and Technology Special Publication, Revision 1,* 1-64. doi:10.6028/NIST.SP.800-88r1

Klein, L., Biesenthal, C., & Delhin, E. (2015). Improvisation in project management: A praxeology. *International Journal of Project Management, 33,* 267-277. doi:10.1016/j.ijproman.2014.01.011

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine, 15,* 155-163. doi:10.1016/j.jcm.2016.02.012

Kratochwill, T. R., & Levin, J. R. (2014). Meta- and statistical analysis of single-case intervention research data: Quantitative gifts and a wish list. *Journal of School Psychology, 52*, 231-235. doi:10.1016/j.jsp.2014.01.003

Kutsch, E., Ward, J., Hall, M., & Algar, J. (2015). The contribution of the project management office: A balanced scorecard perspective. *Information Systems Management, 32,* 105-118. doi:10.1080/10580530.2015.1018768

Kyvik, S. (2013). The academic researcher role: Enhancing expectations and improved performance. *Higher Education, 65,* 525-538. doi:10.1004/s10734-012-9561-0

Lane, D. C. (2016). What we talk about when we talk about systems thinking. *Journal of the Operational Research Society, 67,* 527-528. doi:10.1057/jors.2015.10

Laszlo, A., & Krippner, S. (1998). Systems theories: Their origins, foundations, and development. *Advances in Psychology, l26,* 47-74. doi:10.1016/S0166-4115(98)80017-4

Lauer, C., McLeod, M., & Blythe, S. (2013). Online survey design and development: A Janus-faced approach. *Written Communication, 30,* 330-357. doi:10.1177/0741088313488075

Lederman, N., & Lederman, J. (2013). Mixed up about mixed methods. *Journal of Science Teacher Education, 24*, 1073-1076. doi:10.1007/s10972-013-9367-7

Lee, I. A. (2008). *Relationship between the use of information technology and performances of human resources management*. (Doctoral dissertation). Retrieved from ProQuest. (UMI No.: 3308932)

Li, X., Fang, S.-C., Tian, Y., & Guo, X. (2014). Expanded model of the project portfolio selection problem with divisibility, time profile factors, and cardinality constraints. *Journal of the Operational Research Society, 75*, 108. doi:10.1057/jors.2014.75

Lips-Wiersma, M., & Mills, A. J. (2014). Understanding the basic assumptions about human nature in workplace spirituality: Beyond the critical versus positive divide. *Journal of Management Inquiry, 23*, 148-161. doi:10.1177/1056492613501227

Loosemore, M., & Cheung, E. (2015). Implementing systems thinking to manage risk in public private partnerships projects. *International Journal of Project Management, 33,* 1325-1334. doi:10.1016/j.ijproman.2015.02.005

Luftman, J. (2003). Assessing IT: Business alignment. *Information Systems Management, 20*, 9-15. doi:10.1201/1078/43647.20.4.20030901/77287

Luftman, J., Wander, F., Nathan, M., & Sutaria, H. (2013). Drawing 'align' in the sand: The cultural shift towards federating IT at Guardian life insurance. *Journal of Information Technology Teaching Cases, 3,* 51-59. doi:10.1057/jittc.2013.12

Mandal, J., & Parija, S. C. (2014). Informed consent and research. *Tropical Parasitology, 4,* 78-79. doi:10.4103/2229-5070.138533.

Martinsuo, M. (2013). Project portfolio management in practice and in context. *International Journal of Project Management, 31*, 794-803. doi:10.1016/j.ijproman.2012.10.013

Martinsuo, M., & Killen, C. P. (2014). Value management in project portfolios: Identifying and assessing strategic value. *Project Management Journal, 45,* 56-70. doi:10.1002/pmj.21452

Martz, W. (2013). Evaluating organizational performance: Rational, natural, and open systems models. *American Journal of Evaluation, 34,* 385-401. doi:10.1177/1098214013479151

McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed methods and choice based on research. *Perfusion, 30*, 537-542. doi:10.1177/0267659114559116

Meadows, D. (2008). *Thinking in systems: A primer.* White River, VT: Chelsea Green Publishing.

Meredith, J. R., & Mantel, S. K. (2012). Project management. *A Managerial Approach* (8th ed.). Danvers, MA: John Wiley & Sons, Inc.

Meurs, J. (2016). The experimental design of postmortem studies: The effect size and statistical power. *Forensic Science, Medicine, and Pathology, 12,* 343-349. doi:10.1007/s12024-016-9793-x

Miles, J. (2014). Tolerance and Variance Inflation Factor. *Wiley StatsRef: Statistics Reference Online*. doi:10.1002/9781118445112.stat06593

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: Linking project management and project success. *International Journal of Project Management, 32*, 202-217. doi:10.1016/j.ijproman.2013.05.012

Miracle, V. A. (2016). The Belmont Report: The triple crown of research ethics. *Dimensions of Critical Care Nursing, 35,* 223-228. doi:10.1097/DCC.0000000000000186

Monat, J. P., & Gannon, T. F. (2015). What is systems thinking? A review of selected literature plus recommendations. *American Journal of Systems Science, 4,* 11-26. doi:10.5923/j.ajss.20150401.02

Muller, R., & Jugdev, K. (2012). Critical success factors in projects. *International Journal of Managing Projects in Business, 5*, 757-775. doi:10.1108/17538371211269040

Neumann, K. (2013). Know why thinking as a new approach to systems thinking. *Emergence: Complexity and Organization, 15,* 81-93. doi:10.1108/03684921311295529

Newman, D. A. (2014). Missing data: Five practical guidelines. *Organizational Research Methods, 17,* 372-411. doi:10.1177/1094428114548590

Ngana, J.-P. (2015). Management with a frame of mind for systemic thinking: A conceptual condition for setting tool. *Systems Research and Behavioral Science, 32,* 175-182. doi:10.1002/sres.2257

Nguyen, N. C., & Bosch, O. J. (2014). The art of interconnected thinking: Starting with the young. *Challenges, 5,* 239-259. doi:10.3390/challe5020239

Nowak, M. (2013). Project portfolio selection using interactive approach. *Procedia Engineering, 57*, 814-822. doi:10.1016/j.proeng.2013.04.103

Nwagbogwu, D. C. (2011). *The correlation between project management effectiveness and project success* (Doctoral dissertation). Retrieved from Proquest. (UMI No. 3434599).

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research, 42,* 533-544. doi:10.1007/s10488-013-0528-y

Patanakul, P., Shenhar, A. J., & Milosevic, D. Z. (2012). How project strategy is used in project management: Case of new product development and software development projects. *Journal of Engineering and Technology Management, 29,* 391-414. doi:10.1016/j.jengtecman.2012.04.001

Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research, 4*(3), 192. doi:10.4103/2229-3485.115389

Pedersen, K. (2016). IT project selection: Politics, experience and good friends. *Electronic Journal of Information Systems Evaluation, 19*, 55-70. Retrieved from http://www.ejise.com

Pereira, T. F., Montevechi, J. A. B., Miranda, R. D. C., & Friend, J. D. (2015). Integrating soft systems methodology to aid simulation conceptual modeling. *International Transactions in Operational Research, 22,* 265–285. doi:10.1111/itor.12133

Pigliucci, M. (2014). Between holism and reductionism: A philosophical primer on emergence. *Biological Journal of the Linnean Society, 112,* 261-267. doi:10.1111/bij.12060

Prusty, S. K., Mohapatra, P., & Mukherjee, C. K. (2017). Using generic structures in system dynamics model building: Reflections from modeling for Indian shrimp industry. *Systemic Practice and Action Research, 30,* 19-44. doi:10.1077/s11213-016-9378-3

Quan, H., Mao, X., Chen, J., Shih, W. J., Ouyang, S. P., Zhao, P. L., & Binkowitz, B. (2014). Multi-regional clinical trial design and consistency assessment of treatment effects. *Statistics in Medicine, 33,* 2191-2205. doi:10.1002/sim.6108

Ram, J., & Corkindale, D. (2014). How "critical" are the critical success factors (CSFs)? Examining the roles of CSFs for ERP. *Business Process Management Journal*, *20*, 151-174. doi:10.1108/bpmj-11-2012-1027

Ramezan, M., Sanjaghi, M. E., & Rahimian Kalateh Baly, H. (2013). Organizational change capacity and organizational performance. *Journal of Knowledge-based Innovation in China, 5,* 188-212. doi:10.1108/JKIC-07-2013-0012

Ramos, P., & Mota, C. (2014). Perceptions of success and failure factors in information technology projects: A study from Brazilian companies. *Procedia – Social and Behavioral Sciences, 119*, 349-357. doi:10.1016/j.sbspro.2014.03.040

Randle, J. M., & Stroink, M. L. (2012). *Systems thinking cognitive paradigm and its relationship to academic attitudes and achievement* (Unpublished honors thesis). Lakehead University, Thunder Bay, Canada.

Reynolds, P., & Yetton, P. (2015). Aligning business and IT strategies in multi-business organizations. *Journal of Information Technology, 30*, 101-118. doi:10.1057/jit.2015.1

Ritson, G., Johansen, E., & Osborne, A. (2012). Successful programs wanted: Exploring the impact of alignment. *Project Management Journal, 43,* 21-39. doi:10.1002/pmj.20273

Roberts, L. D., & Allen, P. J. (2015). Exploring ethical issues associated with using online surveys in educational research. *Educational Research and Evaluation*, *21*, 95-108. doi:10.1080/13803611.2015.1024421

Robinson, D. T. (2013). Introducing managers to the VSM using a personal VSM. *Kybernetes, 42,* 125-129. doi:10.1108/03684921311295529

Rolstadas, A., Tommelein, I., Schieflore, P. M., & Ballard, G. (2014). Understanding project success through analysis of project management approach. *International Journal of Managing Projects in Business, 7*, 638-660. doi:10.1108/ijmpb-09-2013-0048

Rook, L. (2013). Mental models: A robust definition. *Learning Organization, 20,* 38-47. doi:10.1108/09696471311288519

Sandelowski, M., & Boshamer, C. (2014). Unmixing mixed-methods research. *Research in Nursing and Health, 37*, 3-8. doi:10.1002/nur.21570

Sanjeev, M. A., & Balyan, P. (2014). Response order effects in online surveys: An empirical investigation. *International Journal of Online Marketing, 4,* 28. doi:10.4018/ijom.2014040103

Sax, H., & Clack, L. (2015). Mental models: A basic concept for human factors design in infection prevention. *Journal of Hospital Infection, 89,* 335-339. doi:10.1016/j.jhin.2014.12.008

Schwaninger, M. (2015). Model-based management: A cybernetic concept. *Systems Research and Behavioral Science, 32,* 564-578. doi:10.1002/sres.2286

Senge, P., Smith, B., Kruschwitz, N., Laur, J., & Schley, S. (2010). The systems-thinking iceberg. In *The necessary revolution: Working together to create a sustainable world* (pp. 172-177). New York, NY: Doubleday.

Serrador, P., & Turner, J. R. (2014). The relationship between project success and project efficiency. *Procedia – Social and Behavioral Sciences, 119,* 75-84. doi:10.1016/j.sbspro.2014.03.011

Sheffield, J., Sankaran, S., & Haslett, T. (2012). Systems thinking: Taming complexity in project management. *On the Horizon, 20,* 126-136. doi:10.1108/10748121211235787

Shelton, C., Smith, A., & Mort, M. (2014). Opening up the black box: An introduction to qualitative research method in anaesthesia. *Anaesthesia, 69*, 270-280. doi:10.1111/anae.12517

Shenhar, A., & Dvir, D. (2007). *Reinventing project management.* Boston, MA: Harvard Business School.

Shenhar, A., Dvir, D., Levy, O., & Maltz, A. (2001). Project success: A multidimensional, strategic concept. *Long Range Planning, 34*, 669-725. doi:10.1016/S0024-6301(01)00097-8

Sheykh, M. J., Azizi, M., & Sobhiyah, M. H. (2013). How can tradeoff between corporate business strategy and project risk be optimized? *Procedia – Social and Behavioral Sciences, 74,* 134-143. doi:10.1016/j.sbspro.2013.03.012

Skarzauskiene, A. (2010). Managing complexity: Systems thinking as a catalyst of the organization performance. *Measuring Business Excellence, 14*, 49-64. doi:10.1108/13683041011093758

Stacey, R. (2013). *Strategic management and organisational dynamics: The challenge of complexity* (Laureate Education, Inc., custom ed.). Essex, England: Pearson Education Limited.

Suen, L.-J. Wu., Huang, H.-M., & Lee, H.-H. (2014). A comparison of convenience sampling and purposive sampling. *Journal of Nursing, 61*, 105-111. doi:10.6224/JN.61.3.105

Survey Monkey. (2014). *SurveyMonkey.* Retrieved from http://www.surveymonkey.com/

Suter, W. N., & Suter, P. M. (2015). How research conclusions go wrong. *Home Health Care Management & Practice, 27*, 171-177. doi:10.1177/1084822315586557

Too, E. G., & Weaver, P. (2014). The management of project management: A conceptual framework for project governance. *International Journal of Project Management, 32,* 1382-1394. doi:10.1016/j.ijproman.2013.07.006

Trusty, J. (2011). Quantitative articles: Developing studies for publication in counseling journals. *Journal of Counseling and Development, 89,* 261-267. doi:10.1002/j.1556-6678.2011.tb0087.x

Ullah, A., & Lai, R. (2013). A systematic review of business and information technology alignment. *ACM Transactions on Management Information Systems, 4*, 1-30. doi:10.1145/2445560.2445564

Vatcheva, K. P., Lee, M., McCormick, J. B., & Rahbar, M. H. (2016). Multicollinearity in regression analyses conducted in epidemiologic studies. *Epidemiology, 6, 227.* doi:10.4172/2161-1165.1000227

Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed method research in information systems. *MIS Quarterly, 37*, 21-54. Retrieved from http://aisel.aisnet.org

Vermerris, A., Mocker, M., & van Heck, E. (2014). No time to waste: The role of timing and complementarity of alignment practices in creating business value in IT projects. *European Journal of Information Systems, 23,* 629-654. doi:10.1057/ejis.2013.11

Von Bertalanffy, L. (1972). The history and status of general systems theory. *Academy of Management Journal, 15,* 407-426. Retrieved from http://www.jstor.org/stable/255139

Walsh, I., Renaud, A., & Kalika, M. (2013). The translated strategic alignment model: A practice-based perspective. *Systèmes d'information et Management*, *18*, 1-29. doi:10.3917/sim.132.0037

Wang, J. Y., & Kitsis, E. A. (2013). Tangling the web: Deception in online research. *American Journal of Bioethics, 13,* 59-61. doi:10.1080/15265161.2013.840868,

Webb, T. (2013). Exploring system boundaries. *Law and Critique, 24*, 131-151. doi:10.1007/s10978-013-9118-0

Whitehead, P., Scherer, W., & Smith, M. (2015). Systems thinking about systems thinking. *IEEE Systems Journal, 9,* 117-1128. doi:10.1109/JSYST.0214.2332494

Williams, M. N., Grajales, G., & Kurkiewicz, D. (2013). Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research & Evaluation, 18,* 1-14. Retrieved from: http://pareonline.net

Wilson, V. (2014). Research methods: Sampling. *Evidence Based Library and Information Practice, 9,* 45-47. Retrieved from https://ejournals.library.ualberta.ca/index.php/EBLIP

Yang, C., Chiang, S., Huang, R., & Lin, Y. (2013). Hybrid decision model for information project selection. *Quality and Quantity, 47,* 2129-2142. doi:10.1007/s11135-011-9646-3

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education, 48,* 311-325. doi:10.1111/ejed.12014

Young, R., & Grant, J. (2015). Is strategy implemented by projects? Disturbing evidence in the State of NW. *International Journal of Project Management, 33,* 15-28. doi:10.1016/j.ijproman.2014.03.010

Young, R., Young, M., Jordan, E., & O'Connor, P. (2012). Is strategy being implemented through projects? Contrary evidence from a leader in New Public Management. *International Journal of Project Management, 30,* 887-900. doi:10.1016/j.ijproman.2012.03.003

Zafar, M. B., Bhattacharya, P., Ganguly, N., Gummadi, K. P., & Ghosh, S. (2015). Sampling content from online social networks: Comparing random vs. expert

sampling of the Twitter stream. *ACM Transaction on the Web, 9,* 1-33. doi:10.1145/2743023

Zahra, S., Nazir, A., Khalid, A., Raana, A., & Majeed, N. M. (2014). Performing inquisitive study of PM traits desirable for project success. *International Journal of Modern Education and Computer Science, 6,* 41-47. doi:10.5815/ijmecs.2014.02.06

Železnik, D., Kokol, P., & Vošner, H. B. (2017). Adapting nurse competence to future patient needs using Checkland's soft systems methodology. *Nurse Education Today, 48,* 106-110. doi:10.1016/j.nedt.2016.09.015

Zuraw, R. (2013). Consenting in the dark: Choose our own deception. *American Journal of Bioethics, 13,* 57-59. doi:10.1080/1526531.2013.840016

Appendix A: Survey Instrument(s)

Instructions: This survey is designed to collect data/information based the study's variables, project alignment and project performance outputs, to determine how these variables relate to project success. The questionnaire is arranged into three sections. Please complete each section.

Section 1 – Inquires about project alignment to business strategies
Section 2 – Inquires about project performance to business strategies
Section 3 – Inquires about project success

Thank you for participating in our survey. Your feedback is important

Section 1: Strategic Alignment

The following 6 sections and their attributes (Luftman, 2000) are believed to impact strategic alignment of information technology projects with business objectives. A short definition is given for each section to assist you in rating the attributes. Responses range from *Initial Process* indicting the organization has initial process in place to *Optimized Processes* indicating processes are in place and optimized. The Strategic Alignment section should take approximately 10 minutes or less to complete.

Please respond to each of the following statements about your organization's maturity. Indicate the degree to which you agree or disagree by marking one response for each item.

	Communications Maturity					
Code	This section refers to the exchange of ideas, knowledge, and information among the IT and business managers, enabling them to have a clear understanding of a company's strategies; business and IT environments; and, the priorities and what must be done to achieve them.	Initial Processes	Committed	Established	Improved	Optimized
PA1	Understanding of business strategies by the IT department					
PA2	Understanding of IT capabilities by the business department					

PA3	Knowledge sharing between organizational levels from strategic to operational and with business partners					
PA4	Creating a communication environment that promotes freedom to express opinions about business and IT strategies in a flexible and informal way					
PA5	Conducing regular meetings between IT and business departments to discuss IT priorities, requirements and implementation					

Competency and Value Measurements Maturity						
Code	This section refers to the assessment of IT investment through the use of metrics to demonstrate the contribution of IT to a business. Please enter your response based on your knowledge of how well the attributes are handled within your organization.	Initial Processes	Committed	Established	Improved	Optimized
PA6	Selection of appropriate metrics for the organization					
PA7	Balance of metrics by linking Business and IT metrics					
PA8	Application of metrics at different organizational level					
PA9	Making effective use of measurements obtained from metrics application					
PA10	Using selected metrics on a regular basis					

Governance Maturity					

Code	The questions within this section refer to the degree in which authority for making decisions is defined and shared among management and the processes managers in both IT and the business organizations apply for setting IT priorities and the allocation of resources	Initial Processes	Committed	Established	Improved	Optimized
PA11	Integrating the enterprise's business plan and IT plan					
PA12	Linking IT projects with the integrated business IT plan					
PA13	Reviewing business priorities before adopting any IT project					
PA14	Conducting steering committees to priorities IT projects					
PA15	Evaluating IT investments before and after implementation					

Partnership Maturity						
Code	This section refers to the relationship amongst business and IT entities, including IT involvement in defining business strategies, the degree of trust between two departments and the ways in which each perceives the contribution of the other.	Initial Processes	Committed	Established	Improved	Optimized
PA16	Involving IT department in developing business strategies					
PA17	Sharing risks and rewards by IT and business management in relation to IT projects					
PA18	Using IT to enable and drive business strategies					
PA19	Considering IT to be a significant part of business, not just a cost center for doing business					

PA20	Sharing a long term relationship between IT and business that enables trust					

	Scope and Architecture Maturity					
Code	This sub-section of Strategic Alignment refers to the organization's infrastructure, change readiness, flexibility in structure, and the management of merging innovations	Initial Processes	Committed	Established	Improved	Optimized
PA21	IT is able to provide integrated information systems across the organization and with business partners					
PA22	IT is able to provide a flexible infrastructure that enables fast response to changes					
PA23	IT is able to evaluate and apply emerging technologies effectively					
PA24	IT is able to enable or drive business processes and strategies with a broad scope of information systems					
PA25	IT is able to provide information security					

	Human Resource Skills					
Code	The final section of strategic alignment addresses the maturity level of the organization's readiness for change and capability to learn and leverage new ideas from skilled resources.	Initial Processes	Committed	Established	Improved	Optimized
PA26	Providing formal opportunities to learn both IT and business skills					
PA27	Providing formal training before implementing a new IT project					

PA28	Providing career cross over opportunities among business departments					
PA29	Willingness or readiness to adapt technological changes					
PA30	Trusting social and political change					

From "Assessing It/Business Alignment", by Luftman, 2003, *Information Systems Management, 20*, 9-15. doi:10.1201/1078/43647.20.4.20030901/77287.2. Copyright by Luftman J. (2000). Reprinted with permission.

Section 2: Organizational Performance

Section 2, Operational Performance (Ramezan, Sanjaghi, & Kalateh Baly, 2013), consists of 6 main sections defined to measure how well the organization's strategic objectives meet the organization's business objectives. Responses range from Strongly Disagree to Strongly Agree.

Please respond to each of the following statements about your organization. Indicate the degree to which you agree or disagree by marking one response for each item. This section should take 5-10 minutes to complete.

Employee Satisfaction						
Code	The employee satisfaction section underscores questions that reflect the happiness level of employees within the organization. Please indicate your level of agreement based on understanding of this aspect within your organization.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP1	I am currently contented with working for the organization.					
OP2	I feel I am of importance to the organization.					
OP3	The manager plays a supportive role in my personal growth and development.					
OP4	This organization pays well compared to other organizations.					
OP5	I feel secure in my job.					
OP6	I feel proud that I am a part of the organization.					

Organizational Communications					

Code	The organizational communications elements seeks information on how communication within the organization aid information, motivation, control and emotional expression. Please indicate your understanding of each question by indicating you responses below.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP7	The communication system in the organization is network rather than hierarchical					
OP8	The communication system of our organization, manpower strength derives from individuals' expertise and skills rather than official authorities.					
OP9	The communication system is a means to inspire the employees.					
OP10	The communication system results in effective organizational activity.					
OP11	The employees and the work teams are informed about their performance in the organization by the feedback provided.					
OP12	The organizational communication system supports innovation and provides proper situation for creativity and innovation.					

Organizational Growth						
Code	Organizational Growth refers to the flexibility of and support provided by the organization for investing in new opportunities. Please indicate your understanding of how your organization handles organizational growth based on your experience.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP13	Our organization is successful in seeking opportunities.					

OP14	Our organization is seen as a pioneer in its own industry.					
OP15	Our organization is of profitability among its competitors					
OP16	Remarkable mutations have occurred during the last decade.					

Strategic Performance						
Code	This sub-section of Organizational Performance, entitles Strategic Performance reflects elements that relate to the alignment of managerial practices to organizational strategic practices. Please indicate on the scale how well your organization aligns these practices.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP17	Activity of different units is in line with major strategies of the organization.					
OP18	The senior manager is committed to the vision of the organization.					
OP19	The outputs and outcomes of the organization support the vision.					
OP20	Our organization is flexible and can adopt itself to new strategies in a short period of time					
OP21	In our organization, the deciding system well supports the mission of the organization.					
OP22	The strengths and weaknesses of the organization are evaluated regularly.					
OP23	Threats and opportunities are well realized					

Knowledge management						

Code	The section on knowledge management involves the level of concentration given to sharing and capturing knowledge within the organization. Using the rating scales, please indicate below how well your organization handles these practices.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP24	This organization enjoys sufficient policies in information sharing.					
OP25	There are mechanisms to get knowledge from different sources, such as the employees, customers, business partners and competitors.					
OP26	In order to store knowledge and have easy access to it, data base, information sources and information technology are used					
OP27	There are processes for spreading knowledge across the organization.					
OP28	There are libraries, documentation centers, databases and other spaces for exchange and dissemination of knowledge.					
OP29	Different methods are used to develop the knowledge of the workers and apply them in the upcoming situations.					

Team Collaboration						
Code	Questions on team collaboration underscores the level of group collaboration supported by the organization team for success and goal achievement. Please indicate the extent to which you believe your organization supports these efforts.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
OP30	In our organization, the work teams have knowledge, expertise, and also varied and complementary skills.					

OP31	Team works have a major role in the organization success.					
OP32	The manager of the organization emphasizes on doing activities and performing plans on the basis of work teams					
OP33	The work teams have a clear vision of the organization.					
OP34	The members of work teams are duty bound to long-term objectives of the organization.					
OP35	Innovation in work teams is encouraged.					
OP36	The organization provides sufficient sources for the work team activity					

From "*Organizational change capacity and organizational performance: An empirical analysis on an innovative industry",* by Ramezan, M., Sanjaghi, M. E. & Kalateh Baly, H. R., (2013). Emerald Group Publishing Limited. Copyright.

Section 3: Project Success Assessment

The third and final section of the survey, the Project Success Assessment Questionnaire (Shenhar & Dvir, 2007), consists of four main sections involving project efficiency, customer/user impact, organizational success, and future preparation. The questionnaire focuses on project success.

Please respond to each question by selecting one response based on your project experience, knowledge, and strategic involvement of a single project of which you were project manager. Responses range from Strongly Disagree to Strongly Agree. This section should take approximately 5-10 minutes to complete.

	Project Efficiency					
Code	Represents a short term measure of whether the project has been completed according to the defined plan. Project efficiency measures on time finishes, within budget, and management of resources during execution	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PS1	The project was completed on time					
PS2	The project was completed within or below budget					
PS3	The project has only major changes					
PS4	Other efficiency measures were achieved					

	Impact to customer					
Code	This sub-section represents how well the project addressed the customer's needs and requirements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PS5	The project improved the customers performance					
PS6	The customer was satisfied					

PS7	The project met customer requirements					
PS8	The customer is using project results					
PS9	The customer will come back for future work					

	Impact to Team					
Code	Questions within this section assess the extent of team learning, growth and newly acquired skills and knowledge as a result of both organizational supports and project implementation.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PS10	The project team was highly motivated and satisfied					
PS11	The project team was loyal to the project					
PS12	The project had high moral and energy					
PS13	The team felt working on the project was fun					
PS14	Team members experience personal growth					
PS15	Team members wanted to stay in the organization					

Business and Direct Organizational Success						
Code	The section of business and direct organizational success seeks to assess how well the implemented project influenced the success of the organization, i.e., contribution to the bottom line. Please indicate how well the strategic project of which you were project manager met the identified criteria	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

PS16	The project was an economic business success					
PS17	The project increased the organization's profitability					
PS18	The project has a positive return on investment					
PS19	The project increased the organization's market share					
PS20	The project contributed to stakeholder value					
PS21	The project contributed the organizations direct performance					

	Preparing for the future					
Code	Questions within this section, preparing for the future, reflects the organization's capacity to develop new technologies and competencies from implementation of projects. Please indicate to which degree you believe your organization met this criteria-referencing implementation of a strategic project of which you were project manager.	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
PS22	The project outcome will contribute to future projects					
PS23	The project will lead to additional new products					
PS24	The project will help create new markets					
PS25	The project created new technologies for future use					
PS26	The project contributed to new business processes					
PS27	The project developed new managerial capabilities					

	Overall project success					
Code	The final question of the project success questionnaire and the research study involves evaluation on overall project success. Please indicate to what extent your strategic project exhibited success.	Strongly disagree	Disagree	Neutral	Disagree	Strongly disagree
PS28	Overall, the project was a success					

From "*Reinventing project management",* by Shenhar, A., & Dvir, D., 2007. Boston, MA: Harvard Business School. Copyright. Reprinted with permission.

Appendix B Permission to Use an Existing Survey

December 22, 2016

Jerry Luftman, Ph.D
[redacted]

RE: Strategic Alignment Maturity Model - Assessing It/Business Alignment, by Luftman, 2003, Information Systems Management, 20, 9-15.
doi:10.1201/1078/43647.20.4.20030901/77287.2.

Dear Dr. Luftman,

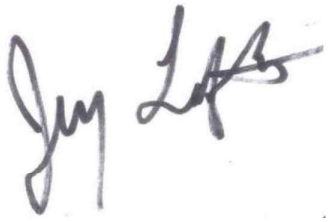
I am a doctoral student from Walden University writing my research study titled Strategic Alignment of Information Technology Projects and Project Success under the direction of my doctoral committee chaired by Dr. Tim Truitt.

I would like your permission to reproduce and use the Luftman Strategic Alignment Maturity Model survey instrument in my research study. I would like to use and print your survey under the following conditions:

- I will use this survey only for my research study and will not sell or use it with any compensated or curriculum development activities.
- I will include the copyright statement on all copies of the instrument.
- I will send my research study and one copy of reports, articles, and the like that make use of the survey data promptly to your attention.

If these are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to me through email at the address indicated below.

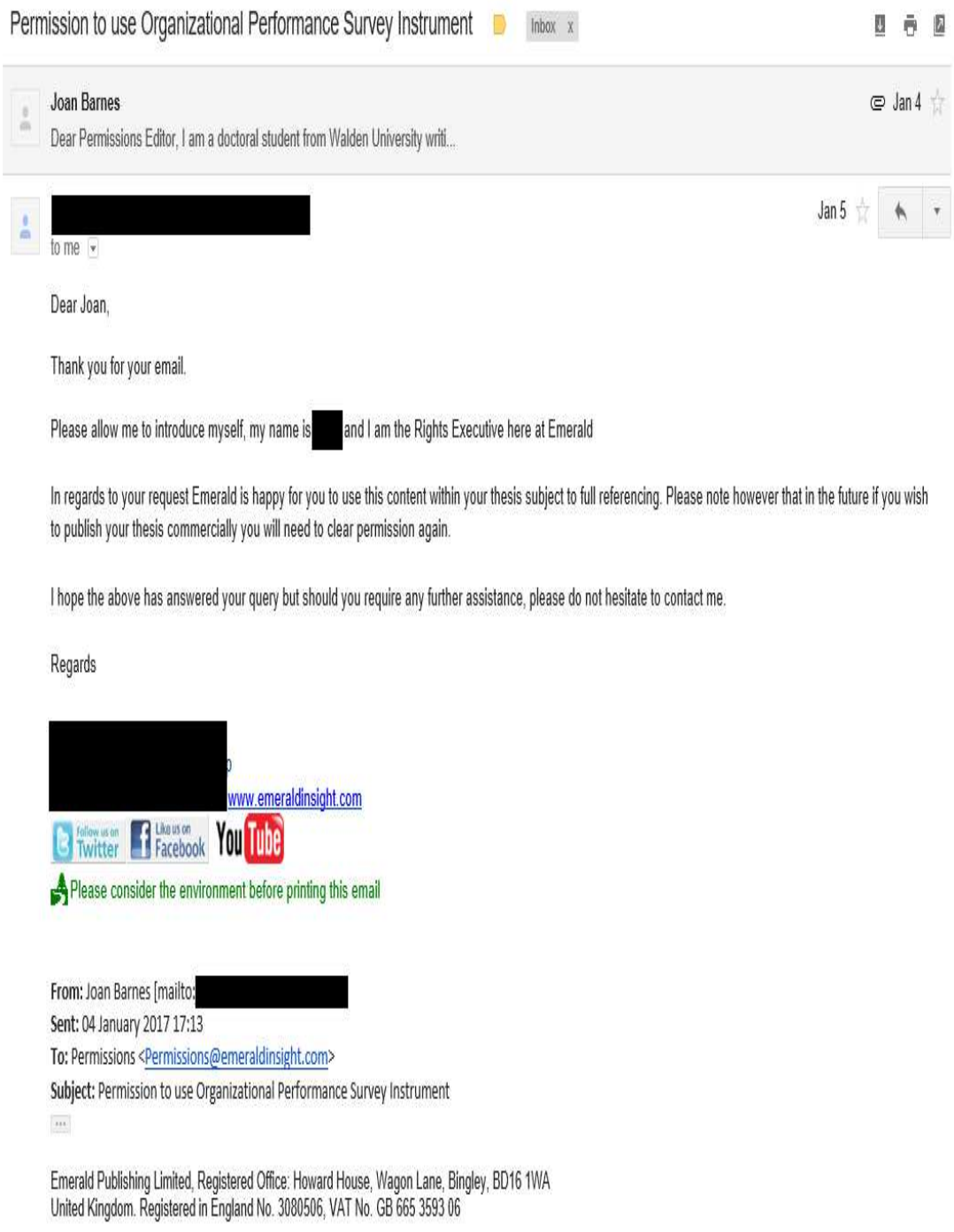
[redacted]
Sincerely,



Joan Barnes

Joan Barnes
Doctoral Candidate - Expected date of completion July 2017

Appendix C: Permission to Use an Existing Survey



Permission to use Organizational Performance Survey Instrument Inbox x

Joan Barnes Jan 4
Dear Permissions Editor, I am a doctoral student from Walden University writi...

[redacted] Jan 5
to me

Dear Joan,

Thank you for your email.

Please allow me to introduce myself, my name is [redacted] and I am the Rights Executive here at Emerald

In regards to your request Emerald is happy for you to use this content within your thesis subject to full referencing. Please note however that in the future if you wish to publish your thesis commercially you will need to clear permission again.

I hope the above has answered your query but should you require any further assistance, please do not hesitate to contact me.

Regards

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Sent: 04 January 2017 17:13
To: Permissions <Permissions@emeraldinsight.com>
Subject: Permission to use Organizational Performance Survey Instrument

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Appendix D: Permission to Use an Existing Survey

Project Success Assessment Questionnaire - Shenhar, A., & Dvir D.

[redacted] Wed, Dec 21, 2016 at 2:45 PM
Reply-To: Harvard Business Publishing - [redacted]
To: Joan Barnes [redacted]

##- Please type your reply above this line -##

Conversation CCs (if any):

Your request (334252) has been updated. To add additional comments, reply to this email.

[redacted]
Dec 21, 16:45 EST

Hello Joan,

Thank you for your inquiry. We allow the use of our publications for academic dissertation and thesis papers, provided that full citation is given to the source article and that it won't be published outside the university nor for-purchase.

Please note that this type of request actually does not require formal permission, so there's no need for us to sign the document. Let me know if you have any questions or need further assistance.

[redacted]
HARVARD BUSINESS PUBLISHING
Customer Service & Permissions Department
[redacted]

Appendix E: E-mail Invite for Survey Participants

Dear ASU PMNetwork / LinkedIn Member,

You are invited to take part in a research study. This survey explores the relationship between project alignment, performance outputs and project success. Understanding the relationship between alignment attributes and performance outputs may provide new critical success factors or substantiate Information Technology investments; thereby aiding business leaders in evaluation and selection of projects that exhibit a greater chance of success.

This survey is voluntary. You do not have to participate if you do not want to and you may withdraw from the survey at any time with no penalty to you. No identifying demographic information is collected or stored and all information collected will be held in utmost confidentiality. The survey should take less than 20–30 minutes to complete.

By clicking the 'Survey Link' button below, you are providing your voluntary consent to participate in this survey, or if you do not wish to participate in this survey, please exit out of this email. If the survey does not open automatically, please copy and paste this link to your internet browser's address bar.

Thank you for your time,

Joan Barnes
Doctoral Candidate May 2017
Walden University

Appendix F: Permission to Use Member Distribution List

Date: 1/3/2017

Arizona State University
ASU PM Network

Dear ASU PM Network Board Members,

I am a doctoral student from Walden University writing my research study titled Strategic Alignment of Information Technology Projects and Project Success under the direction of my doctoral committee chaired by Dr. Tim Truitt.

I would like your permission to present my study's online survey to your network distribution list. I would like to provide a URL hyperlink to your group for survey participation under the following conditions:

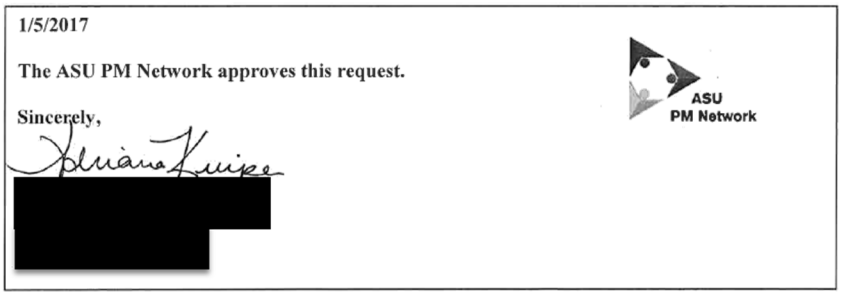
- Participants will receive a consent form to participate as prescribed by the IRB
- The survey will be anonymous and confidential.
- No personal information will be collected.
- I will make available the online survey for approximately two weeks and afterwards the survey will close.
- I will send my research study with survey results once the study is complete promptly to your attention.

If these are acceptable terms and conditions, please indicate so by signing one copy of this letter and returning it to me neither through email.

Sincerely,

Joan Barnes
Doctoral Candidate

Expected date of completion July 2017


1/5/2017

The ASU PM Network approves this request.

Sincerely,

[redacted]

ASU
PM Network

Appendix G: Arizona State University IRB Policy: Use of E-mail Distribution List

From: [redacted]
Sent: Monday, January 30, 2017 8:10 AM
To: Joan Barnes [redacted]
Subject: RE: Arizona State University IRB approval

Dear Jo,

I am providing information related to the ASU IRB:
https://researchintegrity.asu.edu/humans/faqs

A researcher from off campus wishes to perform a study that involves collecting data at ASU without an ASU investigator. What type of review is needed?

The only action needed by the research team is to submit the IRB approval from the other institution to the IRB. The IRB will then check to see if there is any obvious problem with allowing the study to proceed. If there are no problems, then the IRB will inform the researcher that this will not require oversight from the ASU IRB. The ASU IRB provides oversight on projects where ASU faculty, staff or students are collecting or analyzing data. If ASU is used as a recruitment site only, then ASU IRB review is not necessary

In this case, since you are doing this study in your role as a doctoral student at Walden University, the project will need to undergo review by the Walden University IRB. ASU will be a recruitment site only.

If you have questions let me know.

[redacted]

Appendix H: Study Instrument Constructs

Instrument Constructs

Construct (Scale)	# of Questions	Variable Type	Dimensions	Instrument
Project Alignment Maturity	30	Continuous measure	Communication Value Measurement Governance Partnership IT Scope Human Resource Skills	Strategic Alignment Model Maturity (SAMM) Appendix A Part 1
Operational Performance	36	Continuous Measure	Stakeholder Satisfaction Organizational Communication Team collaboration Strategic Performance Knowledge Management Organizational Growth	Operational Performance Instrument (OP) Appendix A Part 2
Project Success	28	Continuous Measure	Project Efficiency Customer/Team Impact Organizational Success Future Preparation	Project Success Assessment Questionnaire (PSAQ) Appendix A Part 3

Appendix I: Power Analysis Protocol Using G* Power 3.1.2.9

Exact: Linear multiple regression: Random model

Options: Exact distribution

Analysis: A priori: Compute required sample size – given α, power, and effect size

Input: Tail(s) = One
H1 $\rho^2 = .15$
H0 $\rho^2 = 0$
α err prob = 0.05
Power (1-β err prob) = 0.8
Number of predictors = 3

Output: Lower critical $R^2 = 0.1124795$
Upper critical $R^2 = 0.0981446$
Total sample size = 61
Actual power = 0.8052499