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Statement of Academic Integrity

I certify that I am the author of the work contained in this dissertation and that it represents my original research and conclusions. I pledge that apart from my committee, faculty, and other authorized support personnel and resources, I have received no assistance in developing the research, analysis, conclusions, or text contained in this document, nor has anyone written or provided any element of this work to me.

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Ambidextrous Project Management: The Influences of Leadership Styles, Project Management Practices, and Team Characteristics on Creativity and Innovation

A DISSERTATION

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Brian C. Crilly

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DOCTORAL COMMITTEE

The members of the committee appointed to examine the dissertation of Brian Crilly find that this dissertation fulfills the requirements and meets the standards of the Hood College Doctoral Program in Organizational Leadership and recommend that it be approved.

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Ambidextrous Project Management: The Influences of Leadership Styles, Project Management Practices, and Team Characteristics on Creativity and Innovation

Brian C. Crilly

Committee Chair: Anita Jose, Ph.D.

ABSTRACT

Ambidextrous project management, the ability of project leaders to adapt behaviors and environmental factors to the prevailing project needs, enhances the performance of project teams and project outcomes. Producing unique and novel project deliverables in support of business objectives requires a careful balance of creative problem solving and disciplined implementation. However, individuals are rarely adept at both divergent creative behaviors and convergent implementation behaviors. To address limited research in this area, this study explores how project leaders can leverage ambidextrous project management to enhance project team creativity and project performance.

Through surveys administered to 202 project leaders and project team members across a variety of organizations and industries, this study considers the influences of transactional versus transformational leadership, the benefits of plan-driven versus agile project management practices, and the impacts of team size and team experience on creativity and project performance. This study also considers the mediating effects of motivation on those same relationships. Using mediated multiple regression to analyze the survey responses, the results suggest that both transformational and transactional leadership styles play an important role in influencing creativity and project performance. In addition, the findings highlight the importance of a trusting and supportive organizational environment for fostering creative outcomes. Further, the results highlight the positive effect of team experience on efficient and effective project execution. By understanding how leadership styles, project management practices, and team

characteristics influence project results, project leaders can adapt these factors to improve the creativity and performance of the project teams they lead.

Chapter 1

INTRODUCTION

Executing a project is process requiring innovation. Innovation requires creativity in the generation of novel concepts and solutions, and discipline in the implementation and realization of the creative vision (Zacher & Rosing, 2015). This duality of creativity and disciplined implementation represents a challenge for successful project execution. Rarely are individuals skilled at both novel idea generation and disciplined attention to detail (Miron et al., 2004).

Several factors influence the creative and innovative behaviors required within a project team, including individual capabilities, leadership styles, team processes, and the organizational environment in which the project team operates (Hunter & Cushenbery, 2011). To be effective, project managers must recognize the tensions created by the duality of creativity and innovation, and they must evaluate the environment in which the project team is operating. With this understanding of the project environment, project leaders can adapt their leadership style to support the project team in successfully meeting these conflicting demands of creativity and innovation.

This study explores how various leadership styles, project management practices, and team characteristics interact within an organizational environment to foster both creative and innovative behaviors among project team members. The results of this study will help guide project managers in adapting their leadership style and shaping the environment in which the project is executed based on their assessment of these contextual factors.

Statement of the Problem

For-profit businesses are concerned with both near-term profitability and long-term growth. A lack of focus on near-term profitability may leave businesses unable to meet near-term

obligations to stakeholders. At the same time, a lack of attention to future growth may render the business unable to keep up with the competition. In order to remain viable and continue to serve their many stakeholders, businesses cannot stay static. They must continually evolve and adapt within a competitive environment or risk operating in a suboptimal state (March, 1991).

Projects are a means by which companies evolve and adapt to remain relevant and viable. The Project Management Institute (PMI) (2017a) defines a project as a "temporary endeavor undertaken to create a unique product, service, or result" (p. 4). Given the unique nature of the intended project outcome, project execution is an innovative process that requires both creativity and focused implementation (Bledow et al., 2011). Companies may execute projects to realize near-term benefits through incremental refinement of existing products, services, and operational practices. Companies may also pursue more radically innovative projects to enhance their long-term viability and minimize the risk of becoming obsolete (Chesbrough & Rosenbloom, 2002).

Successful innovation through project execution is critical for businesses to grow and flourish. However, according to the Project Management Institute (2020b), organizations waste an average of 11.4% of their financial investments in projects simply due to poor performance. Also, organizations declare, on average, between 11% and 21% of their projects as failures (Project Management Institute, 2020b). Thus, organizations could have more successful project outcomes by finding ways to improve the innovation process.

Project innovation begins with the creative process of idea generation and culminates with the disciplined realization of that idea (Amabile, 1988). The innovation process, however, is far from linear. The innovation process often involves chaotic cycles of shifting back and forth between idea generation and idea implementation as the project team learns from unforeseen issues and successful progress (Bledow et al., 2011). Switching between creativity and

innovation presents a challenge for project teams because the ideal characteristics of creative team members are very different from those of team members who excel at implementation (Thayer et al., 2018). Creativity is best served by individuals with open minds, comfort with ambiguity, and a willingness to take risks, while efficient implementation requires conscientiousness, focus, and conformance to a planned course of action (Bledow et al., 2009).

Mumford et al. (2008) present a multilevel framework of factors that influence creative and innovative behaviors at the individual, team, and organizational levels. Individual-level factors include knowledge, skills, and abilities (Thayer et al., 2018), and epistemic and prosocial motivation (De Dreu et al., 2011). Team-level factors include leadership and process (Mumford et al., 2008); diversity and shared mental models (Shalley & Gilson, 2004); psychological safety (Edmondson, 1999); and reflexivity (Schippers et al., 2014). Organizational-level factors influencing creativity and innovation include various elements of culture and climate (Damanpour, 1991).

Project managers must support the project team in successfully executing their assigned projects. Given the challenges of the innovation process, project managers could benefit from a clear understanding of the interplay of these various influences on creativity and innovation by adapting their leadership style appropriately based on other contextual factors to help the project team effectively manage the innovation process.

Theoretical Framework

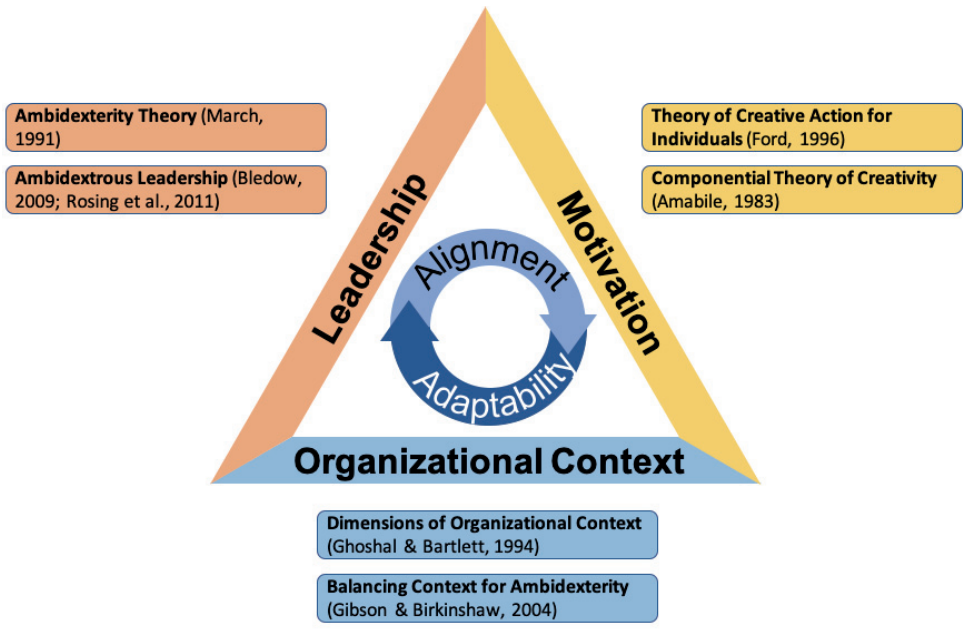
March (1991) introduced the concepts of exploration and exploitation within the context of organizational learning. Exploration is a process of seeking new knowledge for the future benefit of an organization, while exploitation involves leveraging existing knowledge for near term benefit (March, 1991). Exploration allows organizations to adapt to new opportunities in

volatile markets, while exploitation of current assets enables organizations to efficiently align activities that maximize short term value (Birkinshaw & Gibson, 2004). Organizations that effectively balance adaptability and alignment are often referred to as ambidextrous organizations (Birkinshaw & Gibson, 2004). The organizational ambidexterity theory served as a foundation for the work of Bledow et al. (2009) and Rosing et al. (2010) to contribute to the development of the ambidextrous leadership theory.

Figure 1 presents the theoretical foundations for this study. Ambidexterity theory and ambidextrous leadership theory, along with theories on creativity and organizational context, serve as a framework for exploring how project teams can balance adaptability and alignment for the successful innovation of products, services, or other project outcomes.

Figure 1

Theoretical Foundations for the Study



Ambidexterity Theory

March (1991) considered organizational learning through the perspectives of exploitation and exploration. Exploitation, according to March (1991), represents activities for seeking near-

term, low-risk benefits, such as selection, refinement, efficiency, and execution. In contrast, March (1991) defined exploration as activities for seeking longer-term, higher-risk benefits, including variation, experimentation, risk-taking, and discovery. March (1991) contended that exploitation involved leveraging existing organizational knowledge, while exploration involved expanding beyond the existing breadth of organizational knowledge. Given that exploitation and exploration are different activities requiring different skillsets (Miron et al., 2004), March (1991) suggested that managers should consider organizational knowledge and learning when deciding how to deploy limited organizational resources.

Organizational ambidexterity is the ability of an organization to effectively pursue and balance exploitation and exploration (Zacher & Rosing, 2015). Many researchers, including Benner and Tushman (2003), considered structural solutions to organizational ambidexterity, with separate sub-units created specifically for exploration or exploitation. Other researchers have pursued alternative approaches to organizational ambidexterity, including sequentially alternating between exploration and exploitation within the same unit (Nickerson & Zenger, 2002), or shifting between exploration and exploitation within the same unit based on other contextual factors (Gibson & Birkinshaw, 2004).

Ambidextrous Leadership

Bledow et al. (2009) extended the concept of organizational ambidexterity to lower levels within the organization, including ambidexterity at the team level. Bledow et al.(2009) noted that team-level innovation requires exploratory idea generation and variability creation, along with the exploitation of those ideas and variability reduction. Rosing et al. (2011) further built on this concept with a focus on leadership, noting that "time and timing of leadership behaviors are critical in our approach as we assume dynamic relationships between leadership and innovation"

(p. 957). Rosing et al. (2011) used ambidextrous leadership to refer to the temporal flexibility demanded of leaders to best support creativity and implementation behaviors within a project team.

Rosing et al. (2011) further defined ambidextrous leadership as consisting of three elements: (a) opening leader behaviors, defined as behaviors that foster exploration; (b) closing leader behaviors, defined as behaviors that foster exploitation; and (c) the temporal flexibility to switch between both types of leader behaviors as the situation requires. Opening leader behaviors encourage independent thinking and experimentation, increase variance, and otherwise lead to exploration activities among followers (Zacher & Rosing, 2015). Closing leader behaviors promote the reduction of variance by including activities such as setting specific guidelines, monitoring progress toward goals, and taking corrective actions in pursuit of effective implementation (Rosing et al., 2011).

Ambidextrous leadership is a theoretical concept that describes how leaders can support, elicit, and adequately balance both creativity and implementation behaviors (Zacher & Rosing, 2015). Bledow et al. (2009) note that "ambidextrous leaders are characterized by cognitive as well as behavioral complexity and are able to dynamically adapt their tactics (such as being directive or providing autonomy) to contextual demands" (p. 326).

This study builds on the concept of ambidextrous leadership by exploring how various leadership styles interact with other contextual factors, such as project management practices and organizational environment, to influence creative and innovative behaviors.

Motivation

Ford (1996) introduced the theory of creative action for individuals, which suggests that individuals will pursue creativity over habitual action based on three factors: sensemaking,

motivation, and knowledge and skill. In the componential theory of creativity, Amabile (1983) identified four components that influence creativity: domain-relevant skills, creativity-relevant processes, task motivation, and the surrounding environment. These theories share many commonalities, including the emphasis on motivation as a factor influencing creative action.

De Dreu et al. (2008) developed the motivated information processing in groups model, which demonstrated how two specific forms of motivation, social and epistemic, influence the quality of judgments and decisions of groups. De Dreu et al. (2011) built on this model to predict creative and innovative group behaviors based on these forms of motivation. Grant and Berry (2011) separately studied intrinsic and social motivation, finding that social motivation positively moderated the effectiveness of intrinsic motivation on creativity. Each of these theories, models, and findings demonstrate the importance of motivation as a factor that influences the innovation process.

Organizational Context

West (1990) proposed a four-factor model of team climate to facilitate innovation, including a coherent vision, participative safety, task orientation and perceived support for innovation. Participative safety, support for innovation, and a compelling vision were also identified by Amabile et al. (1996) as antecedents of creativity.

In a longitudinal field study, Ghoshal and Bartlett (1994) identified four primary dimensions of organizational context: discipline (clear standards, fast feedback, consistent sanctions); stretch (shared ambition, collective identity, personal meaning); trust (fairness and equity, participative decision-making); and support (access to resources, help, and support from management). Each of these models shares several common factors that influence the work environment and the innovative process.

Gibson and Birkinshaw (2004) argued for the need to balance these contextual factors. Too much focus on discipline and stretch may lead to burn-out, while too much emphasis on trust and support may create "a country club atmosphere in which no work gets done" (Gibson & Birkinshaw, 2004, p. 213). Gibson and Birkinshaw (2004) further contend that the proper balance of contextual factors creates an environment that supports the explorative behaviors of creativity and the exploitative behaviors of implementation.

Theoretical Framework Summary

The theoretical model for this study leverages theoretical frameworks related to ambidexterity, motivation, and organizational context. Each of these theoretical frameworks contribute to an understanding of the interplay between exploration and exploitation in a project management context. Ambidexterity can occur at multiple levels in a business context, including the organizational level, with the behaviors of project leaders, and at the project team level. This study will explore the relationships between several constructs that influence the innovation process, including leadership style, project management practices, motivation, and organizational context. A richer understanding of the interplay of these factors will help organizational leaders and teams achieve ambidexterity in their pursuit of creative and innovative behaviors.

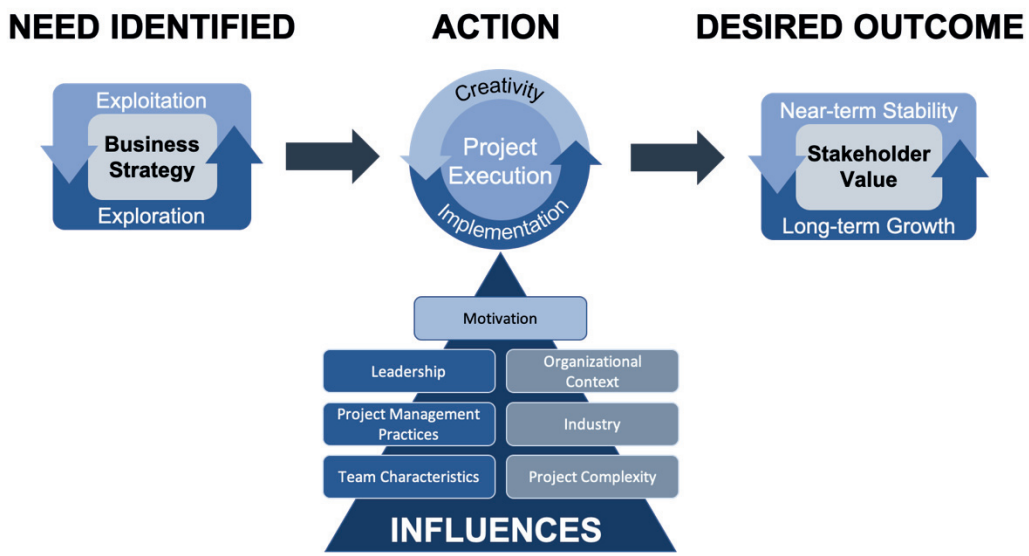
Conceptual Framework

Within a business context, projects drive change in support of business strategy and objectives. Resulting changes can be new and unique products, services, processes, or other outcomes (Project Management Institute, 2017a). The unique nature of these outcomes requires creativity and innovation from the project team. While there are several factors that influence creativity and innovation, this study focuses on how leadership styles, project management practices, and team characteristics influence the innovative process. Figure 2 presents the

conceptual framework for this study. As Figure 2 indicates, the primary influences considered in this study are the leadership styles employed by the project leaders and team, the project management practices that are followed by the project team, and the team characteristics of team size and team member experience. The resulting outcomes evaluated in this study are the levels of creativity and innovation exhibited by the project team, as reflected in the project deliverables. This model considers the moderating effects of motivation while controlling for factors of industry, project complexity, and organizational context.

Figure 2

Conceptual Framework: Enhancing Project Success in Support of Stakeholder Value Creation



Creativity and Innovation

In the context of a project, the innovation process involves both creativity and implementation (Zacher & Rosing, 2015). Creativity is the generation of original and useful ideas (Amabile et al., 2005), and implementation is the realization of those ideas as beneficial outcomes (del-Corte-Lora et al., 2017). The innovation process is not creativity followed by

innovation; instead, it involves the dynamic and possibly chaotic alternation between episodes of creativity and implementation (Bledow et al., 2009).

Although creativity and innovation are related, they require different sets of behaviors. Creativity, according to Bledow et al. (2009), is "an exploratory activity" (p. 316) that increases the variability within the project. Such exploration is a process of discovery that requires comfort with ambiguity, risk-taking, and experimentation (March, 1991). Implementation, in contrast, is "a convergent process of exploiting the potential value of new ideas" (Bledow et al., 2009, p. 316) that requires selection, refinement, and efficiency of execution (March, 1991).

Leadership Style

Kesting et al. (2016) define leadership as "influencing the attitudes and behaviors of individuals and the interaction within and between groups for the purpose of achieving goals" (p. 21). As suggested by Hunter and Cushenbery (2011), leadership has a significant impact on the success of the innovation process. Leaders must be able to support and encourage the behaviors required for both exploration and exploitation within the innovation process (Zacher & Rosing, 2015). Rosing et al. (2010) note that the majority of the research regarding leadership and innovation has focused on leadership styles such as transformational leadership and transactional leadership. Rosing et al. (2010) further note that prior studies have found an inconsistent relationship between transformational leadership and the innovation process. Therefore, they suggest that the innovation process may call for situational adaptations of leader behaviors. This study includes measures of transformational and transactional leadership to explore how adapting between these styles benefits the innovation process.

Bass (1999) defines transactional leadership as "the exchange relationship between leader and follower to meet their own self-interests" (p. 10), often taking the form of contingent

rewards. Transformational leadership, in contrast, refers to the leader leveraging influence, charisma, and vision to move both the leader and the followers beyond self-interest and raise their levels of motivation (Bass, 1999). Transformational leadership fosters high levels of performance through the leader's use of idealized influence, inspiration, intellectual stimulation, and individualized consideration (Rosing et al., 2011). Challenging goals and high standards are established through idealized influence and inspirational leadership, while support and encouragement are provided through intellectual stimulation and individualized consideration (Bass, 1999).

Rosing et al. (2011) note that transactional leadership focuses on performance and goal attainment rather than experimentation, suggesting that transactional leadership likely does not foster creativity. Bledow et al. (2011) presented a similar perspective, noting that transactional leadership may align with exploitation behaviors of selection, refinement, and efficiency, while transformational leadership is far more likely to encourage and support creative exploration behaviors, including experimentation and risk-taking.

Project Management Practices

Organizations undertake projects to create unique outcomes in the form of a products, services, or other results (Project Management Institute, 2017a). Projects occur over a finite period with the intent of producing something new and innovative, at least from the perspective of the interested stakeholders.

Project management practices refer to the tools and techniques the project team employs in their efforts to execute the project successfully and deliver the intended outcome. Project management practices may be grouped by two practices: predictive practices and agile practices (Project Management Institute, 2017a). Predictive project management methodologies,

sometimes referred to as waterfall, traditional, or plan-driven methodologies, typically involve directive approaches intended to help the team focus on efficient execution (Lewis et al., 2002). For consistency, this paper will use the terms traditional and plan-driven methodologies to refer to predictive project management methodologies. Such practices are generally suitable for projects with low levels of complexity, risk, and uncertainty (Stare, 2014), such as exploitative endeavors.

Agile project management, in contrast, refers to a variety of approaches, techniques, methods, and frameworks that adhere to the values and principles intended to foster adaptability in highly dynamic environments characterized by high levels of complexity, risk, and uncertainty (Project Management Institute, 2017b). Practices based on the agile framework focus on participative control in which the project team collectively determines how to approach the challenges they face (Lewis et al., 2002), and on using short, iterative cycles with continuous feedback to guide ongoing adjustments and adaptations (Subramaniam & Hunt, 2006). These practices are generally applicable to projects that have high levels of uncertainty and risk (Project Management Institute, 2017b), such as explorative endeavors.

Projects fall on a continuum between low uncertainty and high uncertainty (Project Management Institute, 2017b). Thus, a balance of predictive and agile practices may be appropriate depending on the needs of the project. Stare (2014) demonstrated that the main differences between predictive and agile practices could be classified along four dimensions: (a) development and management of specifications; (b) scheduling of activities; (c) team responsibilities and participation in decisions; and (d) client involvement. This framework serves as a means for evaluating where specific projects fall along the continuum between predictive and agile approaches based on the practices the project team follows.

Team Characteristics

Several team characteristics may influence project performance. This study considers the influences of team size and team member experience on team performance and project outcomes.

Team Size

In an empirical study of knowledge workers, Mueller (2012) found that, as team size increases, collective performance does not increase proportionally. These findings are consistent with the results of a study by Thornburg (1991), who found that creative output continued to increase as team size increased, but creative output on a per individual basis dropped as the team size increased. Hunter and Cushenbery (2011) suggest that small teams lack the diversity of knowledge, skill, and expertise for effectively meeting innovation challenges, while large groups face communication challenges that may limit the effective exchange of knowledge and ideas. Further, Mueller (2012) suggests that, as team size increases, individual team members may perceive decreasing social support and quality of interpersonal relationships. Thus, Hunter and Cushenbery (2011) recommend that teams comprised of four to seven members may prove optimal for creative output.

Team Experience

In a study of cross-functional teams, Pinto et al. (1993) found more significant team member experience in project-based work led to higher levels of collaboration and project execution efficiency. Horwitz and Horwitz (2007) found that the diversity of task-related experience among team members positively correlated with favorable outcomes. Guzzo and Dickson (1996) suggest that such diversity primarily benefits teams pursuing creative tasks. Horwitz (2005) cautions, however, that heterogeneity within a group may also lead to increased levels of conflict and decreased social integration. Thus, experience and heterogeneity of

experience appear to foster creativity and efficiency. There is a risk, though, that heterogeneity of experience may also lead to intra-team communication challenges and conflict.

Organizational Context

Burgelman (1983) defined organizational context as the broad set of administrative mechanisms that can be manipulated to influence the behaviors of individuals within the organization. Ghoshal and Bartlett (1994) conducted a longitudinal field study, from which they identified discipline, stretch, trust, and support as the primary dimensions of organizational context that influence creative behaviors. Discipline involves establishing clear standards, providing timely feedback, and consistently applying sanctions for failure to meet standards (Ghoshal & Bartlett, 1994). Stretch consists of creating a shared vision and identity and helping individuals find personal meaning in their work (Ghoshal & Bartlett, 1994). Trust is established through greater involvement and procedural justice in the decision-making process (Ghoshal & Bartlett, 1994). Finally, support includes autonomy, availability of resources, and support for initiatives (Taródy, 2016).

A literature review conducted by Anderson et al. (2014) highlighted several factors influencing context, including organizational structure and hierarchy, organizational strategy, intellectual capital and knowledge transfer, culture, and climate. Taródy (2016) further emphasized the influence of organizational support for innovation, which includes elements such as resource availability and team autonomy.

Motivation

Both Amabile (1983) and Ford (1996) identified motivation as a factor influencing creativity. There are several dimensions of motivation that may influence creativity. Deci and Ryan (2008b) introduced self-determination theory in which they suggested that motivation may

be considered autonomous or controlled. Controlled motivation refers to external influences that direct or energize action, while autonomous motivation refers to internally regulated thoughts, feelings, and behaviors (Deci & Ryan, 2008b). Autonomous motivation includes intrinsic motivation along with forms of extrinsic motivation in which the behavior is self-endorsed due to the alignment of the activity with an individual's values and goals (Deci & Ryan, 2008b). Gagné and Deci (2005) suggested that autonomous intrinsic motivation predicts persistence on interesting creative tasks, while autonomous extrinsic motivation predicts persistence on effort-driven implementation tasks.

De Dreu et al. (2011) showed that epistemic motivation, the degree to which individuals willingly expend effort to achieve a depth of knowledge and understanding, and prosocial motivation, the degree to which individuals focus on group success, impacted creativity within a group context. Grant and Berry (2011) also investigated the relationship between motivation and creativity, and found that social motivation moderated the relationship between intrinsic motivation and creativity. This study includes consideration of motivation as a potential mediating variable that influences creativity and innovation.

Measures of Project Success

There are several ways to evaluate project success, which depend on the perspectives and goals of the evaluators. Many practitioner-oriented publications focus on monitoring and control (Lewis et al., 2002), with the intent of evaluating the project using objective measures such as performance against budget and schedule (Project Management Institute, 2017a). Given the increased uncertainty in exploratory endeavors, agile practices tend to incorporate client satisfaction as an important indicator of project success (Project Management Institute, 2017b).

In a study of predictive and agile methods, Stare (2014) evaluated project success using client satisfaction, market success, and return on investment. Return on investment and market success are lagging indicators of success because they often cannot be evaluated until long after the conclusion of the project. While they are meaningful to the organization and inform future project efforts, they are not able to help guide current project teams actively involved in ongoing project execution. Thus, low-latency indicators of success are preferred for continuous project adjustment, while lagging indicators support longer-term organizational learning.

This cross-sectional study surveys project managers and project team members involved in ongoing or recently completed projects. Therefore, this study focuses on low-latency indicators of success, including creative output and implementation efficiency.

Purpose of the Study

This exploratory study investigates the influences of leadership styles, project management practices, and team characteristics on both creative and innovative behaviors within a project team. The ultimate goal is to help project managers enhance the likelihood of successful project execution. After assessing the specific needs of the project and evaluating the context in which the project is being executed, project managers should understand how to adapt their leadership style and project management practices to enhance creative and implementation behaviors among project team members.

Overview of Research Methodology

This research involved a cross-sectional survey of members of the Project Management Institute and members of my professional network who work within project teams. This approach is a form of convenience sampling (Maruyama & Ryan, 2014). Participants completed an online survey to provide information related to each of the independent, dependent,

mediating, and control variables, along with other demographic information. Constructs and variables assessed included leadership style, project management practices, organizational context, motivation, and creative and innovative results of the project. Data were analyzed using hierarchical multiple regression, mediated multiple regression, and the nonparametric Kruskal-Wallis H test to determine the relationships among the independent, mediating, control, and dependent variables. Analysis tools included SPSS and the PROCESS macro for SPSS developed by Hayes (2018).

Research Questions

Ambidextrous leaders would benefit from guidance regarding how various leadership styles, in combination with project management practices, support creative and innovative behaviors within a project team. In keeping with the purpose of this study, the specific research questions addressed by the study are the following:

Research Question 1: How do leadership styles, project management practices, and team characteristics influence creative and innovative project outcomes?

Research Question 2: How does motivation mediate the relationship between leadership styles, project management practices, team characteristics, and creative and innovative project outcomes?

Limitations

This section highlights several limitations concerning this study. Further limitations will be addressed in detail in chapter 5.

Response Rate

The survey and requests for participation were advertised to members of three local chapters of the PMI within the Baltimore-Washington metropolitan area. Invitations for chapter

member participation in the survey were sent via different means for each local chapter. Invitations were either sent via direct email or posted on chapter websites and social media forums. For privacy reasons, I was not given access to the PMI chapter membership and email lists. As a result, I am unable to determine the number of individuals who were aware of the survey. Therefore, estimating the response rate for this survey is not feasible.

Validity

Many factors may influence creativity and innovation. While this study attempts to address several factors, it cannot claim to cover an exhaustive set of constructs, factors, and variables. Also, this survey represents a convenience sample at a single point in time. As with all non-experimental designs, the analysis suggests correlation between variables, but the analysis cannot establish causation.

The survey was given to members of the Project Management Institute. Given that many of the respondents are members of this professional organization, they may have unique perspectives and biases regarding skills and practices within the project management industry. Therefore, the findings based on their responses may not be generalizable to all project managers and project team members.

Significance of the Study

This study is unique in the combination of several constructs and variables in the context of project teams executing the innovation process. Prior research has considered the relationship between motivation and creativity, and other research has considered the influences of leadership style on motivation. This study uniquely examines the mediating effects of motivation on the relationships between each independent and dependent variable and provides novel insights for project leaders hoping to maximize the project team performance and enhance the probability of

project success. Further, this study controls for industry, organizational context, and project complexity.

Further, this study answers the call of Bledow et al. (2009) to "point out how systems can meet conflicting demands of innovation to remain adaptive in the long run" (p. 333). By considering how leadership style, project management practices, and motivation interact to enhance the innovative process, project leaders are better prepared to adapt their leadership styles and project management practices to respond to the evolving needs of the projects and project teams.

Finally, recognizing the importance of breadth of knowledge and skill, the Project Management Institute (2015) developed the PMI Talent Triangle to encourage project managers to develop a balanced set of knowledge, practices, and skills to meet the continually evolving demands of their profession. The PMI Talent Triangle incorporates three primary dimensions of knowledge, practices, and skills: leadership, technical project management, and strategic and business management. PMI certification holders must receive training in each of these areas on an ongoing basis to maintain their certifications. This study contributes insights to each of the dimensions of the PMI Talent Triangle by considering how leadership styles (leadership) and project management practices (technical project management) can be adapted to balance creativity and implementation in order to achieve successful project outcomes in support of business objectives (strategic and business management).

Definitions of Key Terms

The following terms are of central focus for this study. Some of these terms may have multiple definitions depending on the author and the context in which they are used; however, the definitions provided below represent the intended meaning within the context of this study.

- Creativity involves the generation of original and useful ideas (Amabile et al., 2005).
- Implementation is the realization of creative ideas as beneficial outcomes (del-Corte-Lora et al., 2017).
- Innovation and the innovative process refer to exercising both creative and implementation behaviors to produce a unique result (Bledow et al., 2009).
- Leadership is "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2019, p. 6).
- A project is "a temporary endeavor undertaken to create a unique product, service, or result" (Project Management Institute, 2017a, p. 4).
- Predictive project management practices, or traditional plan-driven practices, refer to practices supporting project lifecycles in which the project scope, schedule, and budget are planned early in the lifecycle and deviations from the plan are carefully managed during the execution of the project (Project Management Institute, 2017a).
- Agile project management practices refer to practices supporting project lifecycles in which a general concept is explored early in the lifecycle, but deliverables evolve over iterative cycles as the project team learns from experimentation, trial and error, and customer feedback (Project Management Institute, 2017a).
- Organizational ambidexterity is the ability of an organization to effectively pursue and balance exploitation and exploration (Zacher & Rosing, 2015).
- Ambidextrous leadership refers to the temporal flexibility demanded of leaders to best support the innovation process and innovative behaviors of project team members (Rosing et al., 2011).

Summary

This study explores how project leaders can best address the conflicting demands of exploitation and exploration in a project environment. By understanding the mutual influences of the organizational context in which they operate, their leadership styles, the project management practices employed, and team characteristics, leaders are better prepared to tackle the challenges associated with managing conflicting demands in an ever-evolving project environment. This study jointly considers the influences of leadership, project management practices, team characteristics, and organizational environment on creativity, innovation, and project success.

Organization of the Dissertation

This dissertation is presented in five chapters. Chapter 1 (this chapter) provided an introductory overview of the study. Chapter 2 gives an in-depth review of the existing literature in the areas of ambidextrous leadership, project management practices, team characteristics, organizational context, motivation, creativity, and innovation. Chapter 3 explores the methodology used in this research study. Chapter 4 presents the findings of the research. Finally, chapter 5 provides a discussion of the results along with practical and theoretical implications and recommendations for future research.

Chapter 2

LITERATURE REVIEW

This study explores the innovation process inherent in project execution. Projects are an important means by which organizations realize business strategy and objectives. Project outcomes include new products, services, processes, or other results that support near-term and long-term business objectives. By understanding and enhancing the innovation process, project leaders can improve project performance and outcomes, leading to more effective realization of business strategy.

Innovation refers to the introduction of new products, services, or processes (Bledow et al., 2009) that provide benefits to a group, organization, or society (West & Anderson, 1996). Innovation serves as the means by which businesses operating in a competitive landscape remain viable, increase their economic potential, and grow (Drucker, 1985; Rosenbusch et al., 2011). Through the transformation of novel ideas into useful products, services, and processes, businesses seek to differentiate themselves in order to gain a competitive advantage (Kesting et al., 2016).

Unfortunately, innovation is an expensive endeavor replete with risks (Mumford et al., 2002). Hunter and Cushenbery (2011) suggest that, as a rule of thumb, "19 of 20 innovative projects will ultimately fail" (p. 257). Given such poor prospects, organizations stand to benefit greatly from any actions they can take to improve the odds of successful outcomes from innovation endeavors. Thus, the primary objective of this study is to gain a better understanding of how organizations can improve the likelihood of success in their innovative pursuits.

This literature review explores theories and research related to innovation and the innovation process. The key theories that serve as the foundation for the literature review are

highlighted in Figure 1 of Chapter 1. This literature review starts by defining innovation and the innovation process, and is followed by a presentation of Ambidexterity Theory (March, 1991), which explores the organizational challenges of supporting the various phases of the innovation process. Ambidextrous Leadership Theory (Rosing et al., 2011) builds on Ambidexterity Theory, and explores the impacts of adapting leadership styles in support of the various stages of the innovation process. The antecedents of creativity and innovation are presented next, which are based on the Componential Theory of Creativity (Amabile, 1983). An overview of project management practices concludes the review. The intent of this literature review is to explore the prior research related to this study, identify gaps in the existing literature, and serve as a foundation for further research into the relationships between the innovation process, project management practices, and ambidextrous leadership, with the objective of understanding how to maximize the beneficial outcomes of the innovation process.

While many of the identified topics have a rich history of research, the primary sources of information are peer-reviewed journals, conference proceedings, and edited books published in the past three decades. The review focuses on more recent works from the past decade, along with foundational and seminal works from the past four decades. Collectively, these works serve as a basis for motivating further exploration and research into the innovation process.

Innovation

Innovation refers to the ability of an organization, team, or individual to generate novel and useful ideas, and to put those ideas into practice for the benefit of others (West & Anderson, 1996; Zacher & Rosing, 2015). Innovation extends beyond products and services to include research, marketing, sales, advertising, and distribution (Cropley et al., 2011). Innovation is a

means by which businesses seek to differentiate themselves in a competitive marketplace through novel products, services, or processes (Kesting et al., 2016).

Creativity and Innovation

Anderson et al. (2014) claims the process of innovation consists of two stages: a creativity stage and a subsequent innovation stage. The creativity stage involves the generation of ideas, while the innovation stage involves the implementation and realization of those ideas in the form of useful products, services, or processes (Amabile et al., 1996; Bledow et al., 2009; Mumford et al., 2002; Shalley & Gilson, 2004).

Creativity requires that an idea fit the problem and potentially lead to further insights or solutions (De Dreu et al., 2011). Grant and Berry (2011) note that the novelty and usefulness of creative ideas are independent dimensions. For the innovation process to be successful, novelty alone is not sufficient. Creative ideas must be useful and potentially lead to significant benefits for a wide range of employees and customers.

Innovation goes beyond creativity and requires that the idea "be made, built, or implemented" (Hunter & Cushenbery, 2011, p. 252). Innovation is a process of change; a process of creating something new (Kesting et al., 2016). Therefore, innovation requires an organization to overcome barriers to change, and to effectively allocate resources toward the realization of the creative idea (De Dreu et al., 2011). Further, by adopting and implementing the creative ideas of others, one can be innovative without being creative (De Dreu et al., 2011).

Incremental and Radical Innovation

Innovations are often classified along two dimensions based on how far they deviate from the status quo (Benner & Tushman, 2003). Innovations are deemed incremental if they exploit the existing capabilities of a company. They are considered radical or disruptive if they represent

a fundamental departure from established capabilities and technological competencies (Benner & Tushman, 2003; Bledow et al., 2009; Damanpour & Aravind, 2012). Therefore, radical innovations tend to involve a higher degree of creativity than incremental innovations.

Radical innovation may lead to new and novel products, services, and processes. However, when compared to incremental innovation, radical innovation typically requires a longer time horizon to realize a return on investment, and success is far from certain (Rosenbusch et al., 2011). Incremental innovation tends to be far more predictable in addressing the short-term profitability of a company, but it is unlikely to lead to a sustainable competitive advantage in the long term (Taródy, 2016). Thus, achieving both near-term profitability and long-term growth is best achieved by finding an appropriate balance between pursuits of incremental and radical innovation (March, 1991; Taródy, 2016).

Ambidexterity Theory

Ambidexterity Theory considers innovation from the perspective of exploiting existing organizational knowledge versus exploring and developing new organizational knowledge (March, 1991). Exploitation leads to innovations that meet the needs of current customers and markets by incrementally building on the existing knowledge and skills of the company (Wei et al., 2011). According to March, exploitation of existing knowledge involves activities such as selection and refinement of knowledge and efficient implementation. The exploratory process, in contrast, seeks new knowledge in order to develop innovations that address emerging markets (Wei et al., 2011). Exploration benefits from "variation, risk-taking, experimentation, play, flexibility, [and] discovery" (March, 1991, p. 72). Rosing et al. (2010) links exploration to radical innovation, and aligns exploitation with incremental innovation.

Tushman and O'Reilly (1996) describe the ability of an organization to pursue both exploitation and exploration as organizational ambidexterity. O'Reilly and Tushman (2004) explain that ambidextrous organizations exploit existing capabilities for near-term profit, while also exploring new opportunities for future growth.

March (1991) theorizes that organizational ambidexterity is an important factor in supporting the near-term prosperity and long-term viability of a company. He notes that an exclusive focus on exploration may lead companies to "suffer the costs of experimentation without gaining many of its benefits" (March, 1991, p. 72). Birkinshaw and Gibson (2004) argue that such an approach builds future capabilities at the expense of current operations. In contrast, an exclusive focus on exploitation may hinder future growth opportunities (Birkinshaw & Gibson, 2004), potentially leaving the company "trapped in a suboptimal stable equilibria" (March, 1991, p. 72). Several authors have concluded that an exclusive focus on either exploration or exploitation is an unsustainable business practice (He & Wong, 2004; Taródy, 2016). Thus, in order for companies to succeed in the short- and long-term, they must become ambidextrous; they must engage in both exploitation and exploration activities (Birkinshaw & Gibson, 2004; Rosing et al., 2010; Tushman & O'Reilly, 1996). A company is challenged to "engage in sufficient exploitation to ensure its current viability and, at the same time, to devote enough energy to exploration to ensure its future viability" (Levinthal & March, 1993, p. 105).

Challenges to Ambidexterity

Several researchers have studied a number of challenges faced by organizations in attempting to achieve organizational ambidexterity. First, several authors have found that the practices and behaviors associated with exploration are different than those associated with exploitation. Exploration seeks new and creative ideas by increasing variance through

experimentation and risk taking, while exploitation seeks efficient and expedient implementation by reducing variance through alignment and risk avoidance (March, 1991; Zacher & Rosing, 2015). Organizations are, therefore, challenged to simultaneously support the divergent processes of exploration and the convergent processes of exploitation (Bledow et al., 2009).

A second challenge facing companies results from the fact that markets reward businesses in the near-term (Birkinshaw & Gupta, 2013; Taródy, 2016). Markets consume products and services that are available today, providing an immediate financial return for the company. Given the greater predictability and potential for near-term profitability presented by exploitation (Rosing et al., 2010), the uncertainty of longer-term exploratory activities is often deemed less enticing (Benner & Tushman, 2003; March, 1991). Managers must maintain the discipline necessary to balance short-term rewards with long-term value-enhancing pursuits (Birkinshaw & Gupta, 2013; Taródy, 2016).

A third challenge arises from the uncertainty associated with exploratory activities. Mumford et al. (2002) note that risks are present in every step of the exploratory innovation process, including the failure to generate novel and useful ideas, the inability of the company to implement the idea, or the failure of the realized idea to attract customers. As a result, organizational leaders often dismiss exploratory innovation as being too costly and too risky (Caniëls & Rietzschel, 2015).

A fourth challenge to organizational ambidexterity results from the tendency of companies to continuously strive for standardization of and improvements to operational processes and practices (Benner & Tushman, 2003). Over time, process improvements help companies increase operational efficiency and cost effectiveness through repetition, speed, reduction of waste, and reduction in process variation (Benner & Tushman, 2003; Levinthal &

March, 1993). Unfortunately, such a reduction in variation also constrains innovation to incremental exploitative activities. Benner and Tushman (2003) note that "process management capabilities speed exploitation and efficiency and may allow organizations to survive in the short run, but simultaneously dampen the exploration required for longer-term adaptation" (p. 267). Further, the structures put in place to improve efficiency become interlinked, making radical change increasingly difficult, costly, and time-consuming (Tushman & O'Reilly, 1996).

Ambidextrous Organizations

In order to address the challenges of ambidexterity, two approaches are commonly considered. Researchers such as Tushman and O'Reilly (1996) propose the creation of separate structural units within the organization, with one unit focused on exploration and the other on exploitation. An example within an organization would be a research division operating independently from a division focused strictly on product development. Gibson and Birkinshaw (2004), in contrast, suggest creating an organizational context that supports exploration and exploitation activities within the same organizational unit. Raisch et al. (2009) use the term differentiation to refer to separating exploration and exploitation into different organizational units, and integration to refer to addressing exploration and exploitation within the same organizational unit.

Differentiation

Proponents of differentiation note that the environment, processes, skills, and behaviors that support creativity are very different than those that support implementation (Thayer et al., 2018; West, 2002). Exploration requires autonomy, improvisation, risk-taking, and experimentation (He & Wong, 2004; March, 1991), while exploitation benefits from efficient processes, structure, coordination, risk reduction, and stability (Ancona et al., 2001; March,

1991). Further, some people are deemed as more creative while others are deemed better at implementation of ideas (Bledow et al., 2009). By providing separate organizational units for exploration and exploitation, each unit can maintain the appropriate processes and staff to achieve the intended objective.

Bledow et al. (2009) note that the differentiation approach is based on the dichotomous theory perspective, which suggests that creativity and implementation are distinct activities that should be managed independently. Benner and Tushman (2003) argue that the differentiation approach of organizational separation "allows for uncoupling the variance-decreasing units and activities from those units where variation is strategically vital" (p. 266). Separation is intended to reduce tensions and minimize inefficiencies that may arise between exploration and exploitation (Bledow et al., 2009).

Integration

Proponents of integrating exploration and exploitation within the same organizational unit argue that, while there may indeed be conflicts between exploratory and exploitative activities, these activities are intertwined and mutually dependent (Bledow et al., 2009). Innovation is not a simple linear process of creativity followed by implementation. Rather, the innovative process oscillates in a somewhat chaotic and nonlinear fashion between creativity and implementation as ideas are refined, problems are addressed, and new ideas are spawned (Anderson et al., 2004; Bledow et al., 2009; Mumford et al., 2002; Paulus, 2002; Rosing et al., 2010).

Bledow et al. (2009) refer to this view as a dialectic perspective, emphasizing the interdependence of exploratory and exploitative activities. They further argue that difficulties are likely to arise when these activities are structurally separated. When organizational units are

separated, valuable creative potential that resides in other areas of the organization is not as readily available (Bledow et al., 2009). In addition, as progress fluctuates between creativity and innovation, the costs of effectively coordinating between units can be significant (Bledow et al., 2009).

Gibson and Birkinshaw (2004) argue that an organizational unit that supports and encourages both exploration and exploitation is more sustainable because it eliminates the costs associated with inefficient coordination. Further, this approach allows judgments to be made at the individual level regarding the appropriate balance between exploratory and exploitative activities (Gibson & Birkinshaw, 2004). Taródy (2016) points out that an integration approach also eliminates the costs of maintaining separate management teams, compensation systems, processes, and cultures.

Gilson et al. (2005) show that combining explorative and exploitative activities within the same work team can actually improve customer satisfaction through increased responsiveness to customer needs. In addition, competencies are enhanced, which enables individuals and teams to better address difficult and conflicting demands of alignment and adaptability (Kraft, 2018; Taródy, 2016).

Ambidexterity Summary

Researchers seem to agree that organizations are best served by finding an appropriate balance between exploration and exploitation (March, 1991). Still, there are a number of challenges that must be overcome, including limited resources and the different behaviors required for exploratory versus exploitative activities (March, 1991; Taródy, 2016; Zacher & Rosing, 2015), and the inevitable tensions created by the desire for predictability contrasted with the need for creative exploration (Zhou & George, 2003).

One option to address the challenges is structural separation of explorative and exploitative activities. Structural separation helps managers optimize each organizational unit for its intended purpose, however separation may lead to greater coordination costs (Gibson & Birkinshaw, 2004). Contextual approaches, alternatively, provide flexibility for teams and individuals to determine how to balance exploration and exploitation capabilities based on the needs of the task at hand (Raisch et al., 2009). Managers and leaders must ensure, however, that the natural tendencies of exploitative efficiencies to drive out explorative behaviors are properly managed (Benner & Tushman, 2015; Raisch et al., 2009).

Benner and Tushman (2015) propose a third option that combines structural separation with contextual ambidexterity. Benner and Tushman (2015) suggest that structural separation may be the best option during the early phases of exploration when ideas are immature and risk being dismissed as a result. As ideas mature, Benner and Tushman (2015) argue that a contextual approach may be more appropriate for the continuation of the innovation process.

Regardless of the approach, Tushman and O'Reilly (1996) argue that the key for ambidextrous organizations is to promote variation and experimentation, encourage autonomy and accountability, and decentralize control. Such efforts lead to organizational learning and the ability to expand products, services, and markets (Tushman & O'Reilly, 1996).

This study specifically focuses on the ability of project teams to execute both exploratory and exploitative activities. Within a given project lifecycle, the project team environment represents an integrated structure. Therefore, this study considers the contextual separation approach to exploration and exploitation.

Project Management

The PMI (2017a) defines a project as "a temporary endeavor undertaken to create a unique product, service, or result" (p. 4). Given this purpose, the innovation process is a central element of project execution. The PMI (2017a) defines project management as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (p. 10). Thus, project management has a direct impact on the success of the innovation process. In a survey of 121 business students, Jitpaiboon et al. (2019) found support for the importance of tools, practices, and managerial support in contributing to project success, and further suggested that project failure is often a failure at the system level rather than the individual level.

Hunter and Cushenbery (2011) note that innovation is a series of iterative and cyclic activities where ideas are generated, refined, implemented, and evaluated. Projects differ in terms of the level of uncertainty regarding the desired result (Project Management Institute, 2017b). Higher uncertainty at the outset of a project implies the need for a more iterative and adaptive approach to the innovation process. Lower uncertainty at the outset of a project would suggest efficient execution of the project is one of the primary objectives. The PMI (2017a) defines different project lifecycles that balance efficiency and adaptability, based on the needs of the specific innovative effort.

Project Management Approaches

Lewis et al. (2002) used the terms planned and emergent to describe project management approaches. A planned style provides managerial direction, oversight, and discipline, while an emergent style fosters creativity, flexibility, and improvisation (Lewis et al., 2002). Thus, Lewis et al. suggest that a planned style may enhance execution efficiency, while an emergent style may foster creativity.

Based on their review of prior research, Bledow et al. (2009) emphasize the importance of effectively balancing efficiency and flexibility based on the needs of the project. Building on prior research, Mumford et al. (2002) suggest adapting project management styles, such that structure and formalization increases as projects move from more creative activities to more implementation activities. Based on the results of a two-year study, Lewis et al. (2002) extended this concept, suggesting a more ambidextrous approach of switching styles as the level of uncertainty within a project changes and evolves.

The PMI (2017a) refer to planned and emergent project management approaches as predictive and adaptive project lifecycles respectively, and further suggest that these lifecycle models represent the extremes of a spectrum of possible project management lifecycle models. Stare (2014) notes that predictive lifecycle approaches are appropriate when the needs of stakeholders and the solution are clearly defined, and changes are not expected. In contrast, Stare contends that adaptive life cycles are better suited to projects in which the needs and solution are only partially known, and changes are likely.

Agile project management falls under the domain of adaptive life cycles (Project Management Institute, 2017a). Agile project management practices evolved from a concept for overlapping project phases and multidisciplinary teams presented by Takeuchi and Nonaka (1986). They used the analogy of a rugby team to describe an approach to project management in which a multidisciplinary team worked in a self-organizing and autonomous fashion to support the project through multiple phases of the project lifecycle. This was in contrast to the common method of the day in which specialists focused on one project phase and handed the project off to another group of specialists to execute the next project phase (Takeuchi & Nonaka, 1986). These concepts ultimately led to the development of the agile manifesto, a set of four values for

software development published by a group of thought leaders from the software industry (*Manifesto for Agile Software Development*, 2001). Although agile project management has extended beyond the software domain, agile project management remains a blanket term for a variety of approaches, techniques, methods, and frameworks that adhere to the values and principles expressed in the agile manifesto (Project Management Institute, 2017b).

Stare (2014) explored the differences between predictive and adaptive life cycles, and found that the primary differences between these lifecycles can be classified in four groups: " requirements & specifications (the level of detail at the beginning of the project); project scheduling (iterations and a rough schedule at the planning phase); team work (self-organized teams, daily meetings); and the client collaboration (the representative of the client is a regular team member)" (p. 303). The focus of agile methods on self-organized teams, short iterations, and establishing a collaborative environment lead to the first hypothesis in this study.

Hypothesis 1a (H1a): Project management practices based on the agile framework will have a positive relationship with creativity.

Totten (2017) surveyed PMI chapter members and agile practitioners in Western Michigan and found that key factors contributing to project success in non-software environments included clear vision and commitment from management, holding daily stand-up meetings, keeping task sizes small, and using visual management. The first factor is generally considered a good practice, and the other three factors are all consistent with practices based on the agile framework. The correlation between these factors and project success lead to the second hypothesis.

Hypothesis 1b (H1b): Project management practices based on the agile framework will have a positive relationship with project performance.

Ambidextrous Leadership

Given the importance of ambidexterity in the innovation process, leaders must be able to support and encourage individuals and teams to balance, pursue, and successfully engage in explorative and exploitative practices (Zacher & Rosing, 2015). Bledow et al. (Bledow et al., 2011) contend that specific leadership behaviors may contribute differently to exploration versus exploitation. As innovation is a dynamic process of shifting between episodes of exploration and exploitation (Bledow et al., 2011), the ability of leaders to appropriately adapt their behaviors is important for achieving organizational ambidexterity.

Rosing et al. (2011) used the term ambidextrous leadership to describe the ability of leaders to effectively adapt their behaviors in support of the innovation process. Ambidextrous leaders are able to encourage behaviors such as risk-taking and experimentation during explorative phases, and encourage behaviors such as focus, refinement, and adherence to processes during exploitative phases (Bledow et al., 2009; Thayer et al., 2018).

Challenges to Ambidextrous Leadership

Successfully achieving ambidexterity requires effective leadership, management, and self-regulation by individuals contributing to the innovation process (Bledow et al., 2009). However, the dynamic demands of the innovation process present challenges to effective self-regulation. Exploration requires curiosity and divergent thinking, whereas exploitation benefits from focus and convergent thinking (Bledow et al., 2009). Exploration benefits from a learning orientation, which involves a desire to embrace challenges and seek knowledge (Bledow et al., 2009; Farr et al., 2003) Exploitation benefits from a performance orientation, which involves "demonstrating one's ability, avoiding mistakes, and adhering to normative performance standards" (Bledow et al., 2009, p. 316).

Unfortunately, people are rarely adept at both exploratory and exploitative behaviors (Miron et al., 2004). Thus, self-regulation of divergent versus convergent thinking or learning versus performance orientation can be challenging (Bledow et al., 2009). Further, as individuals and groups develop competencies and learn effective practices, adherence to the learned processes and routines may eventually keep people from further experimentation (Bledow et al., 2009; George & Zhou, 2001).

Individuals and teams, therefore, face challenges when dynamically shifting between exploration and exploitation. Individuals disposed toward a learning orientation or a performance orientation must invest high regulatory effort to meet the demands of both exploration and exploitation (Bledow et al., 2009). Some individuals may find the process emotionally and intellectually taxing and uncomfortable (Hill et al., 2014). Ambidextrous leaders must recognize these challenges and support individuals and teams as they navigate the innovation process.

Ambidextrous Leadership Behaviors

Ambidextrous leaders have the awareness, skills, and ability to adapt their behavior the needs of the teams and individuals involved in the innovation process (Bledow et al., 2009). Rosing et al. (2011) define the behaviors that support exploration as opening leadership behaviors, and the behaviors that support exploitation as closing leadership behaviors. According to the ambidexterity theory of leadership, the innovation process is most productive when leaders effectively employ opening and closing behaviors based on the needs of those involved (Rosing et al., 2011).

Opening leadership behaviors support creativity by increasing variance within the exploration phase (Rosing et al., 2011) and encourage divergent thinking and breaking out of routines (Thayer et al., 2018). Opening leadership behaviors increase empowerment of the

individuals and teams, which includes supporting independent thinking, encouraging experimentation, and tolerating mistakes (Kraft, 2018; Rosing et al., 2011).

Closing leadership behaviors support implementation by reducing variance within the exploitation phase (Rosing et al., 2011). Closing leadership behaviors include directive behaviors, such as defining clear and measurable tasks and goals, establishing routines, following plans, and monitoring and controlling progress toward goal attainment (Kraft, 2018; Rosing et al., 2011; Thayer et al., 2018).

Rosing et al. (2011) note that appropriate leadership behaviors depend, not only on the phase of the innovation cycle, but also on the needs of the individuals involved in the innovation process and other situational factors. Zhou and George (2003) contend that emotional intelligence helps leaders understand the needs of the followers and choose the leadership behaviors that may be appropriate in a given situation.

Leadership Theories

Kesting et al. (2016) define leadership as "influencing the attitudes and behaviors of individuals and the interaction within and between groups for the purpose of achieving goals" (p. 21). With respect to the innovation process, Mumford et al. (2002) refined the definition to focus on exercising influence in order to "increase the likelihood of idea generation by followers and the subsequent development of those ideas into useful products" (p. 706).

Several researchers have noted that the role of the leader within the innovation process is dependent on the phase of the process. Hunter and Cushenbery (2011) note that a leader's role in the creativity stage is to establish an environment suitable for experimentation and exploration of ideas. As the innovation process progresses to implementation, the leader's role becomes more

directive, including selecting ideas with the most merit and eliminating other ideas (Hunter & Cushenbery, 2011).

Mumford et al. (2002) found that leaders must provide followers freedom and autonomy during creative efforts, but such freedom must still be bounded by clear goals. Bledow et al. (2009) further found that directive strategies hinder creativity, while too much freedom may lead to problems during the implementation phase.

Transactional Leadership versus Transformational Leadership

Burns (1978) introduced the concept of transactional versus transformational leadership. Transactional leadership refers to an "exchange relationship between leader and follower to meet their own self-interests" (Bass, 1999, p. 11). The transactional relationship often involves a contingent reward provided to the follower for efforts expended under the direction of the leader (Bass, 1999). Followers are motivated by factors such as praise and rewards, and corrections are made using factors such as feedback and disciplinary action (Bass & Steidlmeier, 1999).

Transformational leadership, according to Burns, involves the leader "moving the follower beyond immediate self-interests through idealized influence (charisma), inspiration, intellectual stimulation, or individualized consideration" (Bass, 1999, p. 11). Bass (1999) contends that transformational leadership elevates followers to higher levels of performance and self-actualization through behaviors such as establishment of a desirable vision, encouraging creative thinking, setting an example, and setting high standards of performance. X.-H. Wang et al. (2016) argue that these transformational leadership behaviors help followers develop skills relevant to creative behavior and may ultimately improve the intrinsic motivation of the project team.

Researchers have extensively considered transactional and transformational leadership in connection with the innovation process. Thayer et al. (2018) links transformational leadership with behaviors that support and encourage creativity, and links transactional leadership with behaviors that support and direct implementation. Thayer et al. (2018) further note that training, development, and awareness of these different leadership styles may prove beneficial to the leader and the innovation team.

In a meta-analytic review, Stewart (2006) found a consistently positive relationship between transformational leadership and team performance. Baškarada et al. (2016) conducted interviews with leaders of the Australian Defense Force and identified a strong alignment between transformational leadership and exploration activities. Bledow et al. (2009) found that individual consideration and intellectual stimulation provided by transformational leaders enhances the creativity of followers. Bledow et al. (2009) also suggested that transformational leaders provide direction by establishing an inspirational vision and motivating followers to achieve that vision. These findings and suggestions lead to two hypotheses.

Hypothesis 2a (H2a): Transformational leadership behaviors will have a positive relationship with creativity.

Hypothesis 2b (H2b): Transformational leadership behaviors will have a positive relationship with project performance.

In the aforementioned Australian Defense Force study, Baškarada et al. (2016) further identified a strong alignment between transactional leadership and exploitation behaviors. Bledow et al. (2011) cautioned that transactional leadership behaviors are likely to hinder creativity unless accompanied by a transformational vision and goal. In a study of autonomous branches of a large European financial services firm, Jansen et al. (2009) identified a negative

relationship between transactional leadership and exploration behaviors. Rosing et al. (2011) supports the contention that transactional leadership limits experimentation and hinders creativity.

Hypothesis 2c (H2c): Transactional leadership will have a negative relationship with creativity.

Bledow et al. (2011) note that transactional leadership behaviors of setting roles and responsibilities, establishing goals, monitoring and controlling activities, and providing contingent rewards align well with implementation activities. Kesting et al. (2016), Anderson et al. (2014), and Jansen et al. (2009) shared similar findings regarding the relationships between transactional versus transformational leadership behaviors and creativity versus innovation.

Hypothesis 2d (H2d): Transactional leadership will have a positive relationship with project performance.

Rosing et al. (2011) further contend that transformational leadership alone may be insufficient to support creativity. For example, creating an inspiring vision may encourage experimentation, or that same vision, if held too tightly by the followers, may prevent them from exploring outside of the vision (Rosing et al., 2011). Thus, Rosing et al. (2010) contend that innovation and creativity are likely contingent on other variables beyond leadership behaviors. Charbonnier-Voirin et al. (2010) suggest that a strong climate for innovation enhances the ability of transactional leaders to support and influence creativity among followers.

Bass and Steidlmeier (1999) contend that most leaders utilize both transformational and transactional styles to some degree. Transformational leaders exhibit more transformational than transactional behaviors, whereas those identified as transactional leaders tend to exhibit more transactional behaviors (Bass & Steidlmeier, 1999). Thus, the ability to transition between

transformational and transactional styles in order to maximize the productivity of the innovation process is likely a strength of ambidextrous leaders.

Other Leadership Styles

Bledow et al. (2011) found that, in addition to transformational leadership, several other leadership styles positively correlate with the innovation process, including leader-member exchange and participative leadership.

Kesting et al. (2016) compared and contrasted directive leadership styles and participative leadership styles. Kesting et al. (2016) note that the main differences between these styles are the extent to which the leader involves the followers in the decision-making process by consulting their opinion. Directive leadership involves providing clear directions and monitoring compliance with the given directions (Kesting et al., 2016). Participative leadership, on the other hand, involves the followers in the decision-making process (Somech, 2006). Kesting et al. (2016), therefore, suggest participative styles benefit the creative stages of the innovation process, while directive styles may benefit the implementation stages. This argument parallels the arguments of Bledow et al. (2009) regarding transformational and transactional leadership styles.

The primary participative leadership style that has been considered with respect to the innovation process is leader-member exchange. Leader-member exchange studies the dyadic relationship between a leader and a follower (Graen & Uhl-Bien, 1991). According to Graen and Uhl-Bien (1991), high quality leader-member exchanges are characterized by mutual trust, respect, and shared influence, while weak leader-member exchanges are characterized by directive, downward influence, and role defined relationships. Rosing et al. (2010) found a strong positive relationship between high quality leader-member exchange and innovation.

Shalley and Gilson (2004) add that this relationship is further strengthened by a climate that is supportive of innovation.

Team Characteristics

In order to effectively execute projects, leaders may have the opportunity to select members of the project team based on characteristics such as diversity of knowledge and skill, experience, and team size. Several researchers have considered the relationships between team characteristics and team performance within the innovation process with what often appear to be mixed results.

Team Size

In a controlled experiment, Hackman and Vidmar (1970) found that group size did not impact team performance. Their experiment, however, was limited to team sizes between two and seven members. Members of larger teams indicated a degree of dissatisfaction with group processes and their ability to contribute, while members of smaller teams felt the teams were too small for optimal performance.

Giannocacaro et al. (2018) conducted a simulation of team resilience in the presence of a disturbance. They found that team resilience declined as team size increased, but strong social relationships within the team had a positive effect on resilience.

Thornburg (1991) conducted a meta-analysis of studies involving team size and creativity. Teams comprised of up to 10 members were studied, with results indicating that, while total creative output continued to increase as team size increased, creative output on a per individual basis dropped as the team size increased (Thornburg, 1991). These findings imply that as team size continues to grow, total creative output is likely to plateau or even begin to decline. More recently, West et al. (2003) conducted a large study involving teams of health care workers.

In the study, West et al. (2003) found a positive relationship between the creative output of the team and team size, thus contrasting the findings of Thornburg (1991).

Kozlowski and Bell (2013) acknowledged inconsistent findings from prior research on team size and team performance, noting that findings have ranged from a curvilinear relationship to no relationship to a positive relationship without limits. More resources add additional skill and capacity to the team; however, additional resources may complicate team interaction, and the dispersion of responsibility may lead to reduced motivation (Kozlowski & Bell, 2013). Soboroff (2012) found that members of larger teams demonstrated less commitment to the team and perceived reductions of trust and cohesion among the team members. Based on his review of the literature, Horwitz (2005) concluded that team effectiveness increases with team size, but only up to some optimal point, beyond which inefficiencies outweigh capacity gains.

Mueller (2012) studied the impacts of team size on social support and interpersonal relationships of team members. Specifically, Mueller (2012) considered emotional support, help and assistance, advice, and information exchange. As team size increases, Mueller (2012) found that team members perceive "gaining supportive help from the team is unlikely as teammates lack the time and resources required to provide individual members with assistance" (p. 113), and thus become more selective regarding building relationships with other team members.

Hunter and Cushenbery (2011) suggest that small teams lack the diversity of knowledge, skill, and expertise for effectively meeting innovation challenges, while large teams face communication challenges that may limit the effective exchange of knowledge and ideas. Thus, teams comprised of four to seven members may prove optimal for communication, coordination, cohesiveness, and creative output (Horwitz, 2005; Hunter & Cushenbery, 2011). Assessment of these prior research findings suggest two hypotheses.

Hypothesis 3a (H3a): Team size will have an inverted U-shaped relationship with creativity.

Hypothesis 3b (H3b): Team size will have a positive relationship with project performance.

Team Experience

In a study of cross-functional teams, Pinto et al. (1993) found greater team member experience in project-based work led to higher levels of collaboration and project execution efficiency. Huckman et al. (2009) reported similar results based on data collected at a large software development firm located in India. Huckman et al. (2009) found general individual experience did not necessarily correspond to team performance output, but team member familiarity and specific role experience both had a significant positive influence on team performance. Levitt and March (1988) suggest that the inconsistent findings regarding experience and team performance may be partially due to competency traps in which experience and comfort with sub-optimal procedures lead to their continued use rather than an ongoing search for more optimal procedures.

Serrador and Pinto (2015) conducted a study of project teams following traditional plan-driven practices as well as teams following project management practices based on the agile framework. This study found no significant relationship between team member experience in project-based work and project success when following practices based on the agile framework (Serrador & Pinto, 2015). However, this study primarily considered stakeholder satisfaction rather than project implementation efficiency as the primary measure of success (Serrador & Pinto, 2015).

In a meta-analysis of literature on team diversity, Horwitz and Horwitz (2007) noted a small but positive relationship between diversity of knowledge and skill and team effectiveness. Guzzo and Dickson (1996) suggest that the relationship between diversity and team performance is strongest for teams pursuing creative activities. However, functional diversity may also lead to challenges in developing a common understanding of tasks and increasing debates among work teams (Horwitz, 2005).

Greater experience and greater diversity of experience within a team may improve creativity, decision-making, and overall team effectiveness. However, greater diversity of experience, if not managed effectively, may also lead to contention, debate, and disagreement among team members, resulting in poor performance.

Based on these studies, the impacts of individual experience on creativity and innovation remain inconclusive, but specific team role experience of the individual does appear to have a positive impact on team performance. Taken together, these findings suggest two hypotheses.

Hypothesis 4a (H4a): Team experience will have a negative relationship with creativity.

Hypothesis 4b (H4b): Team experience will have a positive relationship with project performance.

Antecedents of Creativity and Innovation

Amabile and various colleagues have extensively studied the antecedents of creativity in an organizational environment. Amabile (1983) introduced the componential theory of creativity, which presents various factors that influence the creative process. The theory was evolved by Amabile et al. (1996) to include intrinsic motivation. According to this theory, four components that influence creativity include: domain-relevant skills, creativity-relevant processes, intrinsic task motivation, and the social environment (Amabile, 2013). Amabile (2013) explains that "the

level of creativity that a person produces at any given point in time is a function of the creativity components operating, at that time, within and around that person" (p. 135). This section explores the factors of environment and task motivation.

Organizational Environment

Pirola-Merlo (2010) defines climate as "the set of norms, attitudes, and expectations that individuals perceive to operate in a specific social context" (p. 1076). Several studies of manufacturing employees found a strong correlation between organizational climate and creative performance (Oldham & Cummings, 1996; C. L. Wang & Rafiq, 2014; X. Wang et al., 2019). Schneider et al. (1994) found that management can influence organizational climate in order to enhance innovation.

Amabile et al. (1996) built on the initial creativity theory to generate an eight-factor conceptual model for assessing the support for creativity within the work environment. This model included "(1) organizational encouragement, (2) supervisory encouragement, (3) work group support, (4) freedom, (5) sufficient resources, (6) challenging work, (7) workload pressures, and (8) organizational impediments" (Amabile et al., 1996, p. 1159). Within this model, workload pressure requires careful balance between too little pressure and too much pressure, and organizational impediments are negatively correlated with creativity (Amabile et al., 1996).

West (1990) separately proposed a four-factor model for an innovative work environment. This model included "(1) vision, (2) participative safety, (3) task orientation, and (4) support for innovation" (Anderson & West, 1998, p. 240). Based on this model, Anderson and West (1998) developed the Team Climate Inventory to evaluate the climate for support for innovation. Gilson and Shalley (2004) have found that vision, participative safety, and support

for innovation are important antecedents of creative team processes. In contrast, Bledow et al. (2009) suggested that vision and task orientation are important antecedents supporting successful innovation.

Ghoshal and Bartlett (1994) define context, the basis for the integration approach to ambidextrous organizations, based on four factors: discipline (clear standards, fast feedback, consistent sanctions), stretch (shared ambition, collective identity, personal meaning), trust (fairness and equity, participative decision-making), and support (access to resources, help and support from management). Birkinshaw and Gibson (2004) argue that these four factors create two dimensions of context necessary for ambidexterity: social support and performance management. Social support is comprised of trust and support and is concerned with providing the security and autonomy needed for creativity (Birkinshaw & Gibson, 2004). Performance management, in turn, is comprised of stretch and discipline, and stimulates high-quality results expected from the implementation phase of the innovation process (Birkinshaw & Gibson, 2004).

Hunter et al. (2007) reviewed 42 prior studies that identified factors influencing creativity. Working with other scholars in the field of creativity and climate, they mapped 95% of the dimensions found in their literature review to the following 14 dimensions:

> (1) positive peer group; (2) positive supervisor relations; (3) resources; (4) challenge; (5) mission clarity; (6) autonomy; (7) positive interpersonal exchange; (8) intellectual stimulation; (9) top management support; (10) reward orientation; (11) flexibility and risk-taking; (12) product emphasis; (13) participation; and (14) organizational integration (p. 74).

Hunter et al. (2007) further evaluated the effect sizes of these dimensions, finding that an intellectually stimulating and challenging environment with positive interpersonal exchange provided the strongest effect on creativity and innovation.

Some of these dimensions require careful balance to foster creativity and innovation. For example, Thayer et al. (2018) note that autonomy supports creative work, but the innovation process may benefit from formalized procedures and supervision. When tasks are clearly understood and already optimized, formalized procedures and hierarchical control can lead to increases in efficiency and performance (Stewart, 2006).

Motivation

Ford (1996) introduced a theory of creative action for individuals. This model suggests that the decision of an individual to pursue creative action over habitual action is based on three factors: sense-making, motivation, and knowledge and skill (Ford, 1996). While there is significant overlap between this model and the individual factors Amabile (1983) presents in the componential theory of creativity, it further emphasizes the importance of motivation in support of the innovation process.

Based on her earlier work on the componential theory of creativity (Amabile, 1983), Amabile et al. (1994) developed the Work Preference Inventory to assess how individuals perceive their levels of intrinsic and extrinsic motivation. Results from the Work Preference Inventory demonstrate a strong correlation between intrinsic motivation and creativity (Amabile et al., 1994).

Intrinsic motivation, according to Amabile (2013), represents the motivation to undertake a task because it is "interesting, involving, personally challenging, or satisfying" (p. 3). Chen et al. (2013) confirmed that there is a positive relationship between intrinsic motivation and

innovative performance. Grant (2008) extended the research on intrinsic motivation by demonstrating that high intrinsic motivation enhances the association between social motivation and persistence, performance, and productivity.

Ryan and Connell (1989) conceptualized perceived locus of causality (PLOC) for the achievement-related behaviors of an individual as a gradient from external to introjected, to identified, to intrinsic reasons. According to this model, external motivation is derived from compliance with external authority or rules; introjected motivation derives from the desire for approval or the avoidance of guilt; and identified motivation refers to alignment of the behavior with one's own values (Ryan & Connell, 1989). Ryan and Deci (2000) included integrated regulation as a form of internalized extrinsic motivation. According to Deci and Ryan (2008a), integrated motivation is similar to intrinsic motivation in that it represents volition, yet differs in that the motivation is not driven by the behavior itself but by the internalized sense of the value of the behavior.

According to cognitive evaluation theory (Deci & Ryan, 1985), all contextual factors can be perceived as either informational or controlling. When feedback and other contextual factors are perceived as controlling, intrinsic motivation and creativity will diminish (Shalley et al., 2004). However, when feedback and other contextual factors are perceived as informational, individuals feel supported and encouraged, which produces a positive impact on intrinsic motivation and creativity (Shalley et al., 2004). Leaders can encourage creativity through careful management of information and other contextual factors.

Hirst et al. (2009) studied the link between social identity and prosocial motivation, which is the desire to contribute to the success of the group. Hirst et al. (2009) suggest that the inspirational motivation of transformational leaders builds followers' sense of team

identification, which strengthens social identity and fosters prosocial motivation. According to Hirst et al. (2009), inspirational motivation reinforces the value of group activities, renders the team level goals more salient, and encourages risk-taking and experimentation, and ultimately enhances creative efforts of the group.

De Dreu et al. (2008) developed the Motivated Information Processing in Groups (MIP-G) model, which explores the relationships between social motivation, epistemic motivation, and group level decisions that support creative and innovative outcomes. The model postulates that social motivation drives the specific topics introduced to the group, while epistemic motivation drives the depth to which information is gathered, processed, and considered (De Dreu et al., 2008). De Dreu et al. (2008) note that social motivation and epistemic motivation influence "generating problem solutions, disseminating information, and negotiating joint decisions" (p. 22).

De Dreu et al. (2008) contend that prosocial motivation, in which the individual is concerned with group level outcomes, fairness, and group success, along with high levels of epistemic motivation, lead to the introduction of the most valuable and useful information for the group level decision making process. Hu and Liden (2015) conducted a field study and a controlled experiment in which they were able to link prosocial motivation to team performance. Further, Hu and Liden found the link between prosocial motivation and team performance strengthened as task interdependence increased.

Grant and Berry (2011) continued to explore prosocial motivation, building on motivated information processing theory. Grant and Berry (2011) noted that creative ideas can be novel without being useful. However, based on two studies involving police officers and employees at a water treatment plant, Grant and Berry (2011) found that prosocial motivation, when combined

with taking perspectives of others, led to ideas that were both novel and useful, thus enhancing creativity.

Project Management and Motivation

Adler and Chen (2011) found that creativity correlates most closely with intrinsic motivation and declines as motivation shifts toward the external end of the PLOC gradient. Gagné and Deci (2005) argue that autonomous intrinsic motivation best predicts persistence on interesting creative tasks, while autonomous internalized extrinsic motivation predicts persistence on effort-driven tasks. According to Gagné and Deci (2005), autonomy-supportive work climates enhance such autonomous motivation. Practices based on the agile framework tend to encourage more collaborative interaction, decision making, and autonomy among members of the project team and other stakeholders (Serrador & Pinto, 2015). Therefore, it follows that practices based on the agile framework are likely to enhance motivation, which, in-turn, enhances creativity and project performance.

Hypothesis 5a (H5a): Motivation mediates the relationship between project management practices based on the agile framework and creativity.

Hypothesis 5b (H5b): Motivation mediates the relationship between project management practices based on the agile framework and project performance.

Leadership and Motivation

In a meta-analysis of literature on leadership and innovation, Rosing et al. (2011) identify a positive relationship between transformational leadership and support for the innovation process. However, they also note a wide variation in results among studies, suggesting that other factors may be influencing the innovation process. Bono and Judge (2003) note that transformational leaders provide vision and increase follower self-efficacy; factors that may

foster epistemic motivation among followers by helping them understand the purpose of the study and giving them the confidence to pursue effective solutions that realize the vision. The relationships between motivation and the innovation process, as well as the potential relationships between leadership styles, and motivation, suggest that motivation may serve as a mediating influence in the relationship between leadership styles and the innovation process. These findings suggest four additional hypotheses.

Hypothesis 6a (H6a): Motivation mediates the relationship between transformational leadership style and creativity.

Hypothesis 6b (H6b): Motivation mediates the relationship between transactional leadership style and creativity.

Hypothesis 6c (H6c): Motivation mediates the relationship between transformational leadership style and project performance.

Hypothesis 6d (H6d): Motivation mediates the relationship between transactional leadership style and project performance.

Team Characteristics and Motivation

In a controlled experiment, Hackman and Vidmar (1970) noted that team members felt more dissatisfied with group process and their ability to contribute to the team as the team size increased. Giannocacero et al. (2018) noted, through simulation, that team resilience declined as team size grew. By dividing groups of 12 subjects into subgroups, Kameda et al. (1992) found a roughly inverted U relationship between team size and motivation, with motivation peaking for moderate-sized groups. These findings suggest motivation may mediate the relationship between team size and project outcomes.

Hypothesis 7a (H7a): Motivation mediates the relationship between team size and creativity.

Hypothesis 7b (H7b): Motivation mediates the relationship between team size and project performance.

Bandura (2009) notes that efficacy beliefs are related to self-motivation. People with high self-efficacy are more likely to persevere in the face of challenges and obstacles. One way to instill self-efficacy is through "enactive mastery experiences" (Bandura, 2009, p. 184) that include setback, failure, and learning from mistakes. Therefore, individuals who have greater levels of experience may demonstrate higher levels of self-efficacy and self-motivation, which leads to higher performance and favorable outcomes. These outcomes suggest a relationship between experience, motivation, and project outcomes, leading to two hypotheses.

Hypothesis 7c (H7c): Motivation mediates the relationship between team experience and creativity.

Hypothesis 7d (H7d): Motivation mediates the relationship between team experience and project performance.

Summary of Motivation as a Potential Mediator

In summary, researchers have identified significant links between motivation and the innovation process. Intrinsic motivation, along with prosocial motivation and epistemic motivation, correlate with creativity. Internalized extrinsic motivation, in conjunction with prosocial motivation and epistemic motivation, tend to support the behaviors required for implementation. Therefore, by influencing motivation, project leaders can foster the creative and implementation behaviors required of the innovation process.

Project Performance

When referring to project performance, it is important to differentiate between a successful project and a successfully managed project. Project success refers to how well the resulting project outcome meets business objectives, while project management success refers to how well the project team executed against baseline measures such as budget, schedule, scope, and quality (Cooke-Davies, 2002; Horwitz, 2005). For example, a project may be successfully managed, but the project outcome may fail to meet customer expectations. Similarly, a project may not satisfy baseline targets, such as cost or schedule targets, yet the project outcome may be well received by the customer. Turner and Zolin (2012) suggest that project management success measures are near-term measures, while measures of the project outcome success often occur months or years.

Building on the work of Shenhar et al. (2001) in identifying dimensions of project success, Serrador and Turner (2014) present five dimensions along which a project may be evaluated, including project efficiency, team satisfaction, customer impact, business success, and preparing for the future. According to Serrador and Turner (2014), project efficiency and team satisfaction represent near-term measures, occurring during and immediately after the conclusion of the project. Customer impact is measured after the conclusion of the project, and the remaining two measures occur long after the conclusion of the project.

Serrador and Turner (2014) surveyed 1,386 projects, finding a 60% correlation between project efficiency measures and stakeholder satisfaction. While this result is significant, it also indicates that stakeholder satisfaction is heavily influenced by other factors aside from project management performance.

Project Performance Feedback

One final consideration for this study is how project performance, when considered by the project team, impacts the motivation of project team members. According to prospect theory (Kahneman & Tversky, 1979), individuals evaluate gains and losses relative to a reference point. Further, Kahneman and Tversky (1979) note that individuals are more sensitive to losses than gains. Thus, a project performance measurement outcome, regardless of absolute value, may be considered a gain or a loss depending on the expectation against which it is evaluated by the individual.

Bendickson et al. (2017) note that organizations performing favorably relative to a reference point are likely adopt conservative behaviors and practices. Conversely, organizations performing below a reference point are likely to pursue higher risk behaviors and practices (Bendickson et al., 2017). However, Bendickson et al. (2017) further note that higher risk pursuits resulting from poor organizational performance often compound the poor performance issue.

Hypothesis 8a (H8a): Creativity has a positive relationship with motivation.

Hypothesis 8b (H8b): Project performance has a positive relationship with motivation.

Tversky and Kahneman (1992) further found that, when losses and gains are equally likely, the potential gains must be considered twice as valuable as the potential losses for the challenge to be embraced. These findings may have implications for the measurements, reward systems, and recognition systems used to motivate creative and innovative behaviors. For example, Im et al. (2013) suggest that reward systems based on short-term measures of project performance discourage individuals from following creative but potentially risky pursuits. In

contrast, rewards based on longer-term outcomes may encourage the pursuit of novel, but possibly less useful ideas (Im et al., 2013).

Summary

The objective of this study is to explore how various leadership styles, project management practices, and team characteristics interact within an organizational environment to foster creative and innovative behaviors among project team members. Motivation is specifically considered as a mediating construct influencing creative and innovative behaviors. This literature review has explored several key theories, propositions, and research outcomes that are related to the innovation process. A summary of some of the major foundational works influencing this study is presented in Table 1. Key theories presented herein include organizational ambidexterity, ambidextrous leadership, the componential theory of creativity, the theory of creative practice, and prospect theory. By exploring these foundational theories, along with recent research in these areas, the groundwork is set for further study into potential improvements to the innovation process.

Table 1

Major Foundational Works that Influenced this Study

Author	Date	Research Field	Research Contributions
Benner & Tushman	2003	Innovation	Noted that innovations can be deemed incremental or radical depending on the degree to which they exploit existing knowledge versus explore new knowledge.
March	1991	Ambidexterity	Theorized that organizations must balance exploitation (leveraging existing knowledge) and exploration (pursuit of new knowledge). Exploitation and exploration require different approaches.
Tushman & O'Reilly	1996	Ambidexterity	Argued that ambidexterity is best achieved by creating separate structures for exploration and exploitation.
Gibson & Birkinshaw	2004	Ambidexterity	Suggested that ambidexterity can be achieved within one organizational unit by establishing a supportive organizational context.

Author	Date	Research Field	Research Contributions
Benner & Tushman	2015	Ambidexterity	Argued that organizational ambidexterity can be achieved by leveraging structural separation in the early phases and through organizational context as the project effort matures.
Bledow et al.	2009	Ambidextrous Leadership	Suggested that leaders can adapt their behaviors to the needs of the team in support of the innovation process.
Rosing et al.	2011	Ambidextrous Leadership	Suggested that leaders can influence the innovation process through use of opening leader behaviors and closing leader behaviors.
Burns	1978	Transformational Leadership	Argued that transformational leadership elevates followers to higher levels of performance and self-actualization.
Bledow et al.	2009	Transformational Leadership	Suggested that transformational leadership factors of individual consideration and intellectual stimulation enhance creativity.
Bledow et al.	2011	Transactional Leadership	Suggested that transactional leadership behaviors of setting roles and responsibilities, controlling activities, and use of contingent rewards align with implementation activities.
Amabile	1983	Creativity	Introduced the componential theory of creativity, which suggests creativity is influenced by domain-relevant skills, creativity-related processes, intrinsic motivation, and the social environment.
West	1990	Creativity	Proposed a four-factor model of innovative work environment that included vision, participative safety, task orientation, and support for innovation.
Ghoshal & Bartlett	1994	Creativity	Defined context for creativity and innovation based on four factors, including discipline, stretch, trust, and support.
Ford	1996	Motivation	Proposed the theory of creative action that suggests creative action is influenced by sense-making, motivation, and knowledge and skill.
Grant	2008	Motivation	Demonstrated an association between intrinsic motivation and social motivation that together influence persistence, performance, and productivity.
Ryan & Connell	1989	Motivation	Conceptualized perceived locus of causality (PLOC) as a gradient from external to introjected, to identified, to intrinsic motivation.
Ryan & Deci	2000	Motivation	Added integrated motivation to the PLOC gradient.
Gagné & Deci	2005	Motivation	Argued that intrinsic motivation best predicts creativity while internalized extrinsic motivation best predicts persistence on effort-driven tasks.

Author	Date	Research Field	Research Contributions
De Dreu et al.	2008	Motivation	Developed the Motivated Information Processing in Groups model showing a relationship between social motivation, epistemic motivation, and the level of decisions made by a group to support creative and innovative outcomes.
Lewis et al.	2002	Project Management	Suggested taking an ambidextrous approach to management style as the level of uncertainty within a project evolves.
Stare	2014	Project Management	Identified four groups of factors that can be used to classify a project as either agile or predictive.

Chapter 3

METHODOLOGY

The PMI (2017a) defines a project as "a temporary endeavor undertaken to create a unique product, service, or result" (p. 4). Execution of a project is an innovative process requiring the generation of creative and useful ideas, along with the implementation and realization those ideas as a project outcome (Zacher & Rosing, 2015). Through this innovative process of creativity and implementation, businesses are able to develop new capabilities and exploit their current competencies (March, 1991). Businesses are also able to remain viable and grow within a competitive landscape through a careful balance of exploration and exploitation (Drucker, 1985; Rosenbusch et al., 2011).

Ambidexterity refers to the ability of an organizational unit or project team to support and effectively transition between creative behaviors and disciplined implementation (Gibson & Birkinshaw, 2004). Ambidexterity presents a challenge for project teams because individual team members are rarely skilled at both creative idea generation and disciplined attention to detail (Miron et al., 2004). Given the importance of creativity and implementation in fostering the viability and continued growth of businesses, organizations stand to benefit greatly by obtaining a deeper understanding of ways to foster both creativity and disciplined implementation.

Creative and innovative behaviors are influenced by a number of factors, including the organizational environment, leadership styles, team processes, and individual knowledge, skills, and abilities (Hunter & Cushenbery, 2011). Thus, project managers can enhance project performance by carefully assessing the environment in which the project team is operating and adapting processes, practices, and leadership behaviors to help the project team address the conflicting demands of the innovation process.

The primary purpose of this study is to explore how leadership style, team processes, and team characteristics influence the ability of the project team members to successfully execute the innovation process. A number of researchers have identified motivation as a key factor in supporting creativity and innovation (Amabile, 1983; De Dreu et al., 2011; Ford, 1996; Grant & Berry, 2011). Therefore, this study specifically focuses on the role of motivation in mediating the influences of leadership style, project management practices, and team characteristics on creative and innovative behaviors.

Research Design

This study is a non-experimental, cross-sectional study of project managers and other members of project teams. An online questionnaire survey was utilized to collect data related to a variety of factors including leadership style, project management practices, team characteristics, organizational context, motivation, creativity, and innovation. The survey was distributed to members of the PMI, their colleagues, and members of my professional network. An assessment of the hypotheses presented in the next section is evaluated based on the response data.

Research Questions and Hypotheses

Effective project execution requires the project team to switch between episodes of creativity and focused implementation. This research study is to explore the relationships between leadership styles, project management practices, team characteristics, and creative and innovative behaviors. The primary intent of the study is to better understand how project leaders can influence team ambidexterity through their leadership style, and through appropriate selection of project management practices and team characteristics.

Research Question 1: How do leadership styles, project management practices, and team characteristics influence creative and innovative outcomes?

According to the componential theory of creativity, four components influence creativity: domain-relevant skills, creativity-relevant processes, intrinsic task motivation, and the social environment (Amabile, 1983; Amabile et al., 1996). According to the theory of creative action (Ford, 1996), individuals pursue creative action based on three factors: sense-making, motivation, and knowledge and skill. Both of these theories emphasize motivation as an important factor for influencing creativity. Therefore, this study considers motivation and how it serves to mediate the relationship between leadership styles, project management practices, and creative and innovative outcomes.

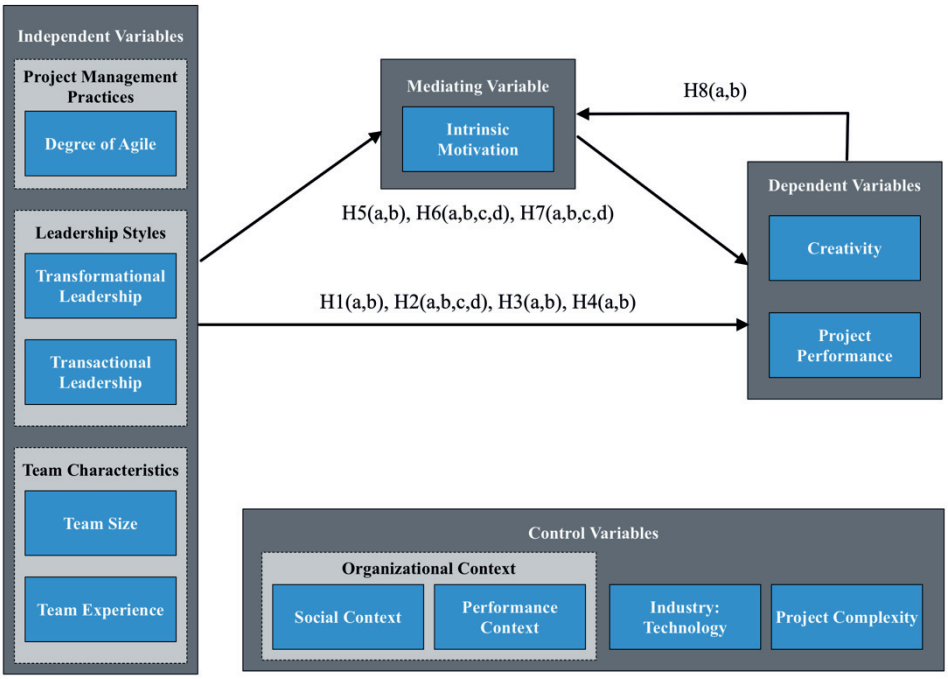
Research Question 2: How does motivation mediate the relationship between leadership styles, project management practices, team characteristics, and creative and innovative outcomes?

Direct Influences

The diagram in Figure 5 presents a mapping of the hypotheses to the key constructs and variables involved in the study. Project management practices, in the context of this study, represent the degree to which the project team follows practices associated with agile principles versus traditional plan-driven project management practices. Lewis et al. (2002) describe project management practices as planned or emergent. Emergent practices, such as those supporting agile principles, foster creativity, flexibility, and improvisation, while planned practices provide managerial direction, oversight, and discipline (Lewis et al., 2002). Thus, teams following practices based on agile principles are likely to demonstrate higher levels of creativity than those following traditional plan-driven project management practices.

Figure 3

Mapping of the Hypotheses



Hypothesis 1a (H1a): Project management practices based on the agile framework will have a positive relationship with creativity.

Hypothesis 1b (H1b): Project management practices based on the agile framework will have a positive relationship with project performance.

Rosing et al. (2011) consider ambidexterity within the innovation process from the perspective of leadership behaviors. March (1991) notes that the creative process of exploration involves experimentation and risk taking, while the implementation process of exploitation is linked to reducing risk and variation, and aligning the team. Rosing et al. (2011) define opening leader behaviors as the set of leader behaviors that support exploration, such as encouraging experimentation and risk-taking. Rosing et al. (2011) define closing leader behaviors as the set of leader behaviors that support exploitation, such as establishing procedures, sticking to plans, and

initiating corrective actions. Thus, Rosing et al. (2011) suggest that the innovation process is most productive when opening and closing leader behaviors are balanced.

Transactional leadership involves an exchange relationship between the leader and the follower for the mutual benefit of their own self-interests (Bass, 1999). Transformational leadership involves the use of idealized influence, inspiration, intellectual stimulation, and individualized consideration to move the leader-follower relationship beyond self-interests toward "achievement, self-actualization, and the well-being of others" (Bass, 1999, p. 11). Intellectual stimulation includes support for creativity, while individualized consideration involves supporting the developmental needs of followers (Bass, 1999). Thus, transformational leadership appears to align with the opening leader behaviors that foster exploration. A meta-analytic study by Rosing et al. (2011) found a positive relationship between transformational leadership and the innovation process.

Hypothesis 2a (H2a): Transformational leadership behaviors will have a positive relationship with creativity.

Hypothesis 2b (H2b): Transformational leadership behaviors will have a positive relationship with project performance.

Research by Jansen et al. (2009) supports the findings of Rosing et al. (2011). Further, this research identifies a negative relationship between transactional leadership and exploration, and a positive relationship between transactional leadership and exploitation (Jansen et al., 2009).

Hypothesis 2c (H2c): Transactional leadership will have a negative relationship with creativity.

Hypothesis 2d (H2d): Transactional leadership will have a positive relationship with project performance.

This study considers team size and team experience for their impact on the innovation process. Research regarding the relationship between team size and creativity has generated mixed results. In a meta-analysis of past studies, Thornburg (1991) found that individuals working by themselves consistently outperformed groups in terms of creative output per individual. However, in a large study of health care workers, West et al. (2003) found a positive relationship between team size and innovation. Hunter and Cushenbery (2011) suggest that small teams may lack the diversity of expertise for effective innovation. However, Hunter and Cushenbery (2011) further argue that the communication challenges imposed by large teams may limit the effective exchange of ideas that foster creativity. Thus, Hunter and Cushenbery (2011) suggest a team of four to seven members may prove optimal for creativity.

Hypothesis 3a (H3a): Team size will have an inverted U-shaped relationship with creativity.

Hypothesis 3b (H3b): Team size will have a positive relationship with project performance.

Pinto et al. (1993) note that greater team member experience on projects leads to better collaboration and efficiency on project based work. Huckman et al. (2009) similarly found that general individual experience does not necessarily correspond to team performance, but team member familiarity and specific role experience both have a significant positive influence on team performance. Thus, it appears there is a positive relationship between project team role experience and the success of the innovation process that is independent of the project management practices the project team follows.

Horwitz and Horwitz (2007) conducted a meta-analysis of literature on diversity and found a small but positive relationship between diversity of task-related experience and team effectiveness. Guzzo and Dickson (1996) found that the relationship between diversity and team performance is strongest for teams pursuing creative activities. Highly experienced teams, especially teams that have worked together for a long time, may share commonality of experience rather than the diversity of task-related experience that fosters creativity.

Hypothesis 4a (H4a): Team experience will have a negative relationship with creativity.

Hypothesis 4b (H4b): Team experience will have a positive relationship with project performance.

Mediating Influences

Several researchers have investigated the relationship between various forms of motivation and creative behaviors. According to self-determination theory, motivation may be autonomous or controlled (Deci & Ryan, 2008b). Controlled motivation refers to external influences that direct or energize an individual to think or behave in a particular way, whereas autonomous motivation refers to internally regulated thoughts, feelings, and behaviors based on the alignment of an activity with an individual's sense of self (Deci & Ryan, 2008b). Autonomous motivation includes intrinsic motivation as well as forms of extrinsic motivation in which behavior is self-endorsed (Deci & Ryan, 2008b).

Gagné and Deci (2005) suggest that autonomous intrinsic motivation predicts persistence on interesting creative tasks, while autonomous extrinsic motivation predicts persistence on effort-driven implementation tasks. Autonomous motivation is affected by the degree to which the basic psychological needs of autonomy, competence, and relatedness are supported within a particular context (Deci & Ryan, 2008b). According to Gagné and Deci (2005), autonomy-

supportive work climates enhance autonomous motivation. Practices based on the agile framework tend to encourage more collaborative interaction and decision making among members of the development team and other stakeholders (Serrador & Pinto, 2015). Therefore, it follows that practices based on the agile framework will likely enhance autonomous, prosocial, and epistemic motivation.

Hypothesis 5a (H5a): Motivation mediates the relationship between project management practices based on the agile framework and creativity.

Hypothesis 5b (H5b): Motivation mediates the relationship between project management practices based on the agile framework and project performance.

De Dreu et al. (2011) considers epistemic motivation, defined as the willingness to expend effort to achieve a thorough understanding of a task or problem to be solved, and prosocial motivation, defined as a concern for joint outcomes and fairness within a group. Epistemic motivation is driven by individual factors such as tolerance for ambiguity and openness to experience, or by situational factors such as accountability or time pressure (De Dreu et al., 2011). De Dreu et al. (2011) further found that higher levels of prosocial motivation and epistemic motivation together correlated with individual creativity.

Adler and Chen (2011) suggest that implementation behaviors based on coordination and control require "subordination of individual gratification to organizational imperatives" (p. 77). Thus, autonomous extrinsic motivation is a better foundation for implementation behaviors than intrinsic motivation. De Dreu et al. (2008) further suggest that high levels of prosocial motivation along with low levels of epistemic motivation lead to maintaining harmony, mutual enhancement, and group centeredness.

Bono and Judge (2003) suggest that transformational leaders motivate followers "by increasing follower self-efficacy, by facilitating followers' social identification with their group, and by linking work values to follower values" (p. 555). These factors align with the autonomy supportive work environment Deci and Ryan (2008b) describe. Bono and Judge (2003) further note that transformational leaders provide vision and increase follower self-efficacy; factors that may foster epistemic motivation among followers by helping them understand the purpose of the study and giving them the confidence to pursue effective solutions that realize the vision.

While Rosing et al. (2011) identify a positive relationship between transformational leadership and support for the innovation process, they also note a wide variation in results among studies. This variation suggests that other factors may be influencing the innovation process. The relationships between motivation and the innovation process, as well as the potential relationships between leadership styles and motivation, suggest that motivation serves as a mediating influence in the relationship between leadership styles and the innovation process.

Hypothesis 6a (H6a): Motivation mediates the relationship between transformational leadership style and creativity.

Hypothesis 6b (H6b): Motivation mediates the relationship between transactional leadership style and creativity.

Hypothesis 6c (H6c): Motivation mediates the relationship between transformational leadership style and project performance.

Hypothesis 6d (H6d): Motivation mediates the relationship between transactional leadership style and project performance.

In a controlled experiment, Hackman and Vidmar (1970) noted that team members felt more dissatisfied with group process and their ability to contribute to the team as the team size

increased. Giannocacero et al. (2018) notes, through simulation, that team resilience declined as team size grows. An experiment by Kameda et al. (1992), which involved dividing groups of 12 subjects into subgroups, found roughly an inverted U relationship between team size and motivation, with motivation peaking for moderate-sized groups. These findings suggest motivation may mediate the relationship between team size and project outcomes.

Hypothesis 7a (H7a): Motivation mediates the relationship between team size and creativity.

Hypothesis 7b (H7b): Motivation mediates the relationship between team size and project performance.

Bandura (2009) notes that efficacy beliefs are related to self-motivation. People with high self-efficacy are more likely to persevere in the face of challenges and obstacles. One way to instill self-efficacy is through "enactive mastery experiences" (Bandura, 2009, p. 184) that include setback, failure, and learning from mistakes. Therefore, those individuals who have greater levels of experience may demonstrate higher levels of self-efficacy and self-motivation, leading to higher performance and favorable outcomes. These outcomes suggest a relationship between experience, motivation, and project outcomes.

Hypothesis 7c (H7c): Motivation mediates the relationship between team experience and creativity.

Hypothesis 7d (H7d): Motivation mediates the relationship between team experience and project performance.

Project Performance Feedback

Serrador and Turner (2014) demonstrated that there is a correlation between project efficiency and project success. This suggests that teams effective at executing the innovation process will show higher levels of project performance.

Bendickson et al. (2017) note that organizations performing favorably relative to a reference point are likely adopt conservative behaviors and practices. Conversely, organizations performing below a reference point are likely to pursue higher risk behaviors and practices (Bendickson et al., 2017). However, according to Bendickson et al. (2017), such high risk behaviors often exacerbate the performance challenges.

Hypothesis 8a (H8a): Creativity has a positive relationship with motivation.

Hypothesis 8b (H8b): Project performance has a positive relationship with motivation.

Summary of Hypotheses

The hypotheses identified in this section are summarized in Table 2. This table presents the hypotheses, along with the variables and the statistical methods used to analyze the hypotheses. The variables and statistical methods are addressed in detail in a later section.

Table 2

Summary of the Hypotheses

Hypothesis	Variables	Method of Analysis
H1a: Project management practices based on the agile framework will have a positive relationship with creativity.	Degree of Agile, Creativity	PROCESS
H1b: Project management practices based on the agile framework will have a positive relationship with project performance.	Degree of Agile, Project Performance	PROCESS
H2a: Transformational leadership style will have a positive relationship with creativity.	Transformational Leadership, Creativity	PROCESS
H2b: Transformational leadership style will have a positive relationship with project performance.	Transformational Leadership, Project Performance	PROCESS
H2c: Transactional leadership style will have a negative relationship with creativity.	Transactional Leadership, Creativity	PROCESS
H2d: Transactional leadership style will have a positive relationship with project performance.	Transactional Leadership, Project Performance	PROCESS
H3a: Team size will have an inverted U-shaped relationship with creativity.	Team Size, Creativity	Kruskal-Wallis Test

H3b: Team size will have a positive relationship with project performance.	Team Size, Project Performance	PROCESS
H4a: Team experience will have a negative relationship with creativity.	Team Experience, Creativity	PROCESS
H4b: Team experience will have a positive relationship with project performance.	Team Experience, Project Performance	PROCESS
H5a: Motivation mediates the relationship between project management practices based on the agile framework and creativity.	Degree of Agile, Motivation, Creativity	PROCESS
H5b: Motivation mediates the relationship between project management practices based on the agile framework and project performance.	Degree of Agile, Motivation, Project Performance	PROCESS
H6a: Motivation mediates the relationship between transformational leadership style and creativity.	Transformational Leadership, Motivation, Creativity	PROCESS
H6b: Motivation mediates the relationship between transactional leadership style and creativity.	Transactional Leadership, Motivation, Creativity	PROCESS
H6c: Motivation mediates the relationship between transformational leadership style and project performance.	Transformational Leadership, Motivation, Project Performance	PROCESS
H6d: Motivation mediates the relationship between transactional leadership style and project performance.	Transactional Leadership, Motivation, Project Performance	PROCESS
H7a: Motivation mediates the relationship between team size and creativity.	Team Size, Motivation, Creativity	PROCESS
H7b: Motivation mediates the relationship between team size and project performance.	Team Size, Motivation, Project Performance	PROCESS
H7c: Motivation mediates the relationship between team experience and creativity.	Team Experience, Motivation, Creativity	PROCESS
H7d: Motivation mediates the relationship between team experience and project performance.	Team Experience, Motivation, Project Performance	PROCESS
H8a: Creativity has a positive relationship with motivation.	Creativity, Motivation	HMR
H8b: Project performance has a positive relationship with motivation.	Project Performance, Motivation	HMR

Participants

This study involved an online survey of members of the PMI, along with their coworkers and colleagues, and members of my professional network. Requests for participation were made in-person at monthly chapter meetings, through broadcast emails distributed to the chapter members, and to project managers listed in the contact database of a local project management training company. Requests for participation were also distributed to individuals from my professional network who are involved in either traditional or agile project management. In return for participation, I offered to present my findings at local PMI chapter meetings.

According to their website, the Baltimore Chapter of the PMI has approximately 3,500 members (PMI Baltimore, MD Chapter, n.d.), while the Silver Spring Chapter has approximately 1,000 members (PMI Silver Spring, MD Chapter, n.d.). The Montgomery County, MD Chapter, does not publish membership statistics on their website, but they are likely to have similar membership numbers as other local chapters. PMI members often join multiple local PMI chapters leading to some overlap in chapter membership numbers. Therefore, it is estimated that efforts to contact potential participants may have reached up to 4,000 project management professionals. However, it is not possible to know the total number of individuals who may have seen and taken notice of the invitation, making estimates of the response rate difficult to assess. The initial goal was to obtain more than 300 responses, with a minimum threshold of 200 in order to achieve good statistical power for the intended analysis method (Faul et al., 2009; Weston & Gore, 2006). Ultimately, I received 263 responses. Of those 263 responses, 202 responses were complete and usable for analysis.

This survey approach represents a form of convenience sampling and snowball sampling. Members of the PMI, however, represent a variety of industries, such as federal, state, and local government; technology; healthcare; biomedical research; engineering; construction; and finance. Therefore, the variety of participant backgrounds and industries improves the generalizability of the findings.

Variables

Independent variables are identified to assess leadership style and project management practices. An assessment of project management practices is intended to measure the degree to which the team follows practices generally associated with agile methodologies as opposed to

traditional plan-driven project management practices. Leadership style variables measure the degree to which project leaders utilize a transformational style and a transactional style.

Other independent variables considered within this study include project team size and experience. Survey questions were also added to assess demographic information and control variables such as industry, project complexity, and organizational context in which the project team operates.

The study originally intended to assess the mediating construct of intrinsic motivation along several dimensions, including intrinsic, autonomous, social, and epistemic motivation of the survey respondent. However, in order to maintain statistical power with the number of responses received, only intrinsic motivation was assessed.

The dependent variables in this study are creativity and project performance as part of the overall innovation process. A summary of the variables considered in this study are presented in Table 3 found later in this chapter.

Measures and Scales

The unit of measure for this study is at the individual level. Using a customized survey primarily comprised of previously validated survey instruments, participants were asked to provide responses for each survey prompt from their own perspectives. The survey was conducted using the SurveyMonkey online survey platform. This approach facilitated anonymous participation in the survey and fostered efficient data collection from a diverse and geographically distributed group of individuals.

The key constructs and variables were measured using existing scales to the fullest extent possible. This section reviews the scales that were leveraged for the survey instrument. The selected survey instruments each utilized ordinal response scales that originally included

between four and seven response options. For consistency, each of these survey instruments were modified to include a five-option ordinal response scale. The survey instrument utilized in this study is presented in Appendix A.

Project Management Practices

Stare (2014) identified four key areas of difference between agile practices and traditional plan-driven project management practices, including requirements, project scheduling, teamwork, and client collaboration. CollabNet VersionOne (2019) publishes an annual survey of agile practitioners that includes a listing of the most common agile practices utilized by organizations. To assess the level of agile practice adoption, the most common practices from the CollabNet VersionOne survey (2019) for each category identified by Stare (2014) were listed. Survey respondents were asked the degree to which each practice is utilized by their project team. Response options were based on an ordinal scale (1 = *not at all* and 5 = *frequently, if not always*). This approach to measuring agile based versus traditional plan-driven project management practices had not been previously used. Therefore, the approach was validated as part of the pilot study. CollabNet Permission granted permission by via email to use the VersionOne survey findings as the basis for this survey question.

Leadership Style

The Multifactor Leadership Questionnaire (MLQ), developed by Bass, and further refined by Bass and colleagues, examines the following leadership factors: charismatic-inspirational leadership, intellectual stimulation, individualized consideration, contingent reward, management-by-exception, and laissez-faire leadership (Avolio et al., 1999). This instrument has been extensively analyzed for internal consistency and validity, with a Cronbach's alpha on the order of 0.84. This instrument was used to assess leadership style. An example statement from

the survey is, “I talk optimistically about the future” (Avolio & Bass, 2004). Participants were asked to respond to each prompt using a five-point ordinal scale (1 = *Not at all* and 5 = *Frequently, if not always*). Cronbach’s alpha, as reported by the authors for each dimension of the scale are: Charismatic/Inspirational = .92; Intellectual Stimulation = .83; Individual Consideration = .79; Contingent Reward = .80; Management by Exception (Active) = .63; Passive = .84 (Avolio & Bass, 2004). This survey instrument was licensed from Mind Garden, Inc. A copy of the survey license is presented in Appendix D. While this survey consists of 45 prompts, license restrictions limit reproduction of the survey instrument within this document to a sample of three specific prompts. Therefore, the text for all other prompts associated with the MLQ survey instrument were removed from the survey questionnaire presented in Appendix A.

Motivation

Within the construct of motivation, this study included measures of intrinsic motivation, autonomous versus controlled motivation, social motivation, and epistemic motivation. However, only the dimension of intrinsic motivation was considered for final analysis. Three survey instruments were utilized to measure each of these dimensions of motivation.

Extrinsic and intrinsic motivation are related to autonomous and controlled motivation. Autonomous motivation includes intrinsic motivation and internalized forms of extrinsic motivation, while controlled motivation covers forms of extrinsic motivation that have not been internalized by the individual (Deci & Ryan, 2008b). The Multidimensional Work Motivation Scale (MWMS) survey instrument created by Gagné et al. (2016) measures each of these dimensions of motivation. According to Gagné et al. (2015), the Cronbach’s alpha for each of the subscales range from 0.7 to 0.9. An example survey item begins with the question “Why do you put efforts into your current job?” with a prompt such as “Because putting efforts in this job

aligns with my personal values" (Gagné et al., 2016, p. 2). Participants were asked to respond to each prompt using a 5-point ordinal scale (1 = *not at all* and 5 = *completely*). Permission to use the MWMS survey instrument was received from the author via email.

Social motivation was measured by a scale created by Grant (2008). This scale measures both intrinsic motivation and social motivation by asking two questions and providing four responses to each question. Participants were asked to evaluate each possible response using a 5-point Likert scale (1 = *strongly disagree* and 5 = *strongly agree*). According to Grant (2008), the Cronbach's alpha for these measures are 0.9 for social motivation and 0.71 for intrinsic motivation. An example question includes, "Why are you motivated to do your work?", with a prompt response such as, "Because I care about benefitting others through my work" (Grant, 2008, p. 51). The author granted permission via email for use of the survey instrument.

De Dreu et al. (2008) argue that need for closure is inversely related to epistemic motivation. Thus, individuals with a high need for closure will demonstrate low epistemic motivation and vice-versa. Need for closure was be measured using a scale developed by Webster and Kruglanski (1994), and later shortened by Roets & Van Hiel (2011). This scale demonstrated good reliability and internal consistency with a Cronbach's alpha of 0.84 (Roets & Van Hiel, 2011). A sample statement includes, "When confronted with a problem, I'm dying to reach a solution very quickly" (Roets & Van Hiel, 2011, p. 17). Participants were asked to evaluate each possible response using a five-point Likert scale (1 = *strongly disagree* and 5 = *strongly agree*). The author granted permission via email to use the survey instrument.

Creativity and Innovation

Creativity and innovation of the anticipated project outcome were measured using the Creative Solutions Diagnostic Scale developed by Cropley et al. (2011). According to the

authors, this scale provides a means for non-expert judges to consistently evaluate the functional creativity of a product. The scale demonstrated good inter-rater reliability and internal consistency with a Cronbach's alpha of 0.94 (Cropley et al., 2011). An example statement includes, "The solution draws attention to shortcomings in other existing solutions" (Cropley et al., 2011, p. 19). Participants were asked to respond to each prompt using a five-point ordinal scale (1 = *not at all* and 5 = *very much*). The author granted permission via email to use the survey instrument.

Other Factors

The survey instrument collects additional information such as demographics, organizational context, and project management performance. Organizational context was evaluated using a survey instrument developed by Gibson and Birkinshaw (2004) that measures performance management and social context. The internal consistency for this scale was evaluated with a Cronbach's alpha of 0.79 for performance management and 0.93 for social context (Gibson & Birkinshaw, 2004). An example statement includes, "Indicate the extent to which systems encourage people at your level to set challenging / aggressive goals" (Gibson & Birkinshaw, 2004, p. 217). Participants were asked to respond to each prompt using a five-point ordinal scale (1 = *never* and 5 = *always*). The author granted permission via email to use the survey instrument.

Project management performance was measured using a survey instrument created by Serrador and Pinto (2015). Based on an evaluation conducted by the authors, this instrument demonstrates good internal consistency with a Cronbach's alpha of 0.945 for project success and 0.77 for project efficiency (Serrador & Pinto, 2015). Respondents were asked to evaluate each survey item using a 5-point Likert scale (1 = *very poor* and 5 = *very well*). A sample survey

statement to measure project success is "How would the project sponsors and stakeholders rate the success of the project?" (Serrador & Pinto, 2015, p. 1046). The author granted permission via email to use the survey instrument.

Summary and Scoring of Measures and Scales

The variables measured as part of this study are presented in Table 3. The survey questions used in this study, except as discussed in relation to the MLQ survey instrument, are presented in Appendix A.

Table 3

Summary of Variables

Variable Name	Variable Type	Level of Measure	Description	Survey Questions
Degree of Agile	Independent	Scale	Mean of Responses	No. 6-7
Transformational Leadership	Independent	Scale	Mean of Responses	No. 9
Transactional Leadership	Independent	Scale	Mean of Responses	No. 9
Team Size	Independent	Ordinal	Size Scale	No. 4
Team Experience	Independent	Ordinal	Years Scale	No. 5
Industry: Technology	Control	Nominal	Industry Selection	No. 25
Project Complexity	Control	Scale	Mean of Responses	No. 2
Organizational Context: Performance	Control	Scale	Mean of Responses	No. 11
Organizational Context: Social	Control	Scale	Mean of Responses	No 11
Motivation: Intrinsic	Mediating	Scale	Mean of Responses	No. 13
Creativity	Dependent	Scale	Mean of Responses	No. 15
Project Performance	Dependent	Scale	Mean of Responses	No. 16
Age	Demographic	Ordinal	Age Scale	No. 18

Level of Education	Demographic	Ordinal	Formal Education Scale	No. 20
Individual Experience	Demographic	Ordinal	Experience Scale	No. 22
Job Level	Demographic	Nominal	Job Category Scale	No. 23
Sector	Demographic	Nominal	Sector Category Scale	No. 24
Organization Size	Demographic	Ordinal	Size Scale	No. 26
Project Management Certifications	Demographic	Nominal	Certification Type Scale	No. 27
Project Role	Demographic	Nominal	Role Category Scale	No. 8

Several of the variable scores are calculated based on combinations of responses to multiple survey prompts. Scoring of those specific variables is presented in Table 4. The measurement model highlighting the number of items used to assess each variable is presented in Figure 4.

Table 4

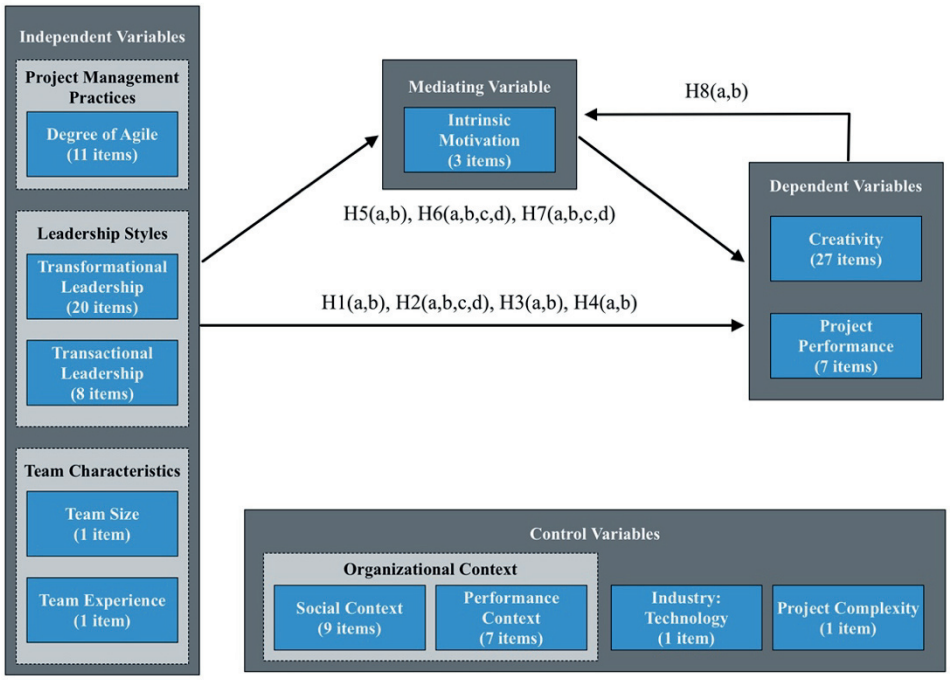
Calculation of Variable Scores

Variable Name	Questions	Scoring
Degree of Agile	No. 6-7	Mean (Q6(R), Q7 Items 1-10)
Transformational Leadership	No. 9	IA = Mean (Items 10, 18, 21, 25) IB = Mean (Items 6, 14, 23, 34) IM = Mean (Items 9, 13, 26, 36) IS = Mean (Items 2, 8, 30, 32) IC = Mean (Items 15, 19, 29, 31) Transformational Leadership = Mean (IA, IB, IM, IS, IC)
Transactional Leadership	No. 9	CR = Mean (Items 1, 11, 16, 35) MBE-A = Mean (Items 4, 22, 24, 27) Transactional Leadership = Mean (CR, MBE-A)

Organizational Context: Performance	No. 11	Mean (Items 1-7)
Organizational Context: Social	No. 11	Mean (Items 8-16)
Motivation: Intrinsic	No. 13	Mean (Items 8-10)
Creativity	No. 15	R&E = Mean (Items 1-6) Prob = Mean (Items 7-9) Prop = Mean (Items 10-14) Eleg = Mean (Items 15-21) Gen = Mean (Items 22-27) Creativity = Mean (R&E, Prob, Prop, Eleg, Gen)
Project Performance	No. 16	Eff = Mean (Items 1-3) Stake = Mean (Items 4-7) Project Performance = Mean (Eff, Stake)

Figure 4

Mapping of the Hypotheses to the Measurement Framework



Pilot Test

The survey instrument was distributed to project managers and project management students at a local university. The pilot survey was completed by 12 individuals who were also asked to identify any issues with either the survey process or the survey content. Further, response data was analyzed to determine if any obvious issues existed with the survey instrument. Based on the pilot test, no significant changes were made to the survey instrument aside from a few minor clarifications to the wording of questions.

Data Analysis

Data was initially intended to be analyzed using structural equation modeling (SEM) to determine the relationships between the variables presented in the measurement model. SEM is a family of statistical techniques that support the evaluation of complex relationships between constructs and variables (Weston & Gore, 2006). Such relationships may include direct effects, mediated effects, covariances, and measurement error (Weston & Gore, 2006). Further, SEM allows for analysis of a mediation process involving multiple independent, mediating, or dependent variables, without the use of ad hoc methods required with standard regression techniques (Gunzler et al., 2013).

Model fit of the observed data was evaluated using chi-square, with the intent of achieving a nonsignificant chi-square, indicating good model fit (Weston & Gore, 2006). Model fit was further evaluated using an appropriate combination of Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Guidelines for fit, as noted by Weston and Gore (2006), included a nonsignificant chi-square, CFI greater than .90, and RMSEA and SRMR both less than .10.

During data analysis, good model fit was not achieved based on these parameters. Therefore, the primary method of analysis shifted to multiple regression, with four separate models employed to address the full set of hypotheses. Mediation was analyzed using mediated multiple regression, enabled by the PROCESS macro from Hayes (2018) and running within SPSS. The PROCESS macro utilizes bootstrapping and regression analysis to estimate relationships between variables. Bootstrapping uses sampling of the data with replacement to estimate the correlation coefficients, along with the generation of confidence intervals for those coefficients (Hayes, 2009), and has been demonstrated to perform well compared to other traditional methods (MacKinnon et al., 2004; Williams & MacKinnon, 2008).

Mediation Evaluation Process

In this study, motivation is considered a mediating factor within the measurement framework. The process of mediation has traditionally been evaluated using a four step process, outlined by Baron and Kenny (1986), of: (1) demonstrating significant correlation between the independent variables and the dependent variables; (2) demonstrating significant correlation between the independent variables and the mediating variables; (3) demonstrating correlation between the mediating variables and the dependent variables while controlling for the independent variables; and (4) observing the correlation between the independent and dependent variables while controlling for the mediating variables (Baron & Kenny, 1986).

More recently, researchers have argued all that is required to establish a mediating effect is to demonstrate a significant indirect effect (Hayes, 2009; Mascha et al., 2013; Zhao et al., 2010). The indirect effect is the difference between the total effect of the independent variable on the dependent variable and the direct effect of this same relationship when controlling for the mediating variable (Hayes, 2018). A large indirect effect relative to the total effect suggests a

strong level of mediation exists in the relationships between the independent and dependent variables (Hayes, 2018). Thus, the mediating effects of motivation were evaluated based on evaluating the indirect effects of the hypothesized relationships, with direct and total effects also presented.

Reliability

The survey developed for this study is primarily comprised of existing survey instruments that demonstrate good test-retest reliability. Further, the survey was pilot tested to help ensure that questions are clear and unambiguous. Following data collection, data analysis included measuring Cronbach's alpha to ensure a moderate or greater level of internal consistency.

Given the number of constructs and variables involved in this study, the length of the survey was managed with the intent of minimizing the impact of participant fatigue on the results. Further, the responses to most of the questions in this survey were based on participant perception. Therefore, social desirability bias may have impacted the findings.

Validity

Internal validity is limited because this study utilized cross sectional data rather than random assignment. This constraint prevents claims of causality and limits explanation of spurious results. However, control variables were introduced to help minimize issues with spuriousness.

External validity is limited because of the use of convenience sampling and snowball sampling. However, many of the participants are members of the PMI, with diverse backgrounds and representing a broad set of industries. These demographic factors may help to improve generalizability of the results to other PMI chapter members.

The survey for this study was developed primarily using existing survey instruments that demonstrate good validity with Cronbach's alphas ranging from around 0.70 to 0.95. Further, the final survey instrument was pilot tested and confirmatory factor analysis was conducted to evaluate internal consistency. Utilization of validated and reliable measures improves the construct validity of the study.

The statistics chosen for this study are deemed appropriate, and the sample size was deemed adequate based on analysis of desired statistical power. Thus, conclusion validity is expected to be adequate.

Limitations

There are a number of limitations that must be considered with regard to this study. First, the survey was advertised to members of the PMI via an emailed monthly newsletter and a discussion forum. It is not possible to determine the number of people who were aware of the survey. Therefore, it is not possible to accurately estimate the response rate for the survey. Second, this survey was conducted at a single point in time. Therefore, while it may be possible to analyze the correlation among the many variables, it will not be possible to evaluate or make claims of causation.

Conclusion

This study intends to explore how motivation mediates the relationships between leadership style and project management practices as independent variables and project creativity and innovation as dependent variables. The primary goal of the study is to help project leaders understand how to foster creative and innovative behaviors among project team members in order to maximize the likelihood of project success. This is a non-experimental, cross-sectional study of project managers and project team members conducted via responses to a survey

instrument. Members of the local chapters of the PMI and other members of my professional network were invited to participate in the survey. Further, the participants were asked to share the survey with their colleagues.

The survey instrument is primarily comprised of previously published and validated survey instruments. The initial survey instrument was pilot tested to assess validity and address any issues associated with ambiguity. Data were analyzed to address the proposed hypotheses initially using structured equation modeling and using hierarchical multiple regression, mediated multiple regression, and the nonparametric Kruskal-Wallis H test to determine the relationships among the independent, mediating, control, and dependent variables. Analysis tools included SPSS and the PROCESS macro for SPSS developed by Hayes (2018).

Chapter 4

QUANTITATIVE ANALYSIS

This study examined how project managers can influence the successful outcomes of projects. The literature suggests that project success requires a careful balance between a learning orientation focused on creativity and a performance orientation focused on implementation effectiveness. A survey, administered to project managers and project team members, explores how leadership styles, project management practices, and team characteristics influence the creativity expressed in the project outcome and the efficiency and effectiveness of project execution.

This chapter presents the analysis and results of this study in the following sequence. The chapter opens with a summary of the study methodology, the characteristics of the participants, preparation of the data for analysis, and a description of the variables used in the study. The next sections explore each of the research questions and hypotheses, followed by analysis of the survey responses and associated findings. Each section supports the analysis to address the following research questions:

- Research Question 1 (R1) – How do leadership styles, project management practices, and team characteristics influence creative and innovative project outcomes?
- Research Question 2 (R2) – How does motivation mediate the relationship between leadership styles, project management practices, team characteristics, and creative and innovative project outcomes?

This chapter closes with a summary of the analysis and findings, including a summary of the results presented in Table 27.

Significance of the Study

This study investigates how to enhance the innovation process by considering a unique combination of constructs and variables as they relate to project leaders and project teams. Prior research has examined the relationship between motivation and creativity, and other research has considered the influences of leadership style on motivation. However, this study represents a unique combination of leadership, motivation, creativity, and other variables. Further, this study considers the mediating effects of motivation on the relationships between each independent and dependent variable, providing new insights for project leaders hoping to maximize the performance of the project team and enhance the probability of project success.

Further, this study answers the call of Bledow et al. (2009) to "point out how systems can meet conflicting demands of innovation to remain adaptive in the long run" (p. 333). By considering how leadership style, project management practices, and motivation interact to enhance the innovative process, project leaders are better prepared to adapt their leadership styles and project management practices to respond to the evolving needs of exploitation and exploration at the project and project team level within their organizations.

Finally, recognizing the importance of breadth of knowledge and skill, the PMI (2015) developed the PMI Talent Triangle to encourage project managers to acquire and maintain a balanced set of knowledge, practices, and skills. The PMI Talent Triangle incorporates three primary dimensions: leadership, technical project management, and strategic and business management. PMI certification holders must receive training in each of these areas on an ongoing basis to maintain their certifications. This study contributes insights to each of the dimensions of the PMI Talent Triangle by considering how leadership styles (leadership) and project management practices (technical project management) can be adapted to balance

creativity and implementation to achieve successful project outcomes in support of business objectives (strategic and business management).

Summary of Methods

The research design selected for this study is nonexperimental and uses a cross-sectional survey for data collection. The survey evaluates the relationships between leadership styles, project management practices, team characteristics, and creativity and project performance outcomes for project teams. Data were collected via an anonymous survey of project management professionals, project team leaders, and project team members actively involved in project execution. Using relevant literature, I constructed a 26-item survey containing 160 questions. The survey questionnaire draws from several existing and validated survey instruments. Appendix A presents a copy of the survey questionnaire.

Institutional Review Board Approval

This study's survey required approval by the Hood College Institutional Review Board (IRB). I received approval to proceed with the survey on October 21, 2019. Appendix B presents a copy of the IRB application and the decision letter.

Pilot Testing

Following IRB approval, 12 students who had just completed a project management course at a local university pilot-tested the survey. The pilot group participants were part-time students who were working full-time and were at various stages of completing a master's degree program with a concentration in project management. The pilot group found no significant problems with the survey, and no questions were added or deleted based on their feedback. No material content changes were made, but some wording of questions was clarified based on suggestions from the pilot group.

Data Collection

Following pilot-testing, I emailed a survey invitation to members of my professional network on November 4, 2019. The survey invitation included a link to the survey hosted on SurveyMonkey. The invitation was also distributed on my behalf to members of three local chapters of the PMI in the Baltimore-Washington metropolitan area during the week of November 11, 2019. Follow-up reminders were sent to the same mailing lists during the week of December 2, 2019. The survey closed on December 21, 2019. At that point, 263 individuals had started the survey, and 202 individuals had fully completed the survey, representing a 76.8% completion rate.

Data Preparation and Case Validation

The data from the survey responses were downloaded from SurveyMonkey to SPSS version 26. The online survey was configured to require answers to all questions. Therefore, the 202 completed survey responses contained answers to all questions.

I performed a visual inspection of the data to identify signs of disengaged respondents. Visual inspection was based on looking for obvious patterns of response consistency for a given respondent, such as selecting "agree" for all responses in a given section (Meade & Craig, 2012). Based on the visual inspection, none of the 202 completed survey responses indicated any obvious signs of a disengaged respondent.

Variables Used in this Study

Variables for analysis were created from the survey response data as defined by the authors of the associated scales. See Table 5 for a summary of the variables created for further analysis.

Table 5

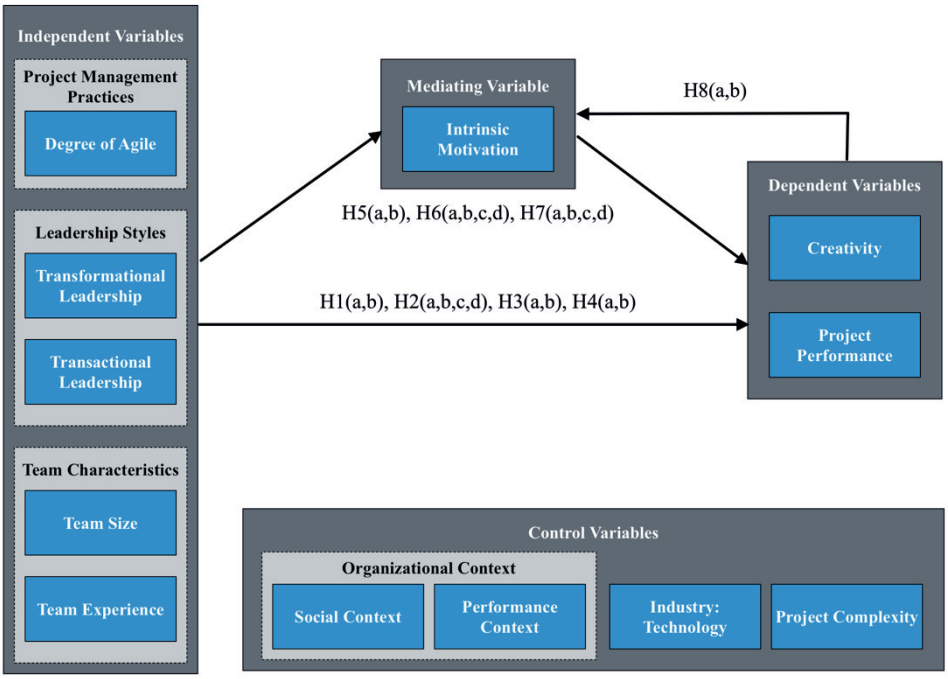
Summary of Variables Used for Study Analysis

Variable Name	Variable Type	Level of Measure	SPSS Description	Survey Questions
Degree of Agile	Independent	Scale	DegAgile	No. 6-7
Transformational Leadership	Independent	Scale	LdTxform	No. 9
Transactional Leadership	Independent	Scale	LdTxact	No. 9
Team Size	Independent	Ordinal	TmSize	No. 4
Team Experience	Independent	Ordinal	TmExp	No. 5
Industry: Technology	Control	Nominal	IndTech	No. 25
Project Complexity	Control	Scale	PrjCplx	No. 2
Organizational Context: Performance	Control	Scale	OCPerf	No. 11
Organizational Context: Social	Control	Scale	OCSoc	No. 11
Motivation: Intrinsic	Mediating	Scale	MotInt	No. 13
Creativity	Dependent	Scale	Creativity	No. 15
Project Performance	Dependent	Scale	ProjPerf	No. 16

Figure 5 presents a mapping of the relationships between the variables considered in this study, along with the associations between the variables and the hypotheses that are analyzed in this chapter.

Figure 5

Mapping Between Variables and Hypotheses



The following tables elaborate on the hypotheses identified in Figure 5. The hypotheses associated with R1 are elaborated in Table 6, along with identification of the primary variables considered for evaluating each of the hypotheses.

Table 6

Hypotheses Associated with Research Question 1 (R1)

Hypothesis	Primary Variables
H1a: Project management practices based on the agile framework will have a positive relationship with creativity.	Degree of Agile, Creativity
H1b: Project management practices based on the agile framework will have a positive relationship with project performance.	Degree of Agile, Project Performance
H2a: Transformational leadership style will have a positive relationship with creativity.	Transformational Leadership, Creativity
H2b: Transformational leadership style will have a positive relationship with project performance.	Transformational Leadership, Project Performance
H2c: Transactional leadership style will have a negative relationship with creativity.	Transactional Leadership, Creativity
H2d: Transactional leadership style will have a positive relationship with project performance.	Transactional Leadership, Project Performance
H3a: Team size will have an inverted U-shaped relationship with creativity.	Team Size, Creativity
H3b: Team size will have a positive relationship with project performance.	Team Size, Project Performance
H4a: Team experience will have a negative relationship with creativity.	Team Experience, Creativity
H4b: Team experience will have a positive relationship with project performance.	Team Experience, Project Performance

The hypotheses associated with R2 are presented in Table 7, along with the primary variables considered for evaluating each of the hypotheses.

Table 7

Hypotheses Associated with Research Question 2 (R2)

Hypothesis	Primary Variables
H5a: Motivation mediates the relationship between project management practices based on the agile framework and creativity.	Degree of Agile, Motivation, Creativity
H5b: Motivation mediates the relationship between project management practices based on the agile framework and project performance.	Degree of Agile, Motivation, Project Performance
H6a: Motivation mediates the relationship between transformational leadership style and creativity.	Transformational Leadership, Motivation, Creativity
H6b: Motivation mediates the relationship between transactional leadership style and creativity.	Transactional Leadership, Motivation, Creativity
H6c: Motivation mediates the relationship between transformational leadership style and project performance	Transformational Leadership, Motivation, Project Performance
H6d: Motivation mediates the relationship between transactional leadership style and project performance.	Transactional Leadership, Motivation, Project Performance
H7a: Motivation mediates the relationship between team size and creativity.	Team Size, Motivation, Creativity
H7b: Motivation mediates the relationship between team size and project performance.	Team Size, Motivation, Project Performance
H7c: Motivation mediates the relationship between team experience and creativity.	Team Experience, Motivation, Creativity
H7d: Motivation mediates the relationship between team experience and project performance.	Team Experience, Motivation, Project Performance

The two remaining hypotheses that are based on the feedback loop in Figure 5 are presented in Table 8, along with the primary variables considered for evaluating each of the hypotheses.

Table 8

Additional Hypotheses Addressed in this Study

Hypothesis	Primary Variables
H8a: Creativity has a positive relationship with motivation.	Creativity, Motivation
H8b: Project performance has a positive relationship with motivation.	Project Performance, Motivation

Characteristics of Participants

Individuals were invited to participate in the study through emails sent to members of the local chapters of the PMI, personal invitations at PMI local chapter meetings, members of my professional network, and contacts on LinkedIn, and members of the Hood College community. I was not provided direct access to the email lists for the PMI local chapters. Therefore, I estimate that approximately 4,000 individuals were sent invitations to participate in the survey based on advertised membership statistics for each local chapter. However, I am unable to determine how many individuals received or took notice of the invitations. A total of 263 people responded to the invitation and started the online questionnaire. Of the 263 responses, 202 questionnaire responses were fully completed and usable for further analysis, representing a 76.8% completion rate. This section presents demographic data for the 202 survey respondents. I have not been able to identify a source of demographic statistics for the membership of the Project Management Institute. Therefore, I am unable to make claims regarding how representative this participant sample is of the broader project management community.

Respondents were asked several demographic questions, including gender, age, education, relevant certifications, industry, and project role. The PMI conducts and publishes an annual salary survey, which includes some demographic information for the 8,967 respondents from the United States (Project Management Institute, 2020a). Where possible, I provide

comparisons between the demographic data collected for my survey and demographic data presented in the PMI salary.

Individual Level Demographics

Of the 202 responses, 37.1% indicated they were female, 61.9% indicated they were male, and 1.0% chose not to indicate gender (see Table 9). The composition of the cohort of survey respondents based on gender compared favorably to the findings of the PMI salary survey for respondents within the United States (Project Management Institute, 2020a), with a $\chi^2(2) = 6.196$, $p = 0.045$. The most notable difference between the findings is that the percent of respondents who did not indicate gender is higher for the PMI salary survey than for this study. This comparison is presented graphically in Figure 6.

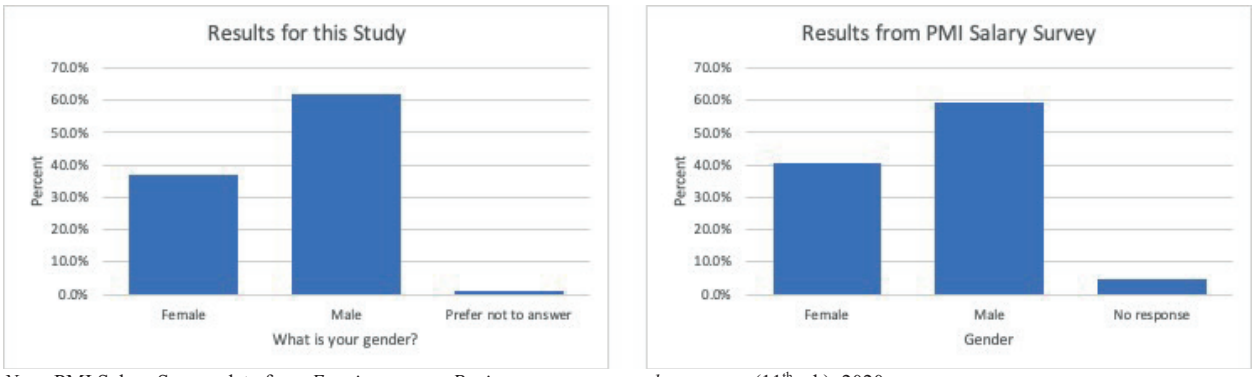
Table 9

Respondent Gender, Age, and Education

Question	Response	Percentage %	*N*
What is your gender?			
	Female	37.1	75
	Male	61.9	125
	Prefer not to answer	1.0	2
What is your age?			
	18-24	1.0	2
	25-34	8.9	18
	35-44	20.8	42
	45-54	29.2	59
	55-64	34.7	70
	65+	5.4	11
What is the highest level of education you have completed or the highest degree you have received?			
	High school degree or equivalent	0.5	1
	Some college but no degree	3.0	6
	Associate degree	2.0	4
	Bachelor's degree	24.8	50
	Master's degree	62.4	126
	Doctoral degree	7.4	15

Figure 6

Gender Summary in Comparison with PMI Salary Survey



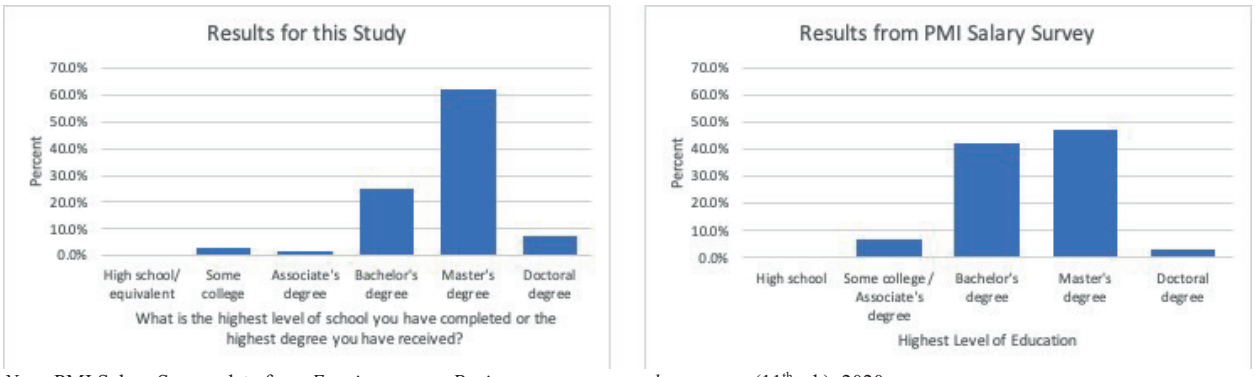
Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

Survey respondents represented a range of age groups, with the median response being the 45 to 54 year old age group (see Table 9). Two respondents identified as being in the 18 to 24 year old age group, while 11 respondents identified as being in the 65+ age group.

The median response for highest level of education was a Master's degree, with 126 respondents indicating they held this degree (See Table 9). This response was followed by 50 respondents indicating they held a Bachelor's degree, and then by 15 respondents indicating they held a Doctoral degree. This cohort of survey respondents appears, on average, to have achieved a higher level of educational attainment than the cohort of respondents to the PMI salary survey from the United States (Project Management Institute, 2020a), with a $\chi^2(4) = 35.600$, $p < 0.001$. This comparison is presented graphically in Figure 7.

Figure 7

Education Attainment Results in Comparison with PMI Salary Survey



Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

Industry Demographics

Participants represented a variety of industries (See Table 10), with 33.2% of respondents indicating they work in the high technology industry. An additional 5% of respondents indicated they work in telecommunications. For data analysis, these two groups were combined to form the industry category "technology" and accounted for 38.2% of the respondents. The next largest group, 20.3% of respondents, indicated they worked in a government position. Government was initially left in the data analysis as a separate categorical group. However, that industry category did not make a statistically significant difference in the data analysis. Therefore, it was combined with all remaining industry categories into the category "other," representing 61.8% of respondents, for further analysis. While a direct industry comparison between the findings in this survey and the findings in the PMI Salary Survey (Project Management Institute, 2020a) is not possible due to differences in categories offered to respondents, a graphical comparison is presented in Figure 8 to provide some indication of similarities and differences between the respective cohorts of respondents.

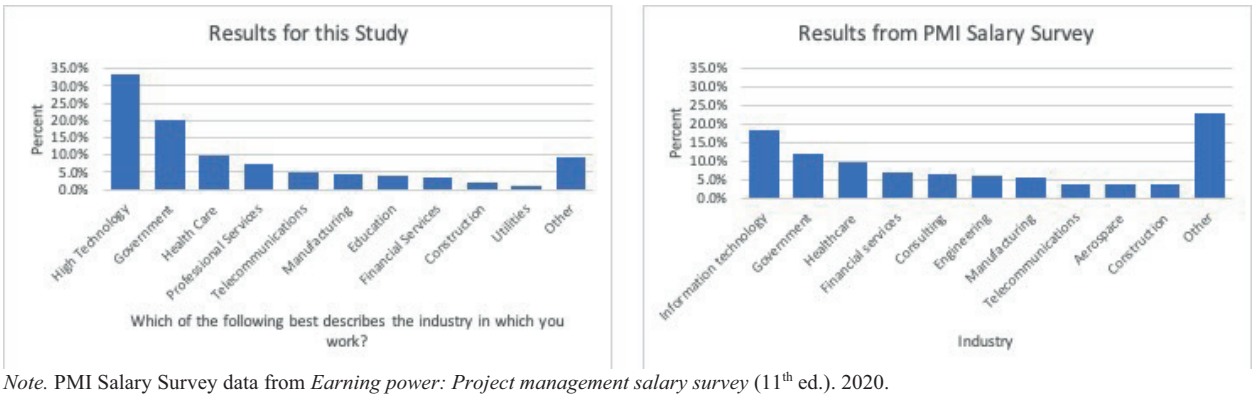
Table 10

Respondent Industry, Years of Experience in Field, and Project Management Certifications

Question	Response	Percentage %	*N*
Which of the following best describes the industry in which you work?			
	High Technology	33.2	67
	Government	20.3	41
	Health Care	9.9	20
	Professional Services	7.4	15
	Telecommunications	5.0	10
	Manufacturing	4.5	9
	Education	4.0	8
	Financial Services	3.5	7
	Construction	2.0	4
	Utilities	1.0	2
	Other	9.4	19
How long have you worked in your current field?			
	Less than 2 years	3.5	7
	2 to 6 years	8.9	18
	6 to 10 years	8.9	18
	10 to 15 years	11.9	24
	More than 15 years	66.8	135
Which of the following project management certifications do you currently hold?			
	Project Management Professional (PMP®)	41.6	84
	Certified Scrum Master (CSM®)	14.4	29
	Certified Scrum Product Owner (CSPO®)	9.9	20
	Agile Certified Practitioner (PMI-ACP®)	6.4	13
	Certified Associate in Project Management (CAPM®)	2.0	4
	Other	13.4	27
	No Formal Certification	40.6	82

Figure 8

Industries Represented in Comparison with PMI Salary Survey



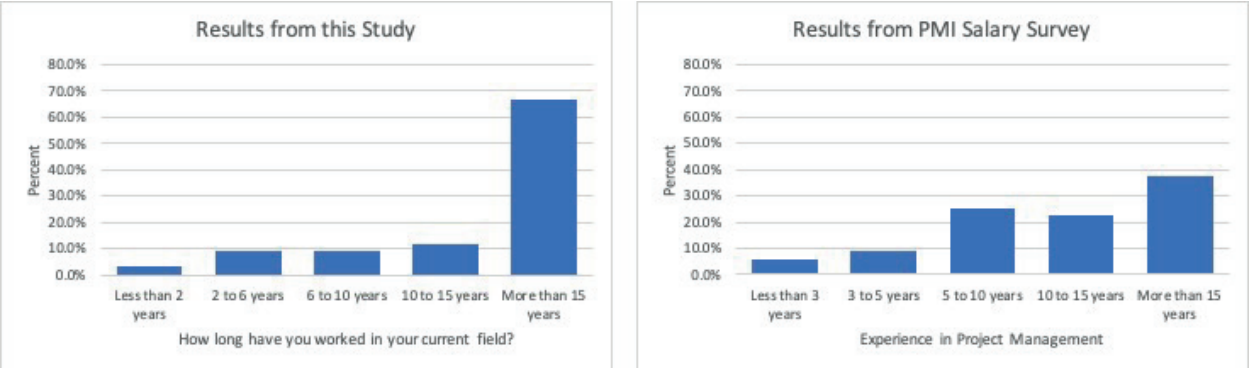
Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

A large percentage of respondents indicated they had a significant amount of experience in their current field. The majority of respondents (66.8%) indicated they had more than 15 years

of experience in their current field (See Table 10). The PMI Salary Survey (Project Management Institute, 2020a) provides information regarding years of experience in project management. Therefore, while the results do not offer a direct comparison, it is informative to note the significant experience indicated by respondents to both surveys. Figure 9 presents the years of experience indicated by respondents of both surveys.

Figure 9

Industry Experience Compared with Project Management Experience from PMI Salary Survey



Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

Respondents held a variety of project management certifications, with many respondents holding multiple project management certifications (See Table 10). Given that invitations were distributed to members of local chapters of the PMI, it was not surprising that 41.6% of respondents held the Project Management Professional certification offered by the PMI. Several respondents indicated they held one or more agile certifications, including Agile Certified Practitioner (6.4%), Certified Scrum Master (14.4%), and Certified Scrum Product Owner (9.9%).

Demographic Characteristics of Organizations

Respondents worked for organizations of varying sizes, with the largest percentage of respondents (37.1%) indicating they worked for organizations with 2,500 or more employees, followed by 26.2% of respondents working for organizations of 100 to 499 employees (see Table

11). This cohort of survey respondents appears, on average, to work for smaller organizations than respondents to the PMI salary survey from the United States (Project Management Institute, 2020a). This comparison is presented graphically in Figure 10.

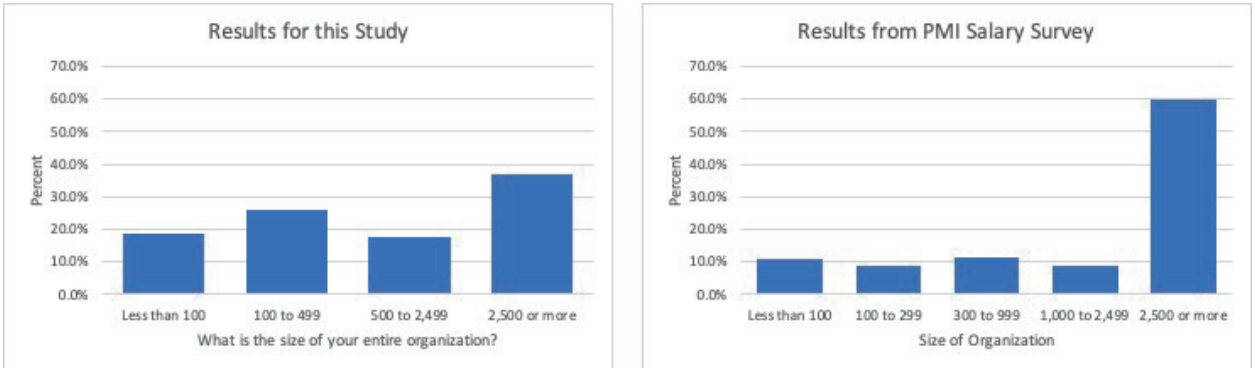
Table 11

Organization Size, Tenure at Organization, and Job Level

Question	Response	Percentage %	*N*
What is the size of your entire organization?			
	1 to 99 employees	18.8	38
	100 to 499 employees	26.2	53
	500 to 2,499 employees	17.8	36
	2,500 or more employees	37.1	75
How long have you worked for your current organization?			
	Less than 2 years	22.8	46
	2 to 6 years	25.7	52
	6 to 10 years	9.4	19
	More than 10 years	42.1	85
Which of the following best describes your current job level?			
	Entry Level	1.0	2
	Intermediate	17.8	36
	Middle Management	42.1	85
	Senior Management	22.8	46
	Owner/Executive/C-Level	6.9	14
	Other	9.4	19

Figure 10

Organizational Size in Comparison with PMI Salary Survey



Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

A large percentage of respondents indicated they had many years of experience at their current organization. The majority of respondents had six or more years of experience, with 9.4% of respondents indicating 6 to 10 years of experience and 42.1% of respondents indicating they

had been with their current organization for more than 10 years (see Table 11). The respondents also represented a variety of job levels. A total of 85 respondents identified as middle management, 46 respondents identified as senior management, and 36 respondents identified as serving in an intermediate level, non-management position (see Table 11).

Project Demographics

Respondents identified their roles on the projects they are actively supporting. Some respondents selected "other" as their role, but they proceeded to describe a role already identified in the options list. I provided the descriptive statistics for the original responses, along with adjusted responses based on the project role descriptions provided by those selecting "other" as their role. The majority of respondents (50.5%) identified as Project Managers (see Table 12). The next largest group of respondents (19.8%) indicated they were serving as developers or project team members.

Table 12

Respondent Role on Project and Project Size

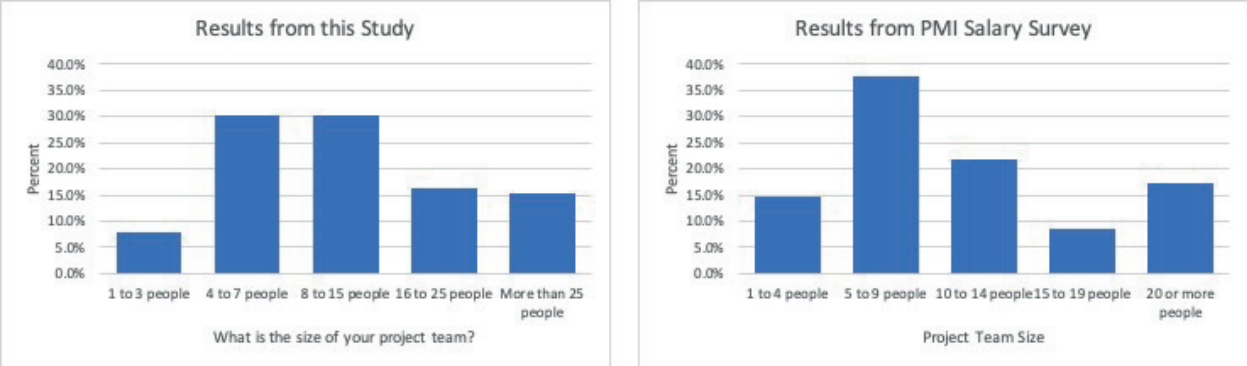
Question	Response	Original Responses		Adjusted Responses	
		Percentage %	*N*	Percentage	*N*
What is your primary role on the project team?					
	Project manager	48.5	98	50.5	102
	Developer or team member	15.3	31	19.8	40
	Functional Manager	7.9	16	8.9	18
	Scrum Master	5.9	12	5.9	12
	Product Owner	5.0	10	5.0	10
	Project Sponsor	4.0	8	4.0	8
	Product Manager	2.0	4	2.0	3
	Other	11.4	23	4.0	8
What is the size of your project team?					
	1 to 3 people	7.9	16		
	4 to 7 people	30.2	61		
	8 to 15 people	30.2	61		
	16 to 25 people	16.3	33		
	More than 25 people	15.3	31		

Project teams varied in size, with the majority of teams having either 4 to 7 members (30.2%) or 8 to 15 members (30.2%). For comparison, the distribution of team sizes based on

responses to the PMI salary survey in the United States (Project Management Institute, 2020a) is presented graphically in Figure 11. The groupings of team sizes reported in the two surveys are different, and therefore only allow for an approximate comparison.

Figure 11

Project Team Size Distribution Compared with PMI Salary Survey



Note. PMI Salary Survey data from *Earning power: Project management salary survey* (11th ed.). 2020.

Demographics Summary

Based on the demographics presented herein, it is apparent that the respondents represent a cohort of highly educated project leaders and project members with many years of experience. However, this survey was conducted within a region of the United States that, according to data provided by the United States Department of Agriculture (n.d.), has one of the highest rates of attainment of a college degree within the country. Further, the fact that many of the respondents are members of the PMI may indicate that these individuals have reached a point in their careers in which they are assuming leadership and management roles. Finally, membership in the PMI may reflect an interest and a desire for continued professional development and career growth. Given these factors, the reported demographic data appears reasonable.

The survey data from the PMI Salary Survey (Project Management Institute, 2020a) offers an interesting point of comparison for the demographic results of this study. While the categories of responses are not precisely aligned between the two surveys, the coarse comparison

still adds some support to the suggestion that the cohort of respondents to this study are highly educated and highly experienced in their fields.

Descriptive Statistics

The descriptive statistics for each variable are reported in Table 13. All variables except for team experience are calculated based on five-item Likert scales, with responses scored one through five. Team experience was based on a three-item scale with responses scored one through three. All variables except for team size report negative skewness, indicating a tendency for agreement with the survey statements.

The data were considered to be sufficiently normal with skewness between -1 and +1, and kurtosis between -1 and +1 for all variables except degree of agile (Hair et al., 2017). Degree of agile exceeded the guideline for kurtosis of -1 by only .056. Therefore, the variable data was retained pending further analysis. Mean and median response values generally agreed, further supporting the contention that the data are sufficiently normal for further analysis. See Table 13 for a summary of the descriptive statistics and Table 14 for skewness and kurtosis figures.

Table 13

Summary of Descriptive Statistics for Scale Variables

Variable Name	*N*	Range	Min	Max	Mean	SD	Median	Skewness	Kurtosis
DegAgile	202	4.00	1.00	5.00	3.16	.93	3.18	-.067	-1.056
LdTxform	202	2.45	2.50	4.95	3.97	.49	4.00	-.436	-.030
LdTxact	202	2.75	1.88	4.63	3.34	.52	3.38	-.105	-.506
TeamSize	202	4.00	1.00	5.00	3.01	1.18	3.00	.253	-.851
TeamExp	202	2.00	1.00	3.00	2.36	.61	2.00	-.372	-.655
PrjCplx	202	4.00	1.00	5.00	3.84	1.02	4.00	-.575	-.428
OCPerf	202	.386	1.0	4.86	3.30	.70	3.29	-.433	.277
OCSoc	202	4.00	1.00	5.00	3.26	.83	3.22	-.069	-.471
MotInt	202	4.00	1.00	5.00	3.85	.87	4.00	-.691	-.364
OutCreat	202	2.69	2.09	4.79	3.70	.52	3.74	-.175	-.177
OutImp	202	4.00	1.00	5.00	3.76	.80	3.83	-.418	-.162

Internal Reliability

Cronbach's alpha was run to assess the internal reliability of the individual factors that comprised the variables in this study. Results of at least 0.7 suggest strong evidence of intercorrelation within each factor that comprised each variable (Hair et al., 2017; Ringle et al., 2018). All variables except for transactional leadership measured at least 0.7, with a range of 0.700 to 0.915. The Cronbach's alpha for transactional leadership was 0.507. However, the assessment of transactional leadership is based on the MLQ-5X questionnaire, a widely distributed, studied, and validated survey instrument (Antonakis et al., 2003; Avolio & Bass, 2004). Therefore, I have chosen to retain the transactional leadership variable within this analysis section despite the low result for Cronbach's alpha.

Table 14

Internal Reliability, Skewness and Kurtosis

Variable Name	*N*	Cronbach's Alpha	Skewness Statistic	Skewness Std. Error	Kurtosis Statistic	Kurtosis Std. Error
DegAgile	11	.869	-.067	.171	-1.056	.341
LdTxform	20	.853	-.436	.171	-.030	.341
LdTxact	8	.507	-.105	.171	-.506	.341
MotInt	3	.901	-.691	.171	.364	.341
OCPerf	7	.752	-.433	.171	.277	.341
OCSoc	9	.907	-.069	.171	-.471	.341
PrjCplx	3	.700	-.146	.171	-.544	.341
OutCreat	27	.900	-.175	.171	-.177	.341
OutImp	7	.897	-.418	.171	-.162	.341

Study Results

The original intent for this study was to use Structured Equation Modeling (SEM) to analyze the research questions and associated hypotheses. The established model fit indices included a nonsignificant chi-square, Comparative Fit Index (CFI) greater than .90, Root Mean Square Error of Approximation (RMSEA) less than 0.10, and Standardized Root Mean Square Residual (SRMR) less than 0.10 (Weston & Gore, 2006). Using LISREL version 10, I was unable to achieve good model fit for the model presented in Figure 5. While CFI was found to be greater than .90 and SRMR was found to be less than 0.10, I was unable to simultaneously achieve a nonsignificant chi-square and an RMSEA less than 0.10. Typical model fit results for a model that aligns with Figure 5 are presented in Table 15. Even with several attempts at manual re-specification of the model, I was unable to achieve good model fit.

Table 15

Fit Indices for SEM

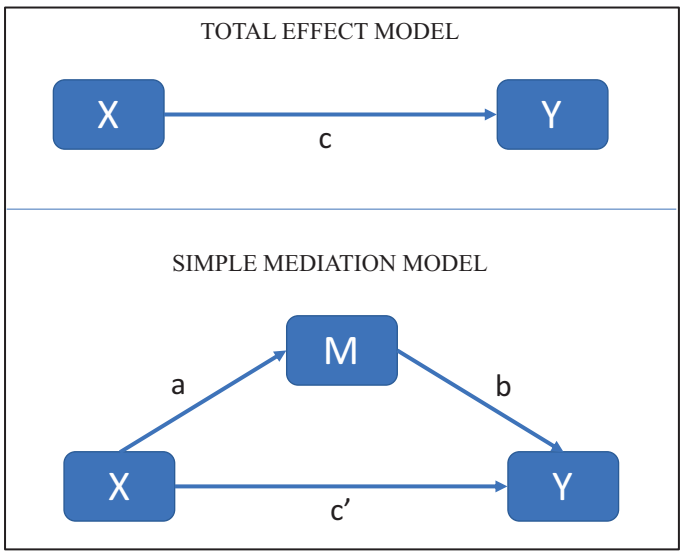
Index	Value Achieved
Chi-Square	45.694 (p = .0000)
Comparative Fit Index (CFI)	0.913
Root Mean Square Error of Approximation (RMSEA)	0.142
Standardized Root Mean Square Residual (SRMR)	0.0624

As a result of not meeting model fit indices, I revised the method of analysis to utilize a series of different models, primarily based on hierarchical multiple regression. Analysis is performed using SPSS version 26. Analysis of mediation utilizes mediated multiple regression, enabled by the PROCESS Macro version 3.5 by Hayes (2018), running within SPSS.

This study considers the total effects of the independent variables on the dependent variables, as well as the mediating effects of intrinsic motivation on the relationships between the independent variables and the dependent variables. Total effect and simple mediation models are presented in Figure 12. In the total effect model presented in Figure 12, c is the coefficient predicting the effect of independent variable X on dependent variable Y. For the mediation model in Figure 12, a is the coefficient predicting the effect of independent variable X on mediating variable M, b is the coefficient predicting the effect of the mediating variable M on dependent variable Y, and c' is the coefficient predicting the direct effect of independent variable X on dependent variable Y. In the mediation model, the total effect of X on Y is equal to the direct effect of X on Y via coefficient c', plus the indirect effect of X on Y through mediator M via coefficients a multiplied by b (Hayes, 2009). The analysis section, found later in this chapter, refers to coefficients a, b, c' and c when describing the results associated with mediation analysis. Referencing the coefficients is intended to help clarify the discussion of the results.

Figure 12

Total Effect and Simple Mediation Models Used in Analysis



In order to establish the presence of mediation, Baron and Kenny (1986) popularized a causal multi-step approach to demonstrate significance among each of the three relationships presented in the simple mediation model in Figure 12, along with significance of the indirect effect (a x b). Zhao et al. (2010) argue that a significant zero-order effect of X on Y is not necessary, noting that the zero-order effect is equivalent to the total effect of X on Y. Therefore, several authors, including Zhao et al. (2010) and Mascha et al. (2013), argue that only a test of significance of the indirect effect (a x b) is necessary to indicate mediation. Further, Zhao et al. (2010) recommend that the causal steps process popularized by Baron and Kenny (1986) be replaced by a bootstrap test of the indirect effect of X on Y, comprised of coefficients a and b. Simulations by MacKinnon et al. (2004) and Williams and MacKinnon (2008) suggest that the bootstrapping approach, as utilized by the PROCESS macro (Hayes, 2018), outperforms the causal steps approach in analyzing mediation effects.

The PROCESS Macro (Hayes, 2018) was designed to perform such simple mediation analysis, along with other forms of mediation and moderation analysis, using the bootstrap procedure recommended by Zhao et al. (2010). Bootstrapping involves treating the original sample dataset of size n as if it were representative of the population. Samples are taken from the dataset with replacement n times in order to create a new sample set of size n. This new sample is used to estimate the path coefficients presented in Figure 12. This process of sampling from the data set and estimating path coefficients is repeated many times to generate a distribution of estimated coefficients. Hayes (2009) recommends repeating this resampling and estimation process 5,000 times or more. The distribution of estimated coefficient values is then used to create confidence intervals for the coefficient values, providing a means to assess the statistical significance of the relationships between the independent, mediating, and dependent variables.

Data Eligibility

Each of the analysis models presented herein, except for Model 3, is a variant of multiple regression. This section addresses the data eligibility requirements for use of multiple regression as a means of analysis. The appropriateness of data for multiple regression is based on assumptions of: (1) independence of residuals, (2) a lack of multicollinearity, (3) a linear relationships between the dependent variable and each independent variable, (4) homoscedasticity of residuals, (5) no significant outliers, and (6) normality (Laerd Statistics, n.d.; Rajaretnam, 2016).

Model 3 utilizes a nonparametric data analysis technique, which requires different data eligibility analysis. The specific data eligibility analysis for Model 3 is addressed within the data analysis section for Model 3.

Response Validity

Each model includes up to five independent variables, one mediating variable, and two control variables. G*Power 3.1 (*Universität Düsseldorf: Gpower*, n.d.) was utilized to estimate the sample size required for analysis. In order to determine a moderate effect size f^2 of 0.15 (based on assessing a moderate R^2 change of 0.13), with an α of .05 and a power (1-β) of .95, a sample size of 139 responses is required. Therefore, the 202 responses obtained sufficiently exceeds the criteria for analyzing a moderate R^2 change using multiple regression as the primary method of analysis.

Independence of Residual

The Durbin-Watson statistic was utilized to determine if the assumption of independence of residuals was met. All values were very close to 2.0 (see Table 16), which indicates the residuals were sufficiently independent and uncorrelated (Rajaretnam, 2016).

Table 16
Assessment of Independence of Residuals

Model	Durbin-Watson statistic
Model 1	2.072
Model 2	2.074
Model 4	1.985

Multicollinearity

Multicollinearity was assessed by the variance inflation factor (VIF) and tolerance values (see Table 17). All VIF values were well within the range of 0.2 to 4.0, suggesting multicollinearity is not an issue for the tested models (Hair et al., 2017; Hayes, 2018).

Table 17

VIF and Tolerance Ranges to Assess Multicollinearity

Model	VIF Min	VIF Max	Tolerance Min	Tolerance Max
Model 1	1.154	1.314	.761	.866
Model 2	1.154	1.314	.761	.866
Model 4	1.082	1.508	.663	.925

Multicollinearity was further assessed based on the correlations between independent variables, control variables, and the mediating variable (see Table 18). All correlations were less than 0.407, with all but three values less than 0.300, suggesting weak multicollinearity (Hair et al., 2017; Rajaretnam, 2016).

Table 18

Zero-Order Correlations

		CtxtSoc	ProjCplx	LdTxform	LdTxact	DegAgile	TeamSize	TeamExp	MotInt
Pearson Correlation	CtxtSoc	1.000	0.000	0.204**	0.167*	0.157*	-0.121	0.123	0.373**
	ProjCplx	0.000	1.000	0.031	0.001	0.127	0.383**	0.075	-0.013
	LdTxform	0.204**	0.031	1.000	0.407**	0.229**	-0.019	-0.077	0.261**
	LdTxact	0.167*	0.001	0.407**	1.000	0.129	0.027	-0.147*	0.202**
	DegAgile	0.157*	0.127	0.229**	0.129	1.000	0.104	0.269**	0.065
	TeamSize	-0.121	0.383**	-0.019	0.027	0.104	1.000	0.092	-0.101
	TeamExp	0.123	0.075	-0.077	-0.147*	0.269**	0.092	1.000	-0.020
	MotInt	0.373**	-0.013	0.261**	0.202**	0.065	-0.101	-0.020	1.000

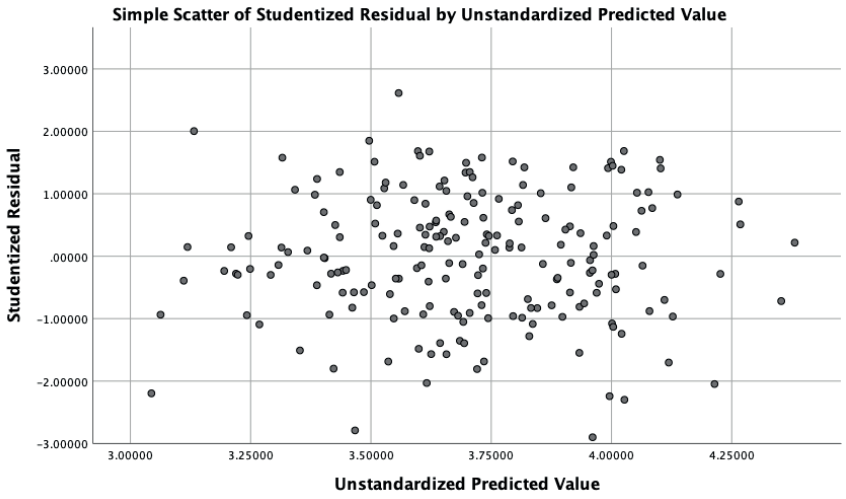
Note. n=202. *p<.05. **p<.01.

Linearity

Linearity was assessed for each model based on a visual inspection of the plot of studentized residuals versus unstandardized predicted values. The plot for Model 1 is presented in Figure 13. The residual plots for all models demonstrate a horizontal band across all values of the plot, suggesting linearity (Rajaretnam, 2016).

Figure 13

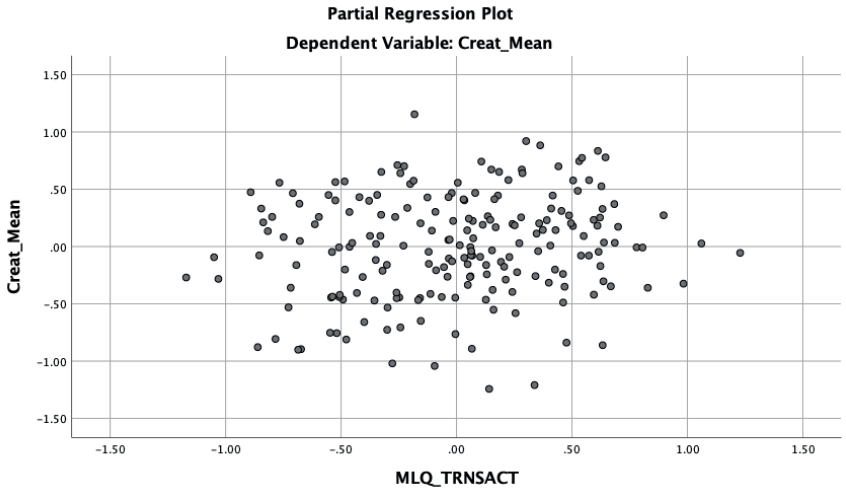
Plot of Unstandardized Predicted Values vs. Studentized Residuals



Linearity was further assessed by visual inspection of all partial regression plots for each independent variable and dependent variable combination. Figure 14 presents an example partial regression plot for transactional leadership versus creativity. All partial regression plots indicated evidence of a linear relationship between the independent variables and dependent variables.

Figure 14

Partial Regression Plot to Assess Linearity



Homoscedasticity

Homoscedasticity describes a situation in which the residual error distribution is consistent across values of the independent variables. Homoscedasticity was assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values (presented in Figure 13 for Model 1). The residual plots for all models indicate sufficiently consistent residual error distribution across all values of the independent variables to suggest homoscedasticity (Osborne & Waters, 2002).

Significant Outliers

Outliers were identified based on inspection of studentized deleted residuals greater than ±3 standard deviations. Two outliers were identified for Model 2 and one outlier was identified for Model 4. Each outlier was assessed for influence via Cook's Distance and high leverage based on the leverage values (see Table 19). All Cook's Distance values were well below the threshold of 1.0, indicating influence was not an issue, and all leverage values were below the safe threshold of 0.2, indicating there were no highly influential points (Laerd Statistics, n.d.). Given these criteria together, outlier bias does not appear to be an issue with the data set, so all outliers have been retained in the analysis.

Table 19

Data for Assessment of Outlier Bias

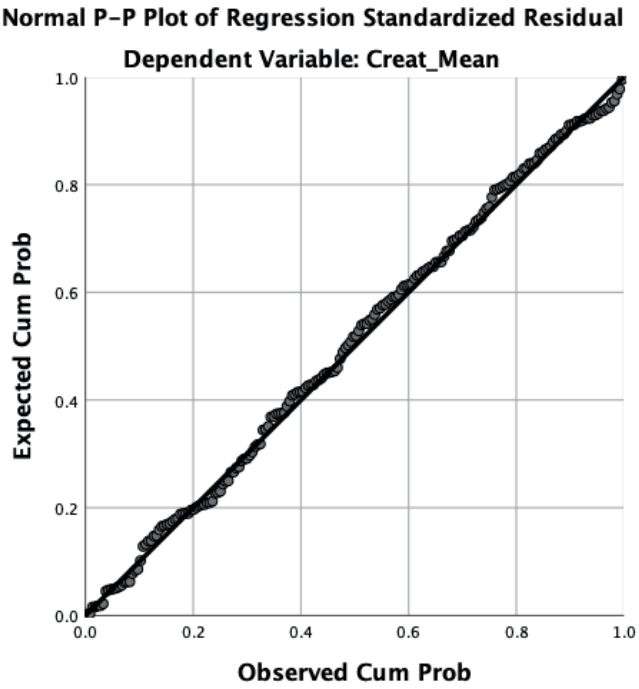
	Model	SDR Max	SDR Min	Cook Max	Lev Max
Outlier Bias	Model 1	2.65378	-2.95822	.08894	.12260
	Model 2	2.69323	-4.38886	.16524	.12260
	Model 4	2.45736	-3.10922	.08146	.10960

Normality

Normality was assessed based on a visual inspection of the P-P plots. The P-P plot for Model 1 is presented in Figure 15. The visual inspection of the P-P plots indicates the points are sufficiently aligned along the diagonal to suggest normality is sufficient for further analysis.

Figure 15

P-P Plot to Assess Normality

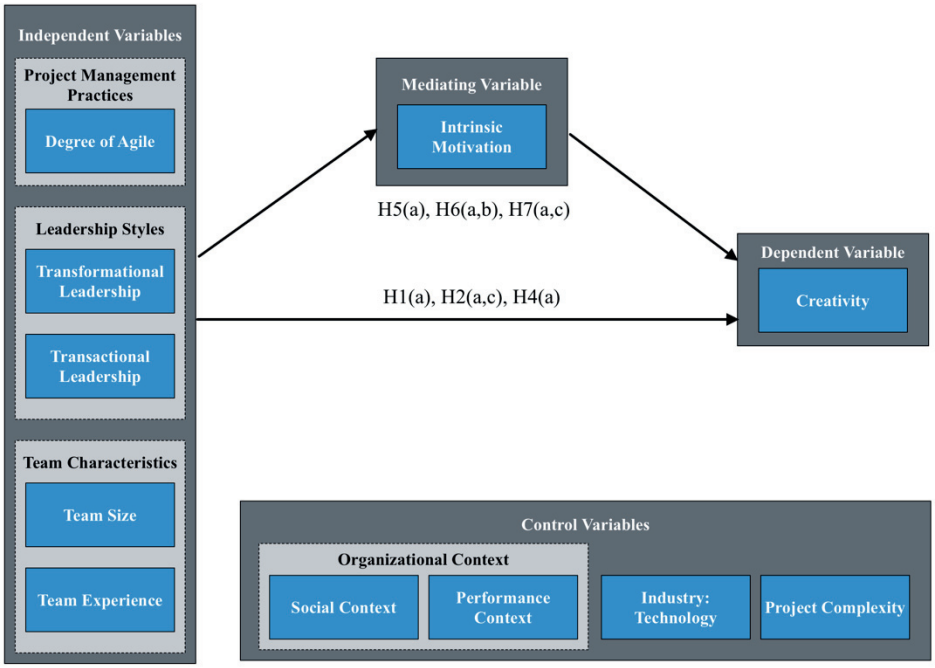


Model 1 Data Analysis

The first model utilizes the PROCESS Macro version 3.5 (Hayes, 2018) within SPSS for data analysis. Model 1 is consistent with the model presented in Figure 5, but only considers creativity as the dependent variable and excludes project performance from analysis and consideration (see Figure 16). Model 1 is presented to address hypotheses H1a, H2a, H2c, H4a, H5a, H6a, H6b, H7a, and H7c, each of which is related to creativity as the dependent variable.

Figure 16

Data Analysis Model 1: Creativity as the Dependent Variable



Model 1 was initially evaluated using all control variables identified in Figure 16. However, the control variables "Industry: Technology" and "Organizational Context: Performance Context" were not found to be significant in any of the models presented herein. Therefore, these variables were eliminated from all further analysis. The results of the multiple regression analysis using the PROCESS macro are presented in Table 20.

The full model presented in Figure 16 is statistically significant ($p<.001$), with $R^2 = .1852$, $F(7, 194) = 6.2992$ for the direct effects on the mediator variable, $R^2 = .2583$, $F(7, 194) = 8.4014$ for the direct effects on the dependent variable, and $R^2 = .2544$, $F(7, 194) = 9.4583$ for the total effects on the dependent variable. The analysis results used for assessment of the hypotheses associated with Model 1 are presented in Table 20 below. The raw PROCESS output from SPSS is presented in Appendix C.

Table 20

PROCESS Results for Model 1: Creativity as the Dependent Variable

Variable	*B*	*95% CI for B*		*SE B*	*β*	R^2	*F*
		LL	*UL*				(7, 194)
Coefficient a: Direct Effect on Intrinsic Motivation (Mediator Variable)						.1852***	6.2992
Constant	1.3974*	.1983	2.5965	.6080			
LdTxform	.2886*	.0325	.5446	.1298	.1630*		
LdTxact	.1367	-.1016	.3751	.1208	.0819		
DegAgile	-.0213	-.1522	.1097	.0664	-.0226		
TeamSize	-.0442	-.1479	.0594	.0526	-.0600		
TeamExp	-.0349	-.2319	.1622	.0999	-.0243		
CtxtSoc	.3418***	.2002	.4834	.0718	.3251***		
ProjCplx	.0080	-.1106	.1266	.0601	.0094		
Coefficient c': Direct Effect on Creativity (Dependent Variable)						.2583***	8.4014
Constant	1.2104***	.5199	1.9008	.3501			
LdTxform	.3261***	.1788	.4734	.0747	.3102***		
LdTxact	.1430*	.0071	.2789	.6899	.1442*		
DegAgile	.0368	-.0376	.1112	.0377	.0659		
TeamSize	-.0042	-.0632	.0548	.0299	-.0095		
TeamExp	.0100	-.1020	.1219	.0568	.0117		
CtxtSoc	.0963*	.0113	.1813	.0431	.1543*		
ProjCplx	.0326	-.0348	.1000	.0342	.0644		
MotInt	.0408	-.0396	.1213	.0408	.0688		
Coefficient c: Total Effect on Creativity (Dependent Variable)						.2544***	9.4583
Constant	1.2674***	.5862	1.9487	.3454			
LdTxform	.3379***	.1924	.4834	.0738	.3214***		
LdTxact	.1486*	.0132	.2840	.0687	.1498*		
DegAgile	.0359	-.0385	.1103	.0377	.0643		
TeamSize	-.0060	-.0649	.0529	.0299	-.0136		
TeamExp	.0086	-.1034	.1205	.0567	.0100		
CtxtSoc	.1130**	.0298	.1907	.0408	.1766**		
ProjCplx	.0329	-.0344	.1003	.0342	.0651		
Coefficient (a x b): Indirect Effect on Creativity (via Mediator)							
LdTxform	.0118	-.0127	.0485	.0152	.0112		
LdTxact	.0056	-.0066	.0302	.0094	.0056		
DegAgile	-.0009	-.0122	.0057	.0043	-.0016		
TeamSize	-.0018	-.0136	.0045	.0043	-.0041		
TeamExp	-.0014	-.0143	.0123	.0060	-.0017		

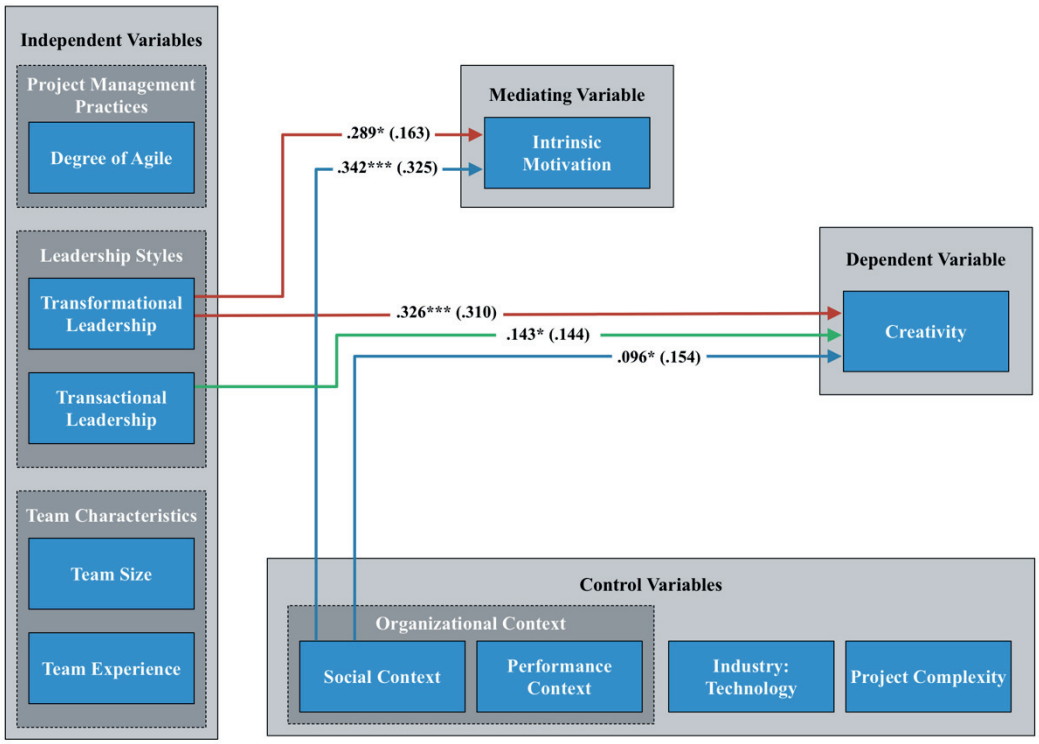
Notes: N=202. †*p*<.10. **p*<.05. ***p*<.01. ****p*<.001.

H1a states that project management practices based on the agile framework will have a positive relationship with creativity. Based on the results presented in Table 20, there was not a

statistically significant relationship between the variables degree of agile and creativity (total effect c of *B*=.0359, β=.0643, *p*>.05). Therefore, H1a is not supported.

Figure 17

Significant Results from Model 1: Creativity as the Dependent Variable



Notes: Unstandardized Coefficient B (Standardized Coefficient β). N=202. †*p*<.10. **p*<.05. ***p*<.01. ****p*<.001.

H2a states that transformational leadership will have a positive relationship with creativity. Based on the results presented in Table 20, the relationship between the variables transformational leadership and creativity was statistically significant, with a direct effect c' of *B*=.3261, β=.3102, *p*<.001, and a total effect c of *B*=.3379, β=.3214, *p*<.001. Therefore, hypothesis H2a is supported. The direct effect of this relationship is presented in Figure 17.

H2c states that transactional leadership will have a negative relationship with creativity. Based on the results presented in Table 20, the relationship between the variables transactional leadership and creativity was statistically significant, with a direct effect c' of *B*=.1430, β=.1442,

$p<.05$, and a total effect c of $B=.1486$, $\beta=.1498$, $p<.05$. However, the relationship between the variables was found to be positive rather than negative as suggested by H2c. Therefore, hypothesis H2c, as stated, is not supported. The direct effect of this relationship is presented in Figure 17.

H4a states that team experience will have a negative relationship with creativity. Based on the results presented in Table 20, there was not a statistically significant relationship between the variables team experience and creativity (total effect c of $B=.0086$, $\beta=.0100$, $p>.05$). Therefore, H4a is not supported.

H5a, H6a, H6b, H7a, and H7c each suggest that motivation serves as a mediator between the various independent variables and creativity. Based on the results presented in Table 20, the relationship between intrinsic motivation and creativity was not found to be statistically significant (direct effect c' of $B=.0408$, $\beta=.0688$, $p>.05$). As a result, there were no statistically significant indirect effects on creativity via the mediating variable intrinsic motivation. Therefore, intrinsic motivation does not serve as a mediator in this model, indicating that H5a, H6a, H6, H7a, and H7c are not supported.

The correlations between each independent, control, and mediating variable and the dependent variable creativity are presented in Table 21. The table includes the values for zero-order, partial, and part correlations. The similarity between the partial and part correlation values indicate the dependent variable is not significantly influenced by a confounding variable. Further, the difference between the zero-order and partial correlations reflects that a degree of confounding influences exists between the independent and control variables considered in the study.

Table 21

Correlations with Creativity as the Dependent Variable

	Variable	Zero-Order	Partial	Part
Correlations	LdTxform	.435	.300	.271
	LdTxact	.317	.148	.129
	DegAgile	.195	.070	.060
	TeamSize	-.005	-.010	-.009
	TeamExp	.006	.013	.011
	CtxtSoc	.280	.159	.139
	ProjCplx	.079	.069	.059
	MotInt	.240	.072	.062

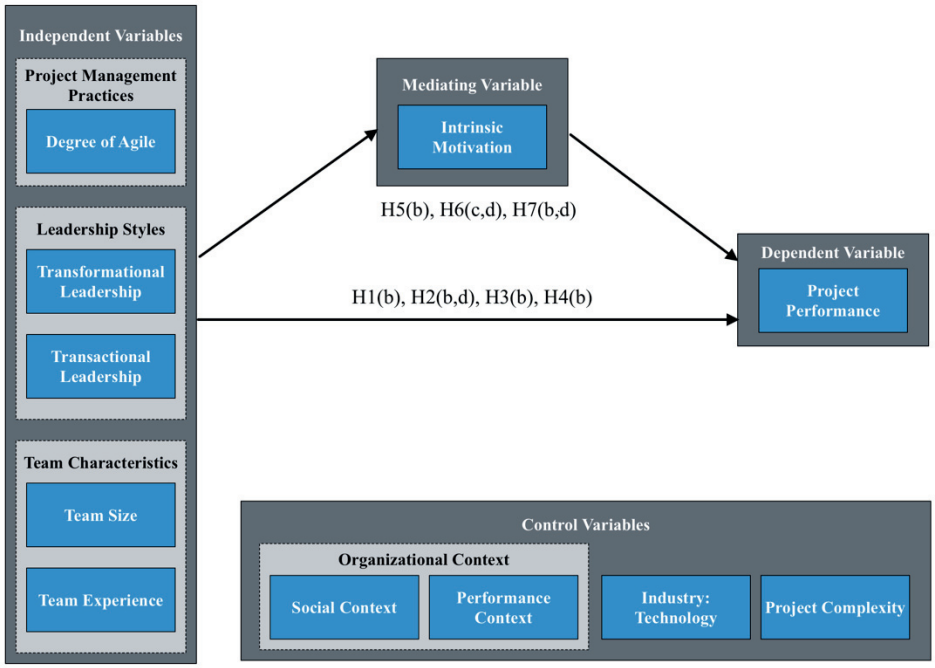
Notes: N=202.

Model 2 Data Analysis

The second model also utilizes the PROCESS macro (Hayes, 2018) within SPSS for data analysis. Model 2 is consistent with Figure 5, but only considers project performance as the dependent variable and excludes creativity from consideration and analysis (see Figure 18). Model 2 is presented to address H1b, H2b, H2d, H3b, H4b, H5b, H6c, H6d, H7b, and H7d, each of which is related to project performance as the dependent variable.

Figure 18

Data Analysis Model 2: Project Performance as the Dependent Variable



The full model presented in Figure 18 was statistically significant ($p<.001$), with $R^2 = .1852$, $F(7, 194) = 6.2992$ for the direct effects on the moderator variable, $R^2 = .2135$, $F(7, 194) = 6.5468$ for the direct effects on the dependent variable, and $R^2 = .1900$, $F(7, 194) = 6.5019$ for the total effects on the dependent variable. The analysis for each of the hypotheses related to Model 2 is presented in Table 22. The raw PROCESS output from SPSS is presented in Appendix C.

Table 22

PROCESS Results for Model 2: Project Performance as the Dependent Variable

Variable	*B*	*95% CI for B*		*SE B*	*β*	R^2	*F*
		LL	*UL*				(7, 194)
Coefficient a: Direct Effect on Intrinsic Motivation (Mediator Variable)						.1852***	6.2992
Constant	1.3974*	.1983	2.5965	.6080			
LdTxform	0.2886*	.0325	0.5446	.1298	.1630		
LdTxact	0.1367	-.1016	0.3751	.1208	.0819		
DegAgile	-0.0213	-.1522	0.1097	.0664	-.0226		
TeamSize	-0.0442	-.1479	0.0594	.0526	-.0600		
TeamExp	-0.0349	-.2319	0.1622	.0999	-.0243		
CtxtSoc	0.3418***	.2002	0.4834	.0718	.3251		
ProjCplx	0.0080	-.1106	0.1266	.0601	.0094		
Coefficient c': Direct Effect on Project Performance (Dependent Variable)						.2135***	6.5486
Constant	.9943†	-.1079	2.0965	.5588			
LdTxform	.3220**	.0868	0.5572	.1192	.1976**		
LdTxact	.1990†	-.0179	0.4158	.1100	.1294†		
DegAgile	-.0026	-.1214	0.1161	.0602	-.0030		
TeamSize	-.0162	-.1104	0.0779	.0478	-.0239		
TeamExp	.2620**	.0833	0.4407	.0906	.1983**		
CtxtSoc	.0679	-.0678	0.2036	.0688	.0701		
ProjCplx	-.1461**	-.2537	-0.0386	.0545	-.1863**		
MotInt	.1563*	.00278	0.2847	.0651	.1697*		
Coefficient c: Total Effect on Project Performance (Dependent Variable)						.1900***	6.5019
Constant	1.2126*	.1119	2.3134	.5581			
LdTxform	0.3671**	.1320	0.6022	.1192	.2253**		
LdTxact	0.2203*	.0016	0.4391	.1109	.1433*		
DegAgile	-0.0059	-.1261	0.1142	.0609	-.0069		
TeamSize	-0.0231	-.1183	0.0720	.0482	-.0341		
TeamExp	0.2566**	.0757	0.4374	.0917	.1942**		
CtxtSoc	0.1213†	-.0087	0.2513	.0659	.1253†		
ProjCplx	-0.1449**	-.2537	-0.0360	.0552	-.1847**		
Coefficient (a x b): Indirect Effect on Project Performance (via Mediator)							
LdTxform	.0451†	-.0010	.1109	.0290	.0277†		
LdTxact	.0214	-.0129	.0781	.0234	.0139		
DegAgile	-.0033	-.0276	.0193	.0116	-.0038		
TeamSize	-.0069	-.0294	.0129	.0104	-.0102		
TeamExp	-.0054	-.0372	.0318	.0166	-.0041		

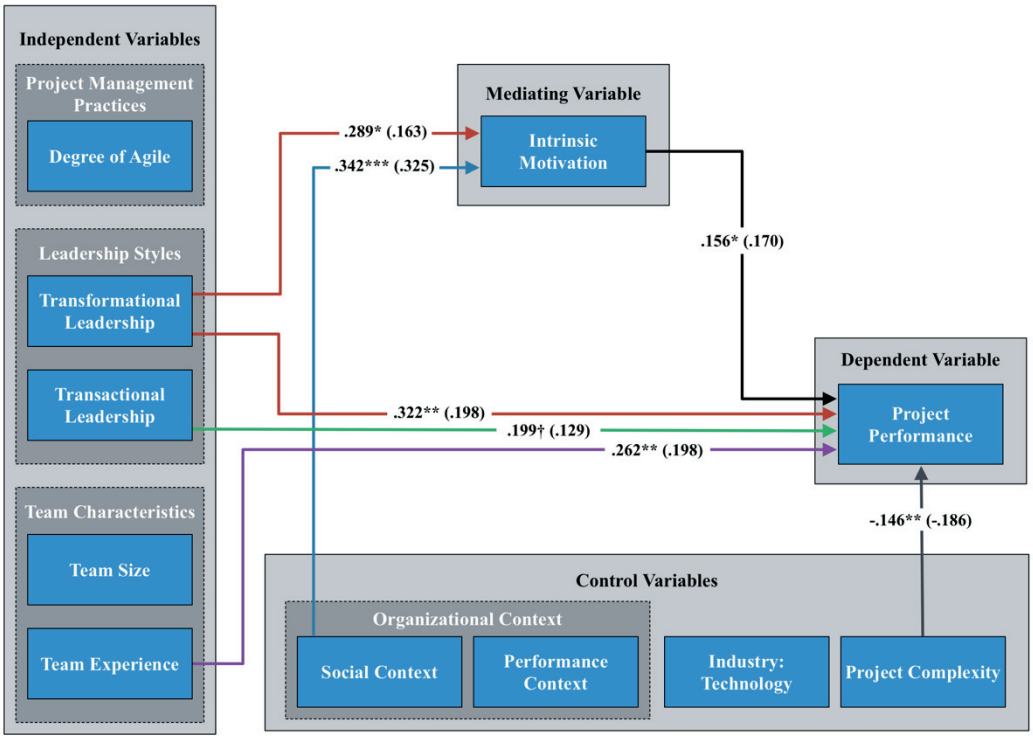
Notes: N=202. †*p*<.10. **p*<.05. ***p*<.01. ****p*<.001.

H1b states that project management practices based on the agile framework will have a positive relationship with project performance. Based on the results presented in Table 22, there

was not a statistically significant relationship between the variables degree of agile and project performance (total effect c of *B*=-.0059, β=-.0069, *p*>.05). Therefore, H1b is not supported.

Figure 19

Significant Results from Model 2: Project Performance as the Dependent Variable



Notes: Unstandardized Coefficient B (Standardized Coefficient β). N=202. †*p*<.10. **p*<.05. ***p*<.01. ****p*<.001.

H2b states that transformational leadership will have a positive relationship with project performance. Based on the results presented in Table 22, the relationship between the variables transformational leadership and project performance was found to be statistically significant with a direct effect c' of *B*=.3220, β=.1976, *p*<.01, and a total effect c of *B*=.3671, β=.2253, *p*<.01. Therefore, H2b is supported. The direct effect of this relationship is presented in Figure 19.

H2d states that transactional leadership will have a positive relationship with project performance. Based on the results presented in Table 22, the relationship between the variables transactional leadership and project performance was statistically significant with a direct effect

c' of *B*=.1990, β=.1294, *p*<.10, and a total effect c of *B*=.2203, β=.1433, *p*<.05. Therefore, H2d is supported. The direct effect of this relationship is presented in Figure 19.

H3b states that team size will have a positive relationship with project performance. Based on the results presented in Table 22, there was not a statistically significant relationship between the variables team size and project performance (total effect c of *B*=-.0231, β=-.0341, *p*>.05). Therefore, H3b is not supported.

H4b states that team experience will have a positive relationship with project performance. Based on the results presented in Table 22, the relationship between the variables team experience and project performance was found to be statistically significant with a direct effect c' of *B*=.2620, β=.1983, *p*<.01, and a total effect c of *B*=.2256, β=.1942, p<.01. Therefore, H4b is supported.

H5b states that motivation mediates the relationship between project management practices based on the agile framework and project performance. The indirect effect (a x b) from degree of agile to project performance via mediator intrinsic motivation (*B*=-.0033, β=-.0038, p>.10) was not statistically significant. Therefore, H5b is not supported.

H6c states that motivation mediates the relationship between transformational leadership and project performance. The indirect effect of transformational leadership on project performance, mediated by intrinsic motivation (a x b), was statistically significant to *p*<.10: *B*=.0451, 90% CI=(.0000, .1129), β=.0277. Thus, intrinsic motivation was found to partially mediate the relationship between transformational leadership and project performance at the level of p<.10, supporting hypothesis H6c. This relationship can be seen in Figure 19 via the direct effect a of transformational leadership on mediator intrinsic motivation and the direct effect b of intrinsic motivation on dependent variable project performance.

H6d states that motivation mediates the relationship between transactional leadership and project performance. The indirect effect (a x b) of transactional leadership on project performance, mediated by intrinsic motivation, was not statistically significant (B=.0214, β=.0139, p>.10). Thus, H6d is not supported.

H7b states that motivation mediates the relationship between team size and project performance. Given that the relationship between team size and project performance is not statistically significant either with or without accounting for intrinsic motivation, as discussed with respect to H3b, hypothesis H7b is not supported.

H7d states that motivation mediates the relationship between team experience and project performance. The indirect effect (a x b) of team experience on project performance, mediated by intrinsic motivation, was not statistically significant (B=-.0054, β=-.0041, p>.10). Therefore, H7d is not supported.

The correlations between each independent, control, and mediating variable and the dependent variable project performance are presented in Table 23. The table includes the values for zero-order, partial, and part correlations. The similarity between the partial and part correlation values indicate the dependent variable is not significantly influenced by a confounding variable. Further, the difference between the zero-order and partial correlations appears to reflect that a degree of confounding influences exists between the independent and control variables considered in the study.

Table 23

Correlations with Project Performance as the Dependent Variable

	Variable	Zero-Order	Partial	Part
Correlations	LdTxform	.288	.191	.172
	LdTxact	.225	.129	.116
	DegAgile	.108	-.003	-.003
	TeamSize	-.103	-.024	-.022
	TeamExp	.152	.204	.185
	CtxtSoc	.222	.071	.063
	ProjCplx	-.177	-.189	-.171
	MotInt	.274	.170	.153

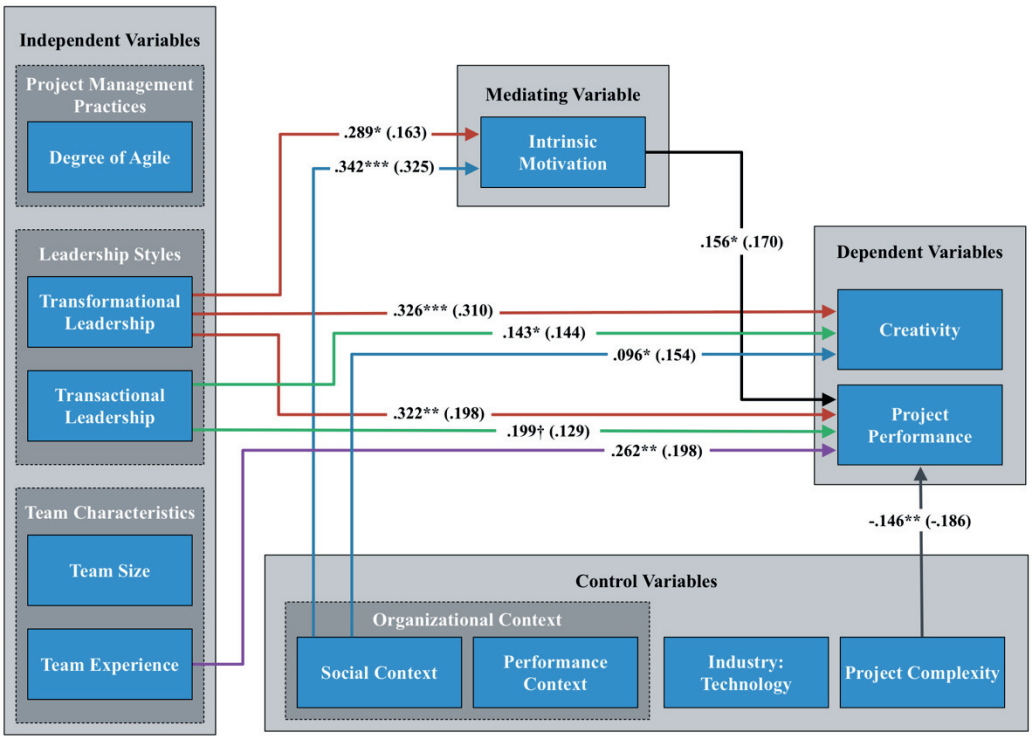
Notes: N=202.

Summary of Findings from Model 1 and Model 2

Figure 20 presents the significant relationships among the variables in the study based on the results from the analysis of Models 1 and 2. As noted in Figure 20, no significant correlations were found between the independent variables degree of agile and team size, and the mediating or dependent variables. Significant correlations were found between the independent variables: transformational leadership and transactional leadership, and the dependent variable creativity. Significant correlations were found between the independent variables: transformational leadership, transactional leadership, and team experience, and the dependent variable project performance.

Figure 20

Significant Results for Models 1 and 2 Combined



Notes: Unstandardized Coefficient B (Standardized Coefficient β). N=202. †*p*<.10. **p*<.05. ***p*<.01. ****p*<.001.

Control Variables

The PROCESS Macro (Hayes, 2018) controls for the mediating effect when calculating the direct effect between the independent and dependent variables. HRM was run to verify the significance of the effect between the independent and dependent variables remained when controlling for the control variables. HRM was run first with creativity as the dependent variable and a second time with project performance as the dependent variable. In each case, the control variables were entered during the first step of the HRM process and then the independent variables were entered during the second step.

The evaluation of the significance between the independent variables and creativity while controlling for the control variables is presented in Table 24. Step 1 was found to be significant with $R^2 = 0.085$, $F(2, 199) = 9.220$, $p<.001$. Step 2 was found to be significant with $R^2 = 0.254$,

F(7, 194) = 9.458, p<.001, ΔR^2 = 0.170, F(5, 194) = 8.828, p<.001. Based on the results presented in Table 24, the effects of the independent variables on creativity previously determined to be significant in Models 1 and 2 were still found to be significant when controlling for the influence of the control variables.

Table 24

HRM Results for Independent Variables and Creativity

Variable	*B*	*95% CI for B*		*SE B*	*β*	R^2	ΔR^2
		LL	*UL*				
Step 1						.085***	.085***
Constant	2.983***	2.602	3.364	.193			
CtxtSoc	0.175***	0.210	0.488	.071	.332***		
ProjCplx	0.040	-0.122	0.096	.055	-.015		
Step 2						.228***	.170***
Constant	1.267***	.586					
CtxtSoc	0.110**	.030	.191	.041	.177**		
ProjCplx	0.033	-.034	.100	.034	.065		
DegAgile	0.036	-.038	.110	.038	.064		
LdTxform	0.338***	.192	.483	.074	.321***		
LdTxact	0.149*	.013	.284	.069	.150*		
TeamSize	-0.006	-.065	.053	.030	-.014		
TeamExp	0.009	-.103	.120	.057	.010		

Note. n=202. $^{\dagger}p$<.10. *p<.05. **p<.01. ***p<.001.

The evaluation of the significance between the independent variables and project performance while controlling for the control variables is presented in Table 25. Step 1 was found to be significant with R^2 = 0.081, F(2, 199) = 8.741, p<.001. Step 2 was found to be significant with R^2 = 0.190, F(7, 194) = 6.502, p<.001, ΔR^2 = 0.109, F(5, 194) = 5.234, p<.001. Based on the results presented in Table 25, the effects of the independent variables on project performance previously determined to be significant in Models 1 and 2 were still found to be significant when controlling for the influence of the control variables.

Table 25

HRM Results for Independent Variables and Project Performance

Variable	*B*	*95% CI for B*		*SE B*	*β*	R^2	ΔR^2
		LL	*UL*				
Step 1						.081***	.081***
Constant	3.594	3.001	4.186	.300			
CtxtSoc	0.215***	0.085	0.345	.066	.222***		
ProjCplx	-0.139**	-0.244	-.034	.053	-.177**		
Step 2						.190***	.109***
Constant	1.213*	.112	2.313	.558			
CtxtSoc	0.121	-.009	0.251	.066	.125		
ProjCplx	-0.145**	-.254	-0.036	.055	-.185**		
DegAgile	-0.006	-.126	0.114	.061	-.007		
LdTxform	0.367**	.132	0.602	.119	.225**		
LdTxact	0.220*	.002	0.439	.111	.143*		
TeamSize	-0.026	-.118	0.072	.048	-.034		
TeamExp	0.257**	.076	0.437	.092	.194**		

Note. n=202. $^{\dagger}p$<.10. *p<.05. **p<.01. ***p<.001.

Model 3 Data Analysis

The third model is specific to addressing hypothesis 3a (H3a), which states that team size will have an inverted U-shaped relationship with creativity.

Assumptions

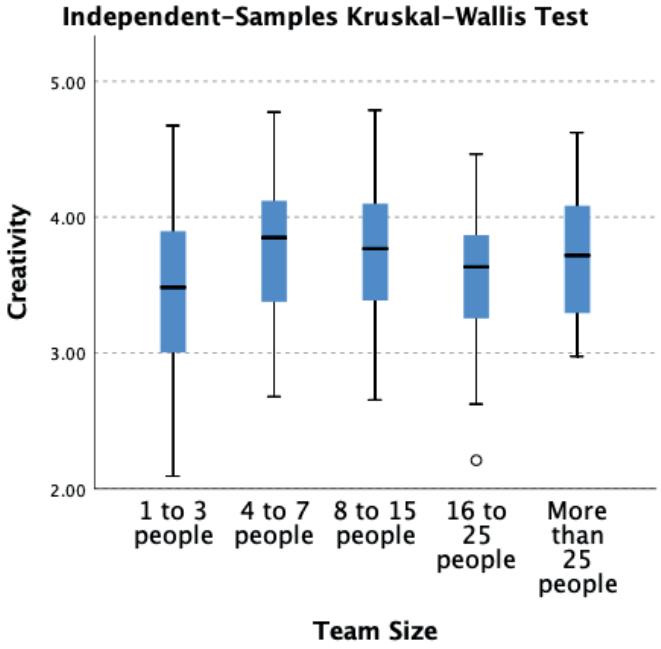
H3a suggests a nonlinear relationship between the variables Team Size and Creativity. The Kruskal-Wallis H test is appropriate for evaluating such a nonlinear relationship. The assumption for using the Kruskal-Wallis H test includes similarity of shape distribution of creativity scores across teams of various sizes. Distributions of creativity scores were found to be similar for all groups, as assessed by visual inspection of the boxplot (see Figure 21).

Results

The Kruskal-Wallis H test was conducted to determine if there were differences in creativity of project outcomes between projects that differed based on team size: 1-3 people (n = 16), 4-7 people (n = 61), 8-15 people (n = 61), 16-25 people (n=33), and more than 25 people (n=31). Differences of creativity of project outcome scores between groups were not statistically significant: $\chi^2(4) = 4.727$, $p = .316$. See Figure 21 for the graphical results of the Kruskal-Wallis H test. Therefore, H3a is not supported.

Figure 21

Kruskal-Wallis Test to Evaluate Relationship Between Team Size and Creativity



Model 4 Data Analysis

The fourth model utilizes hierarchical multiple regression to address H8a and H8b. Model 4 evaluates the feedback loop presented in Figure 5, with motivation as the dependent variable, and creativity and project performance serving as the independent variables. Each

variable that was not identified as significant in all of the previous models was eliminated from model 4. Eliminated variables include degree of agile, team size, performance context, and technology industry. Data were entered in steps for the hierarchical multiple regression as follows:

- Step 1: Control variables (Social Context, Project Complexity, Transformational Leadership, Transactional Leadership, Team Experience)
- Step 2: Independent variable - Creativity
- Step 3: Independent variable - Project Performance

The full model results presented in Table 26 were statistically significant ($p<.001$), with an R^2 of .206, which is a medium effect size.

H8a states that creativity will have a positive relationship with motivation. Based on the results presented in Table 26, there was not a statistically significant relationship between the variables Creativity and Intrinsic Motivation ($B=.025$, $\beta=.015$, $p>.05$). Therefore, H8a is not supported.

H8b states that project performance will have a positive relationship with motivation. Based on the results presented in Table 26, the relationship between the variables Project Performance and Intrinsic Motivation was statistically significant ($B=.183$, $\beta=.168$, $p<.05$). However, while the relationship between the variables was found to be significant, the direction of the relationship cannot be assessed using cross-sectional survey data. Therefore, the claims only note that the findings are consistent with H8b.

Table 26

Hierarchical Multiple Regression Results for Model 4

Variable	*B*	*95% CI for B*		*SE B*	*β*	R^2	ΔR^2
		LL	*UL*				
Step 1						.182***	.182***
Constant	1.351*	.164	2.537	.602			
CtxtSoc	0.349***	.210	0.488	.071	.332***		
ProjCplx	-0.013	-.122	0.096	.055	-.015		
LdTxform	0.283*	..033	0.533	.127	.160*		
LdTxact	0.127	-.110	0.363	.120	.076		
TeamExp	-0.052	-.239	0.136	.095	-.036		
Step 2						.186***	.004
Constant	1.196†	-.031	2.422	.622			
CtxtSoc	0.335***	.193	0.477	.072	.318***		
ProjCplx	-0.017	-.127	0.092	.055	-.020		
LdTxform	0.239†	-.026	0.504	.134	.135†		
LdTxact	0.108	-.132	0.347	.121	.064		
TeamExp	-0.054	-.242	0.133	.095	-.038		
Creativity	0.124	-.124	0.372	.126	.074		
Step 3						.206***	.020*
Constant	1.103†	-.114	2.320	.617			
CtxtSoc	0.323***	.182	0.464	.072	.307***		
ProjCplx	0.014	-.097	0.126	.057	.017		
LdTxform	0.208	-.056	0.471	.134	.117		
LdTxact	0.083	-.155	0.321	.121	.050		
TeamExp	-0.098	-.288	0.092	.096	-.068		
Creativity	0.025	-.236	0.286	.132	.015		
ProjPerf	0.183*	.021	0.344	.082	.168*		

Note. n=202. †p<.10. *p<.05. **p<.01. ***p<.001.

Summary

This study examined the relationships between independent variables leadership style, project management practices, and team characteristics, and dependent variables creativity and project performance. A survey of 202 project leaders and project team members was conducted to gather data for evaluation of these variables and to address the research questions and hypotheses presented herein. Data eligibility testing was conducted to ensure the data was deemed satisfactory for further analysis.

Transformational leadership was found to be the most influential factor with respect to both creativity and project performance. Transactional leadership was found to have a statistically significant but moderate relationship with both creativity and project performance. Project management practices based on the agile framework were not found to have a statistically significant influence on either creativity or project performance. Finally, team experience was found to have a statistically significant influence on project performance, but not on creativity. Motivation was evaluated as a mediator between each of the independent variables and the dependent variables. Motivation was found to partially mediate the relationship between transformational leadership and project performance. Motivation did not mediate the relationships between any of the other pairs of independent and dependent variables. Finally, the influence of both creativity and project performance on motivation was evaluated. A significant relationship was identified between project performance and motivation, suggesting that project success may further improve project team motivation. Table 27 summarizes the findings for each hypothesis analyzed in this study.

These findings are notable from a theoretical perspective and from a practical perspective. Chapter 5 presents a discussion of how these findings may influence future research, as well as how project leaders can utilize these findings to help guide their projects toward successful outcomes.

Table 27

Summary of Findings

Hypothesis	Finding	Justification
H1a: Project management practices based on the agile framework will have a positive relationship with creativity.	Not supported	Model 1
H1b: Project management practices based on the agile framework will have a positive relationship with project performance.	Not supported	Model 2

H2a: Transformational leadership style will have a positive relationship with creativity.	Supported	Model 1
H2b: Transformational leadership style will have a positive relationship with project performance.	Supported	Model 2
H2c: Transactional leadership style will have a negative relationship with creativity.	Not Supported	Model 1
H2d: Transactional leadership style will have a positive relationship with project performance.	Supported	Model 2
H3a: Team size will have an inverted U-shaped relationship with creativity.	Not Supported	Model 3
H3b: Team size will have a positive relationship with project performance.	Not supported	Model 2
H4a: Team experience will have a negative relationship with creativity.	Not supported	Model 1
H4b: Team experience will have a positive relationship with project performance.	Supported	Model 2
H5a: Motivation mediates the relationship between project management practices based on the agile framework and creativity.	Not supported	Model 1
H5b: Motivation mediates the relationship between project management practices based on the agile framework and project performance.	Not supported	Model 2
H6a: Motivation mediates the relationship between transformational leadership style and creativity.	Not supported	Model 1
H6b: Motivation mediates the relationship between transactional leadership style and creativity.	Not supported	Model 1
H6c: Motivation mediates the relationship between transformational leadership style and project performance.	Supported	Model 2
H6d: Motivation mediates the relationship between transactional leadership style and project performance.	Not Supported	Model 2
H7a: Motivation mediates the relationship between team size and creativity.	Not supported	Model 1
H7b: Motivation mediates the relationship between team size and project performance.	Not supported	Model 2
H7c: Motivation mediates the relationship between team experience and creativity.	Not Supported	Model 1
H7d: Motivation mediates the relationship between team experience and project performance.	Not Supported	Model 2
H8a: Creativity has a positive relationship with motivation.	Not Supported	Model 4
H8b: Project performance has a positive relationship with motivation.	Supported	Model 4

Chapter 5

CONCLUSIONS AND IMPLICATIONS

This chapter provides a discussion of the research study findings, along with the theoretical and practical implications of those findings. The hypotheses analyzed in this study are summarized, and the results are evaluated in comparison to the findings of prior research introduced in the literature review. Limitations of the study and generalizability of the findings are discussed, followed by implications for practitioners. This chapter concludes with a discussion of unanswered research questions and recommendations for future research.

Summary of the Study

This study explored how leadership style, project management practices, and team characteristics influence the creativity and performance of project teams. Creativity was assessed as the creativity reflected in the project outcome, while project performance was assessed using the low-latency measures of performance against budget and schedule, along with customer satisfaction.

The results of the study suggest that leadership style plays a fundamental role in fostering creativity and performance of project teams, with transformational leadership demonstrating a stronger influence over both creativity and project performance than transactional leadership. Regarding project management practices, following practices based on the agile framework was not found to significantly influence project creativity or project performance. In terms of team characteristics, team size did not impact project creativity or performance, while the data suggests that team experience has a statistically significant and moderately strong influence on project performance. The data also suggest the mediator variable, intrinsic motivation, partially mediates the relationship between transformational leadership and project performance.

However, intrinsic motivation does not mediate the relationship between transformational leadership and creativity. Finally, the results suggest that social context has a statistically significant influence on intrinsic motivation and creativity. Although not directly explored as part of this study, the results further suggest that intrinsic motivation may serve as a mediator between social context and project performance.

The study suggests that project leaders should focus on their leadership styles and the social context in which the project is executed in order to enhance project creativity and project performance. Further, project performance appears to benefit from utilizing experienced team members and from minimizing the complexity of the project, while neither of these factors appears to significantly influence creativity.

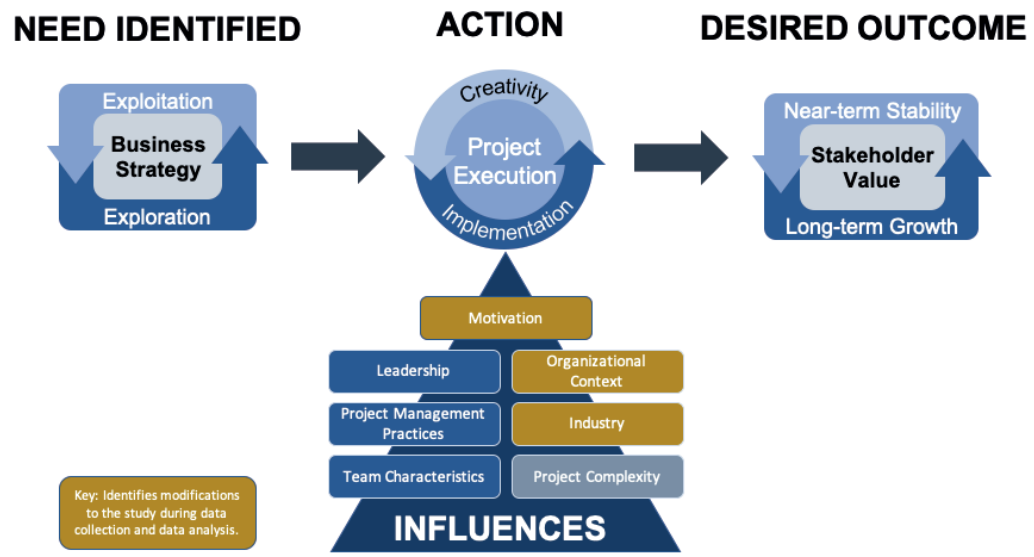
Discussion

The framework for this study is presented in Figure 22. This study focused on the factors that influence effective project execution, leading to successful project outcomes. Projects, by definition, are intended to deliver unique products, services, or results (Project Management Institute, 2017a). To achieve project success, project teams must strike a careful balance between a learning orientation and a performance orientation in order to tackle creative challenges in an efficient manner. The learning orientation supports the creativity required to address novel, challenging problems and provide solutions that benefit the end-users. The performance orientation supports effective and efficient project execution, encouraging project leaders and project teams to manage competing project constraints, such as scope, budget, schedule, quality, risk, and resource availability (Project Management Institute, 2017a). By understanding which factors influence creativity and which factors influence project performance, this study intends to help project managers and other project leaders understand which organizational and

environmental factors should be adjusted to strike the necessary balance between a learning orientation and a performance orientation. Achieving an appropriate balance between exploration and exploitation enhances the likelihood of project success.

Figure 22

Post-Study Conceptual Framework



During data collection and data analysis, modifications were made to the conceptual framework presented in Figure 22 to provide the most meaningful analysis in support of the research questions. These updates are highlighted in yellow in Figure 22. Based on the number of valid survey responses collected, it became apparent that a reduction in the number of variables considered would be beneficial to maintaining statistical power. Thus, industry analysis was limited to the high technology industry versus other industries. Also, consideration of motivation was limited to intrinsic motivation. Further, as analysis proceeded, the variables performance management context and industry: technology were not found to be significant in any of the analysis models. Therefore, these variables were removed from final analysis.

Since an intended outcome of this study is to help project leaders understand how they can adapt their behaviors and the project environment to promote ambidexterity within a project team, this section reviews each of the key variables considered in this study and discusses the relevant findings. The practical implications of the findings are addressed in a later section of this chapter.

Leadership Style Influences Project Outcomes

This study focused on transformational and tractional leadership styles and their relationship to creativity and performance in a project setting. Transformational leadership is measured by the degree to which the leader expresses idealized influence, inspirational motivation, individualized consideration, and intellectual stimulation (Avolio & Bass, 2004). Several researchers have investigated the relationships between leadership style and its influence on employee performance and organizational outcomes, with a specific focus on transformational leadership (Ding et al., 2017; ElKordy, 2013; Hirst et al., 2009; Jaskyte, 2004). This study focused on project outcomes rather than on organizational outcomes. However, the findings of this study were consistent with those of the other researchers considering organizational performance, suggesting that transformational leadership has a positive relationship with creativity and performance at both the project team level and the organizational level.

Transactional leadership is measured by the degree to which the leader utilizes contingent reward and management-by-exception (Avolio & Bass, 2004). While not as extensively researched as transformational leadership, transactional leadership is often found to be aligned with a performance orientation rather than a learning orientation (Baškarada et al., 2016; Bucic et al., 2010). However, in this study, transactional leadership was found to have a positive

relationship with both creativity and project performance. The relationships between transactional leadership and both creativity and project performance were not as strong as the relationships between transformational leadership and those same outcomes.

Research by Baškarada et al. (2016) indicates that transformational leadership is supportive of the exploration activities associated with a learning orientation, while a transactional leadership style aligns with exploitation behaviors associated with a performance orientation. Thayer et al. (2018) suggest that transformational leadership behaviors support and encourage creativity, while transactional leadership behaviors are associated with efficient and effective implementation. Transformational leadership elevates followers through the establishment of a desirable vision, encouraging creative thinking, setting an example, and setting high standards for performance (Bass, 1999).

According to Bass and Steidlmeier (1999), most leaders display both transformational and transactional leadership behaviors. Further, their behaviors may vary over time between primarily transformational or primarily transactional. Designating individuals as transactional or transformational is primarily based on how the associated leadership behaviors align with their core beliefs and values.

The results of the survey suggest that leadership style influences both creativity and project performance for project teams. Further, given that transformational leadership was found to have a stronger influence on creativity and innovation than transactional leadership, project leaders should consider their leadership style and strive to enhance their transformational leadership skills and behaviors. The more creativity that must be expressed in the project deliverable, the more the project is likely to benefit from transformational leadership behaviors. Transactional leadership style does appear to support project outcomes to a lesser extent than

transformational leadership. Therefore, complementing transformational leadership with transactional leadership behaviors may be appropriate for straightforward projects or during later stages of projects when the need for creativity may be less important.

Project Management Practices and Project Outcomes

Lewis et al. (2002) suggest that an emergent, adaptive style of project management, such as practices based on the agile framework, fosters creativity, while a planned style of project management may enhance execution efficiency. The results of this survey suggest that the adoption of project management practices based on the agile framework is not sufficient to influence creativity or enhance project performance.

Kelle et al. (2015) conducted a study of project managers that also focused on project leadership and agility. They focused on the degree of perceived agility while this study inquired about the degree to which the project teams utilized project management practices associated with the agile framework. In contrast to the findings of this study, Kelle et al. (2015) found the degree of perceived agility to be a strong predictor of project success. Further, and also contrary to the findings of this study, Kelle et al. (2015) found transformational leadership to be a weak indicator of project success. However, the measure of perceived agility may be a reflection of the support provided by transformational leaders within a favorable social context.

It is important to note that the degree of perceived agility is a different measure of agility than a measure of utilization of practices based on the agile framework. One possible explanation for the discrepancy of findings between the studies is that some project teams may follow practices based on the agile framework while maintaining a performance-oriented mindset. Thus, further research may be informative in determining if following practices based on the agile framework in the absence of a learning mindset tempers the intended benefits of such practices.

Given that this survey focused on members of the PMI, it is not surprising that the most prominent certification held by 41.6% of respondents is the Project Management Professional (PMP) certification. This certification has traditionally focused on the knowledge, skills, tools, and techniques related to predictive, performance-oriented project management practices (Project Management Institute, 2017a). Therefore, it seems reasonable to question if these project leaders, trained and certified in performance-oriented practices, maintain a performance-oriented mindset, even in the presence of adaptive project management practices, thus negating the potential benefits of those practices.

In 2017, the PMI updated one of their primary publications, A Guide to the Project Management Body of Knowledge (PMBOK Guide) to the sixth edition (Project Management Institute, 2017a). The updates to the PMBOK included increased emphasis on agile techniques alongside plan-driven practices. PMI also included a supplement to the PMBOK titled Agile Practice Guide (Project Management Institute, 2017b). Along with the updates to these publications, the PMP certification exam now includes content on agile-based project management. With the additional emphasis on agile project management in conjunction with plan-driven project management, it may be informative to revisit the relationship between practices based on the agile framework and project outcomes to determine how the change in emphasis may impact future project execution and project outcomes.

Totten (2017) found that the key factors leading to success in an agile environment included a clear vision and commitment by management, holding daily stand-up meetings, keeping task sizes small, and using visual management. The practices assessed in this study support these key factors but do not guarantee that each of these factors is present. Thus, while the practices common to agile methodologies may support the realization of the agile principles,

the practices alone are not enough to guarantee a learning orientation and an adaptive mindset. Therefore, it may be informative to conduct further research on the relationships between an agile mindset, practices based on the agile framework, creativity, and project performance.

Team Characteristics and Project Outcomes

Past research on team size and team performance has been mixed, with some researchers finding no relationship between team size and team performance (Hackman & Vidmar, 1970) and other researchers finding positive or negative relationships (Nieva et al., 1985). In research conducted by Hackman and Vidmar, team size was limited to between two and seven individuals. Nevia et al. suggest a curvilinear relationship between team size and team performance may exist, and prior studies may not have sufficiently manipulated team size to realize this relationship.

Other authors have presented findings that lend credibility to the notion of a curvilinear relationship between team size and team performance. Thornburg (1991), in a study of teams of up to 10 members, found that creative output continued to increase as team size increased. However, Thornburg found that creative output per person declined as team size increased. As team size increases, the increase in diversity may help to generate more creative ideas. However, Kozlowski and Bell (2013) suggest that additional resources may also complicate team interaction, which may hinder both creativity and implementation efficiency as the team size continues to increase.

Through simulation, Giannoccaro et al. (2018) found team size negatively impacted team resilience in the presence of a disturbance (challenge), while social density had a slightly positive effect. Such competing impacts may further support the concept of a curvilinear relationship, with social density initially benefitting the team, but with the negative impacts of size eventually

overcoming the benefits of social density. Thus, a robust social context may moderate the negative impacts of team size on project performance.

The results of this survey suggest there is not a statistically significant relationship between team size and either creativity or project performance. With 7.9% of respondents indicating a project team size of 1 to 3 people, and 15.3% of respondents indicating a project team size of greater than 25 people, this study considered a variety of team sizes. However, team size was measured using an ordinal scale with five separate groupings. Therefore, the resolution of the team size data may be insufficient to identify a curvilinear relationship.

In contrast to team size, team experience was found to have a significant positive correlation with project performance. Other researchers have noted similar findings. In a study of software service firms, Huckman et al. (2009) found that team member experience within a given role within a team correlated with performance, while years at the firm did not correlate with performance. Humphrey et al. (2009) found, in a study of baseball players, that career and team experience of individuals independently and positively contributed to team performance.

Team experience did not, however, demonstrate a significant correlation with creativity., When taken together, these findings suggest that projects with a learning orientation may not be significantly impacted by limited experience among team members. In contrast, performance-oriented projects benefit from experienced team members.

Organizational Context and Project Outcomes

Birkinshaw and Gibson (2004) identified that two dimensions of context necessary for ambidexterity are social support and performance management. Social support is comprised of trust and support, while performance management is comprised of stretch and discipline. Birkinshaw and Gibson (2004) suggest that social support provides the security and autonomy

required for fostering creative behaviors, while performance management stimulates project performance results.

Social support and performance management were treated as control variables in this study. However, investigation of the results suggests some interesting findings concerning these organizational context variables and project outcomes. Consistent with the suggestion of Birkinshaw and Gibson (2004), the results of this study indicate that social support has a significant positive relationship with creativity. Further, social support does not have a significant direct relationship with project performance. However, social support has a statistically significant and positive indirect effect on project performance through intrinsic motivation, leading to a statistically significant ($p<0.10$) total effect. Further study regarding how a positive social context may foster both creativity and project performance may be warranted.

Contrary to the suggestion of Birkinshaw and Gibson (2004), performance management was not found to have a significant relationship with project performance. This finding suggests that the respondents to this survey were not significantly influenced by the organizational factors of stretch and discipline. It is possible to speculate on several potential reasons for this finding, and it may be informative to investigate further if such a finding is unique to this cohort of respondents. For example, one could inquire if the high levels of education and experience combined with the formal training and certification in predictive project management practices for this cohort of respondents moderates the relationship between the organizational factors of stretch and discipline and the outcome of project performance.

Project Complexity and Project Outcomes

O'Donnell (2010) surveyed project leaders and found that project complexity had a significant negative relationship with project success. The findings of this study are consistent

with O'Donnell's findings. In this study, project complexity also had a statistically significant negative relationship with project performance.

Complexity models from the software industry suggest that there is an exponential relationship between complexity and both project effort and duration (Kemerer, 1987). The study conducted by O'Donnell (2010) identified three levels of complexity, and this study identified five levels of complexity, neither of which would be sufficient to evaluate such an exponential relationship. Thus, it may be informative to determine if a consistent, finer resolution measure of project complexity would identify a similar exponential relationship between complexity and project effort and duration.

It was previously noted that team size did not contribute to project performance. However, Fitsilis (2009) indicates that a factor of complexity is the scope of the project. Further, as scope increases, team size tends to increase, suggesting that team size tends to correlate with project complexity. In this study, there was a significant Pearson correlation between team size and project complexity ($p<.001$) of .383. Thus, team size may be a contributing factor to reduced project performance through the mediating factor of complexity.

Intrinsic Motivation and Project Outcomes

Findings regarding the relationship between intrinsic motivation and creativity have been mixed. In a study of college students who were given problems requiring creativity to solve, researchers Shalley and Perry-Smith (2001) did not find any direct links between intrinsic motivation and creativity. In contrast, Dewett (2007) surveyed 165 research and development personnel, finding that intrinsic motivation increased an individual's willingness to take risks, which enhanced creativity. Finally, in another study of research and development employees, Shin and Zhou (2003) found that transformational leadership influenced creativity, with intrinsic

motivation partially mediating the relationship between transformational leadership and creativity.

Similar to Shin and Zhou (2003), this study suggest that transformational leadership influences creativity. However, in contrast to the findings of Shin and Zhou, this study did not identify a significant relationship between intrinsic motivation and creativity.

The results of this study identified a statistically significant positive relationship between intrinsic motivation and project performance. Through this link, intrinsic motivation was found to partially mediate the relationship between transformational leadership and project performance.

Finally, the results of this study suggest there could be a reinforcing feedback loop between intrinsic motivation and project performance. Although a causal direction of relationships cannot be fully established in this cross-sectional survey, the data suggests that project success may influence intrinsic motivation, which may further enhance project performance. Full validation of this hypothesis requires the establishment of a causal link, which would necessitate further study and analysis.

Discussion Summary

This study intends to help project leaders determine what adjustments they can make in order to foster ambidextrous behaviors among project team members, leading to enhanced creativity and enhanced project performance. Based on the findings of this study, transformational leadership and social context have a significant influence on the creativity of project outcomes. The results also suggest that project performance is enhanced in the presence of transformational leadership, transactional leadership, and team experience. Project

performance is further supported by intrinsic motivation and negatively influenced by project complexity.

While agile practices did not significantly influence project creativity or project performance, it may be worth investigating if an agile mindset, rather than agile practices, influences project creativity or project performance.

Limitations

This study was limited to responses based on a convenience sample of project management professionals, project leaders, and project team members who were either members of the local chapters of the PMI or members of my professional network. As a result of such an approach, there was little control over participation in the study. Further, I was unable to obtain general demographic statistics for the project management industry, which limited the ability to determine if the demographic statistics for the respondents are representative of the broader population. Therefore, the responses provided by this cohort of participants may include biases that are not characteristic of the broader population. For example, many of the respondents noted they hold the Project Management Professional certification, indicating they have been trained and certified in plan-driven project management practices. As a result, many of the participants with knowledge and skills based on plan-driven practices might perceive limited benefits from utilizing adaptive project management practices.

The data further represent responses from participants who self-assessed factors such as leadership style, the degree to which they followed adaptive project management practices, project complexity, and project outcomes. There is a distinct possibility that social desirability bias impacted the data, with respondents presenting more favorable views of their individual performance and project outcomes than are genuinely warranted. The survey was conducted

anonymously to minimize social desirability bias. However, the use of an anonymous survey is unlikely to have eliminated the potential bias in the data.

Beyond social desirability bias, the results of this survey may be subject to common method bias, in which the relationships between variables are influenced by the fact that a single approach was used to measure the variables of interest (Podsakoff et al., 2003; Speklé & Widener, 2018). In such cases, the significance and strength of the relationships between constructs may be inflated, potentially leading to a Type I error (Speklé & Widener, 2018). Recent research indicates that significant concern over common method variance and common method bias may not be entirely warranted (Bozionelos, 2018; Siemsen et al., 2010). Siemsen et al. (2010) point out that studies incorporating multivariate linear relationships, with each variable subject to the same common method variance, may reduce common method bias as additional independent variables are included in the regression analysis. Thus, while recent research suggests that common method bias may not be a severe threat to studies such as this one, the concern cannot be dismissed entirely.

The cross-sectional data taken from this survey was taken at a single point in time. These data and corresponding results cannot be interpreted as causal, but merely suggest the presence or absence of a relationship between variables. Further, the snapshot of information provided from this data represents responses at a unique point in time and not necessarily responses that should be expected to remain stable across time.

This study considers the mediating effects of intrinsic motivation as part of the analysis. Several examples of using cross-sectional data to evaluate mediation effects indicate that this practice continues to be used (Jago et al., 2015; A. Schmitt et al., 2017; van der Velde et al., 2020). However, use of cross-sectional data for analysis of mediation may lead to bias in the

results (Maxwell & Cole, 2007; O'Laughlin et al., 2018). Based on calculations performed by Maxwell and Cole (2007), mediation analysis using cross-sectional data may provide misleading estimates of the proportion of the total effect contributed by the mediating variable, especially in instances of complete mediation. Further, Fairchild and McDaniel (2017) caution against this practice without sufficient rationale for suggesting mediation, noting that such a practice undermines the presumption of temporal ordering of the causal chain. In this study, the mediation effects of intrinsic motivation represent a subset of the research questions and hypotheses being explored. Justification for proposing the mediating effects of intrinsic motivation was provided in the literature review. Further, given the limited findings with respect to intrinsic motivation as a partial mediator, no claims regarding statistically significant, strong mediation effects are being presented. Nonetheless, further longitudinal analysis should be considered to validate the findings of this study regarding the mediating effects of intrinsic motivation.

As discussed in Chapter 4, the 202 complete and usable responses were deemed sufficient for the analysis. However, given the number of variables considered, a higher response rate would have been preferred to further improve the power of the findings. Unfortunately, the length of the questionnaire, driven by the complexity of the measurement framework, may have affected the overall response rate. The fact that 23.2% of respondents abandoned the survey before completion seems to support this conjecture.

Further, the limited number of responses impacted the ability of the study to factor in a variety of industries beyond the high-tech industry. While working in the high-tech industry did not appear to impact results, the same argument cannot be extended to other industries without further exploration and data.

Transformational leadership and transactional leadership were measured using the MLQ-5X survey instrument (Bass & Avolio, 1995), which is a widely distributed, studied, and validated survey instrument (Antonakis et al., 2003). However, the Cronbach's alpha associated with the measure of transactional leadership was found to be low (0.507) for this study. Transactional leadership is comprised of the factors management by exception (active) and contingent reward. The Cronbach's alpha for management by exception (active) was found to be 0.63, matching the value reported by Avolio and Bass (2004). However, Cronbach's alpha for contingent reward was found to be 0.47 in this study versus 0.80 as reported by Avolio and Bass (2004). This fact could represent a problem with the data associated with transactional leadership or a limitation in the validity of the findings associated with transactional leadership.

The moderate values of R^2 and adjusted R^2 in the results indicate that much of the variance in creativity and project performance remains unexplained. Suggestions for future research, found later in this chapter, include consideration of additional factors that may help explain more of the remaining variance.

Practical Implications

Project managers and project leaders face many challenges as they strive toward delivering successful project outcomes. Projects, by definition, are undertaken to develop unique products, services, or results (Project Management Institute, 2017a). The unique nature of the project outcomes means projects follow an innovation process, which includes bouts of creativity and implementation. Project leaders should consider several factors to foster ambidexterity as the project team oscillates between creativity and implementation. The results of this study suggest that project leaders should consider their leadership style, the organizational context in which they operate, the experience of the team, and the complexity inherent in the project itself.

Leadership Style

Ambidextrous leaders have the skills and ability to adapt their behaviors to the needs of the individuals and teams involved in the innovation process (Bledow et al., 2009). Opening leadership behaviors support creativity by encouraging divergent thinking and risk-taking (Thayer et al., 2018). Closing leadership behaviors support performance by defining clear and measurable goals, establishing and following plans, and monitoring and controlling progress (Kraft, 2018; Rosing et al., 2011; Thayer et al., 2018). Researchers have identified alignment between transformational leadership and opening leadership behaviors as well as transactional leadership and closing behaviors (Baškarada et al., 2016; Bucic et al., 2010).

The findings of this research are consistent with prior research, which suggests the importance of leadership style in supporting the effective execution of the innovation process. Leadership style has been found to influence culture (Jaskyte, 2004), employee attitudes (ElKordy, 2013), team creativity (X.-H. Wang et al., 2016), and project success (Kelle et al., 2015). Given the importance of leadership style, project leaders should assess their natural leadership style, understand how it influences project outcomes, and consider learning to adapt their style based on the needs of the project and project team. Zhou and George (2003) suggest that emotional intelligence helps leaders assess the needs of the project team and adapt their leadership style accordingly. Thus, leaders may benefit from evaluations of their emotional intelligence along with their leadership style, with the goal of increasing their ability to sense the needs of the project team and adapt their leadership style to complement those needs.

Organizational Context

Several researchers have identified the impact of organizational context on the innovation process (Blindenbach-Driessen, 2015; Hu & Liden, 2015; C. L. Wang & Rafiq, 2014; X. Wang

et al., 2019). The specific factors of organizational context considered for this study, social support and performance management, are based on the work of Birkinshaw and Gibson (2004), in which they suggest social support fosters creativity and exploration, while performance management fosters project performance and exploitation.

The results of this study emphasize the importance of social support, which is comprised of trust and support for the project team (Birkinshaw & Gibson, 2004). Social support was found to have a significant relationship with creativity, and the data suggest that social support may support project performance through an increase in intrinsic motivation. Therefore, project leaders are advised to assess the organizational context in which their project is being conducted. Project leaders should ensure that the team members feel they are trusted with an appropriate degree of autonomy and have the support of leaders and managers to address issues as they arise.

Team Experience

Similar to the findings of Huckman et al. (2009), the findings of this research study indicate that team experience has a significant positive impact on project performance. Also, the findings suggest that experience does not significantly contribute to team creativity, and the degree of creative effort required by a project may be considered when assigning individuals to project teams.

Project managers and functional managers are often tasked with determining which staff members to assign to each of the various projects in the organization. Projects supporting exploitative endeavors tend to be performance-focused and are likely to benefit from experienced team members. Projects supporting explorative endeavors tend to require more creativity, adaptation, and learning, and the level of experience of team members may not be as critical. Thus, experienced team members may be best allocated to performance-focused projects or

projects in the later stages when the emphasis of the project has shifted from creative activity to an implementation focus. Staff members with less experience may be best suited to projects with a focus on creative activity when a learning orientation is beneficial to the project.

Project Complexity

Project leaders must always remain mindful of the significant negative impact project complexity has on project outcomes. Project leaders must, therefore, work to assess, manage, and reduce complexity where possible.

Geraldi and Adlbrecht (2007) present a taxonomy of project complexity that includes complexity of faith, complexity of fact, and complexity of interaction. According to Geraldi and Adlbrecht (2007), complexity of faith refers to the uncertainty present in doing something new and unique, complexity of fact refers to the natural interdependence present in highly integrated, multifunction systems, and complexity of interaction refers to the complexity inherent in managing efforts across two or more teams, groups, or organizations. Such a taxonomy of complexity may be a useful starting point to help project managers assess the complexity of their project. Upon assessing the drivers of project complexity, project leaders may be better prepared to manage the complexity inherent in their project. Further, they may choose to modify the project constraints in order to reduce the complexity and enhance the probability of project success.

Summary of Practical Implications

This study suggests that project leaders should consider several factors to drive the ambidextrous behavior of project teams as they balance demands for creativity and project performance. The results are summarized in Table 28. Leadership style was found to be a significant factor, with a transformational leadership style able to support both creativity and

project performance. Social context was found to influence creativity and intrinsic motivation. The social context dimension of organizational context is comprised of trust and social support, which suggests that projects could benefit when executing in such an environment. Finally, team experience positively correlated with project performance, while project complexity was found to negatively impact project performance. By considering and controlling each of these factors, project leaders can make a significant positive impact on team performance and project outcomes.

Table 28

Summary of Practical Implications

Variable	Objective	Potential Benefit
Leadership	Adapt leadership style to incorporate transformational leadership behaviors balanced with some degree of transactional leadership behaviors.	Transformational and transactional leadership styles appear to benefit both creativity and project performance.
Organizational Context	Ensure that the project operates in a favorable social context characterized by trust and support.	A positive social context supports creativity and also supports intrinsic motivation, which, in turn, supports project performance.
Team Characteristics	Utilize experienced team members to enhance project performance. Team member experience does not appear to be as critical for creative endeavors.	Balancing team member experience based on the degree of creativity versus performance can improve project performance and effective staff utilization.
Project Complexity	Assess and attempt to minimize the complexity of the project at the outset. Recognize and adequately plan for the performance impacts associated with a complex project.	Recognizing and managing project complexity at the outset can help minimize potential performance impacts, or at least prepare the team to address the impacts.

Theoretical Implications and Future Research Opportunities

While the antecedents of creativity and organizational performance have been explored in prior research teams, ambidexterity at the project team level does not appear to have been extensively considered. This study contributes to the literature regarding project performance by considering how various factors support creative and innovative behavior. By exploring these

factors and understanding their influence on project outcomes, project leaders can consider modifying these factors as appropriate to enhance the probability of successful project outcomes.

Leadership Implications

This research offers further insight into the importance of leadership style on project performance. Transformational leadership, with its emphasis on idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Avolio & Bass, 2004), does foster creativity, as suggested by prior research (Hirst et al., 2009; Hon & Chan, 2013; X.-H. Wang et al., 2016). Also, this study contributes to the literature by highlighting a significant positive relationship between transformational leadership and project performance in addition to creativity.

Project Management Implications

The findings of this study indicate that project management practices based on the agile framework do not influence creativity or project performance. Following such practices does not appear to make a team agile. Project teams may be following such practices while maintaining a plan-driven perspective rather than an adaptive perspective. While this study does not bring into question the validity of agile as a project management methodology, it does, at a minimum, suggest that functioning in a truly agile manner likely entails far more than merely adopting a set of practices and activities. Assessing the degree of agility of a project team requires measures beyond the consideration of specific project management practices.

Many prior studies investigating the relationship between leadership style and creativity measured a manager's assessment of employee creative behavior and creative effort (Hirst et al., 2009; Hon & Chan, 2013; Tierney & Farmer, 2004; B. Wang et al., 2016). This study contributes to the literature by assessing the creativity of the project outcome as opposed to creative behavior

and creative effort. Using a scale created by Cropley et al. (2011), this study asked each respondent to individually assess the creative quality of the project outcome based on five dimensions. It may be informative to replicate this study of creativity with a behavioral-based assessment rather than an outcome-based assessment to determine if the findings regarding creativity remain consistent. For example, perhaps the modified study would find that project management practices based on the agile framework would have a different relationship with creative behaviors as opposed to creative outcomes.

Team Characteristic Implications

Findings from past research have been mixed regarding the relationship between team size and performance (Kozlowski & Bell, 2013). The findings from this study lend some credibility to prior studies that have found no significant relationship between team size and team performance (Hackman & Vidmar, 1970).

Team experience was an indicator of project performance but did not influence creativity. This finding suggests that team experience is essential for projects with a performance orientation. However, projects requiring creativity and a learning orientation do not appear to benefit significantly from a team of experienced contributors. Thus, the need for project creativity should be evaluated as part of any resource planning activity.

Organizational Context Implications

Social context was found to have a significant relationship with both intrinsic motivation and creativity. Intrinsic motivation, in turn, had a significant relationship with project performance. This finding suggests that establishing a strong social context appears to be a foundation for fostering project team ambidexterity and project success.

Performance management context, comprised of stretch and discipline (Birkinshaw & Gibson, 2004), was not found to influence creativity or project performance. The majority of respondents were well educated (69.8% of respondents had a master's degree or higher) and had a vast amount of experience (78.7% of respondents had ten or more years of experience in their current field). Such an accomplished cohort of respondents may be sufficiently self-driven and, therefore, would not require or benefit from a performance management context. Therefore, it would be informative to determine if such findings are consistent with a different demographic group.

Additional Considerations for Future Research

This study has explored factors that can influence either creativity or project performance. The premise was that these factors could serve as leverage points for project leaders seeking to foster creativity or project performance, depending on the needs of the project and project team. However, project leaders must first be able to assess the degree of creativity versus the project performance focus that is appropriate at any given time. Therefore, project leaders could benefit from a study that explores how to assess the appropriate balance between creativity and project performance for a particular project and project team.

This study suggested that different leadership styles have different degrees of influence on creativity versus project performance. Rosing et al. (2011) used the term ambidextrous leadership to describe the ability of leaders to adapt their leadership style in support of the innovation process. However, the question remains if leaders truly can, in practice, learn to dynamically shift their style based on the needs of the project.

This study evaluated creativity based on five factors defined by Cropley et al. (2011). All five factors indicated a significant Pearson correlation with project performance, with elegance

(0.520, $p<0.01$) and effectiveness (0.478, $p<0.01$) demonstrating the strongest correlation. This finding suggests that creativity may serve as a determinant of project performance rather than an independent dimension of the overall project outcome.

The number of factors that can be studied within the context of project management is extensive. Table 29 presents a small sampling of factors that have been considered throughout the literature on creativity and team performance. While this study did consider a subset of these factors at the individual, team, leadership, and environmental levels, it would not be practical for any single study to attempt to evaluate all potentially relevant factors. As such, strategic decisions were made during the development of this study to focus on a carefully chosen set of specific factors. The selection of the specific factors was based on several factors, such as guidance from relevant literature, availability of appropriate survey instruments, and the anticipated demographic profile of the target participant population.

Given that the results of this study suggest a good portion of the variance in project outcomes remains unexplained, additional factors warrant consideration. The current study can be readily modified by removing factors that proved of limited value and including new factors for consideration. Such a change to the study may help explain more of the variance in project outcomes.

Table 29

Factors that May Influence Project Outcomes

Antecedents of Creativity and Team Performance			
Individual	Team	Leadership	Environment
Hülsheger et al. (2009) • Task orientation Edmondson (1999) • Openness • Humility • Talent • Drive • Empathy Thayer et al. (2018) • Openness • Conscientiousness • Self-efficacy • Social skills Amabile (1983) • Domain expertise • Creative thinking skills • Intrinsic motivation	Hülsheger et al. (2009) • Team size • Team longevity • Diversity ○ Job-related ○ Background • Interdependence ○ Task ○ Goal • Participative safety • Vision • Cohesion • Communication ○ Internal ○ External • Conflict ○ Task ○ Relationship Amabile (1997) • Autonomy De Dreu (2007) • Motivation ○ Epistemic ○ Prosocial • Divergent thinking Thayer et al. (2018) • Diversity ○ Functional ○ Skill ○ Tenure • Shared mental models	Amabile (2013) • Clear vision • Clear goals Edmondson (1999) • Inspiring vision • Modeling of desired behavior • Coaching and feedback • Display of fallibility • Invitation of participation • Treat failures as learning Thayer et al. (2018) • Ambidextrous leadership • Idea generation Anderson et al. (2014) • Transformational leadership • Transactional leadership	Hülsheger et al. (2009) • Team size • Team longevity Amabile (1988) • Resources • Time • Available help Thayer et al. (2018) • Climate ○ Vision ○ Participative safety ○ Task orientation ○ Innovation support • Culture ○ Socialization process ○ Policies and procedures ○ Uncertainty avoidance ○ Power distance ○ Collectivism Pawar and Eastman (1997) • Efficiency versus adaptation orientation • Technical core versus boundary spanning task system • Organizational structure and governance

Conclusions

The survey response data suggests that leadership style, social support, team experience, and project complexity each impact project outcomes. Transformational leadership and social support were found to support project creativity, while transformational leadership, team

experience, and project complexity influenced project performance. Further, intrinsic motivation was found to partially mediate the relationship between transformational leadership and project performance.

This study suggests that project leaders can use these variables to foster creativity and project performance within their project teams and team members. Project leaders should assess their natural leadership style, understand how it influences project team behavior, and consider shifting their style based on the needs of the project team. Further, project leaders should work to establish a social context based on trust and support. Employee experience should be considered in project assignments, with more experienced people assigned to projects demanding a performance orientation and those with less experience assigned to projects demanding creativity and a learning orientation. Finally, project leaders should carefully assess project complexity and work to minimize complexity as much as possible at the outset of the project.

Utilizing project practices based on the agile framework was not found to influence creativity versus performance. However, project leaders must keep in mind that this finding simply implies that the practices in and of themselves do not influence project outcomes. It may be that being agile is more about the mindset than specific practices. As noted in the literature review, there appears to be alignment between the creative and adaptive aspects of agile and a transformational leadership style. Thus, both may prove to be a powerful combination for projects requiring high levels of creativity.

Projects are an essential mechanism through which organizations initiate change in support of overall strategic plans. Successful project execution contributes to, among other things, business objectives of near-term financial stability and long-term growth. By understanding how various individual, team, leadership, and environmental factors influence

project outcomes, project managers can seek to adapt these factors in order to maximize the probability of project success.

Afterword

My motivation to study project management stems from my involvement in project execution throughout my career. With a master's degree in electrical engineering, I began my career as an embedded hardware and software engineer and project team member. During my years of product development, I have experienced many project successes, as well as many project challenges. In recognizing how each project stakeholder is impacted through these successes and challenges, I sought to learn more about how project managers and leaders can foster project success. Upon moving into leadership and management roles, I pursued an MBA with a specialization in project management. I also obtained the Project Management Professional (PMP) and Agile Certified Practitioner (PMI-ACP) certifications from the PMI, and the Certified Scrum Master (CSM) and Certified Scrum Product Owner (CSPO) certifications from the Scrum Alliance. For the past several years I have been teaching plan-driven and agile project management at the graduate level. My experience, academic pursuits, and certifications set the foundation for this exploration of ambidexterity within a project context.

On this dissertation journey, I had the privilege of working with John M. "Mike" Jewett, MBA, the Executive-in-Residence for the George B. Delaplaine Jr. School of Business at Hood College, and an instructor in leadership and project management. Mr. Jewett also serves as the Associate Director for Program Integration for the National Institute for Allergy and Infectious Diseases, with more than 40 years of project management experience in health care administration, finance, information technology, and construction.

During several discussions with Mr. Jewett, we recognized that, in our collective decades of experience in the field of project management, we have witnessed the project management profession evolve at a rapid pace. Today's project managers must operate in a dynamic environment, responding to the evolving needs of the customer while remaining aligned with the strategic initiatives of the organization. They must be technically savvy to manage sophisticated software systems that support analyzing and predicting project performance factors of success including cost, schedule, scope, and risks. They must understand the complexities of leadership, management, organizational behavior, and team dynamics. They need to understand plan driven and adaptive practices and choose the best set of practices for the task at hand. Finally, project managers must have a technical understanding of the problem domain in which they are operating to ensure the quality of the project outcome.

This dissertation contributes to our understanding of the knowledge and skills that best enable project managers and project leaders to be successful. The findings of this study highlight the need for project managers to be ambidextrous in their leadership behaviors. They must create a supportive organizational environment that empowers project team members to excel and thrive. They must tap into the tremendous talent within each team member and manage finite resources to unleash infinite success.

The field of project management continues to grow and evolve across all industries in both the public and private sectors. Project managers and project leaders must continue to evolve and adapt to meet the challenges and complexities presented by this growth. The PMI has highlighted the need for development of project managers along each of the dimensions of leadership, technical project management, and strategic and business management. This dissertation confirms the importance of each of these dimensions, indicating how leadership

styles, team characteristics, and the organizational environment foster project success in support of organizational strategy and stakeholder value creation.

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Appendix A

Survey Instrument

This appendix contains the survey instrument used in this study. The survey was administered online via SurveyMonkey. This section replicates what was presented to the survey participants, with additional notes added for the benefit of the reader. These notes address permissions to use specific instruments and scoring of the data. The survey is presented in three sections: the welcome letter, the informed consent acknowledgement, and the survey questions. Due to license restrictions, only a sample of three of the survey prompts associated with the Multifactor Leadership Questionnaire (question 9) are presented herein.

Welcome Letter

Project Management Performance Survey

Welcome!

Dear Member of the Project Management Community:

My name is Brian Crilly and I am a doctoral candidate at Hood College in Frederick, MD.

I am kindly requesting your participation in a research survey that explores factors influencing project performance. The intent of the study is to inform the project management community about ways to further improve the performance of project execution. Therefore, your participation is extremely valuable in helping to continue to advance the understanding of effective project execution within the project management profession.

Your participation involves completing this online survey regarding a currently active project or a recently completed project (within the last six months) in which you were a project team member, a project manager, or a project leader. Completion of the survey is expected to take between 25 and 30 minutes. If you would like to receive a copy of the findings of the study, you will be given the option of submitting your email address at the conclusion of the survey.

The survey does not require any personally identifiable information, and all data will be kept confidential. If you voluntarily submit your email address at the conclusion of the survey, your email address will be kept confidential, and will only be used to communicate with you to keep you informed of the findings of the study.

Thank you in advance for your support of this important effort and for sharing your valuable knowledge, insights, and experiences. Your responses to this survey will help in continuing to advance the state of practice within the project management community.

Sincerely,

Brian Crilly

bcc4@hood.edu

Informed Consent

Before proceeding with the survey, please review the following information.

1. INTRODUCTION

You are invited to be a participant in a research study about the effectiveness of various aspects of project execution. You were selected as a possible participant because you are involved in project management or you are a member of a project team. We ask that you read this document and ask any questions you may have before agreeing to be in the study. We require that participants in this study be at least 18 years old. The study is being conducted by Hood College.

2. BACKGROUND AND PURPOSE OF THE STUDY

The purpose of this study is to understand how various aspects of project execution influence project outcomes. The outcome of this study is intended to help inform the project management community regarding ways to further improve project performance.

3. DURATION

The survey is estimated to take between 25 and 30 minutes to complete.

4. PROCEDURES

If you agree to participate in this study, you will simply need to complete the survey with respect to a current or recently completed project (within the past 6 months) in which you were a significant contributor, a manager, or a leader.

5. RISKS/BENEFITS

There are no known risks to participating in this study. Your valued participant will help to inform the project management community regarding ways to further improve the success of project execution.

6. CONFIDENTIALITY

The records of this study will be kept private. No personally identifiable information is collected as part of the survey. Further, the published outcomes of the study will be based on aggregated data rather than any individual responses. If you wish to be kept informed of your individual responses or the findings of the study, you will be given the option to submit your email address at the end of this survey. While submitting your email address is completely optional, it will remain confidential and will only be used to provide you feedback regarding the findings of the study.

7. VOLUNTARY NATURE OF THE STUDY

Your participation in this study is completely voluntary. Your decision whether or not to participate will not affect your current or future relations with Hood College or any of its representatives. If you decide to participate in this study, you are free to withdraw from the study at any time without affecting those relationships.

8. CONTACTS AND QUESTIONS

I, Brian Crilly, am the principal researcher for this study. You may ask questions at any time by contacting me at 301-312-0816 or at bcc4@hood.edu.

If you have questions or concerns regarding this study and would like to speak with someone other than the researcher, you may contact Dr. Diane Graves, Institutional Review Board Chair, Hood College, 401 Rosemont Ave., Frederick, MD 21701, graves@hood.edu, or Dr. Anita Jose, Faculty Sponsor, Hood College, 401 Rosemont Ave., Frederick, MD 21701, ajose@hood.edu.

9. STATEMENT OF CONSENT

You may request a copy of this form at any time by contacting the researcher.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I am at least eighteen years old. I understand that my participation is voluntary and that I may withdraw anytime without penalty. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt unnecessarily threatened), I may contact the Chair of the Institutional Review Board or the Chair of the sponsoring department of this research regarding my concerns.

1) I have reviewed and understand the Informed Consent information, and I agree to participate in this survey.	
Yes - I agree	☐
No - I do not agree	☐

Note: The survey will terminate if the participant selects "I Do Not Agree".

Survey Questions

Project Descriptive Questions

2) How complex is this project?	
Not at all	☐
Somewhat	☐
Moderately	☐
Fairly	☐
Very	☐

Note: (Serrador & Pinto, 2015) - Permission granted from author (see Appendix D).

3) What is the planned (or actual) duration of this project?	
Less than 3 months	☐
3 – 6 months	☐
7 – 12 months	☐
13 – 24 months	☐
More than 24 months	☐

4) What is the size of your project team (full-time staff equivalent)?	
1 – 3 people	☐
4 – 7 people	☐
8 – 15 people	☐
16 – 25 people	☐
More than 25 people	☐

5) How experienced, on average, is the project team with the type of work being conducted?	
Low – limited experience	☐
Medium – somewhat experienced	☐
High – very experienced	☐

Note: (Serrador & Pinto, 2015) - Permission granted from author (see Appendix D).

Project Management Practices Questions

6) To what degree is the project is being done using Agile methodologies versus Traditional Plan-Driven processes and practices?	
Fully Agile	☐
Mostly Agile	☐
Even mix of Agile and Traditional Plan-Driven Practices	☐
Mostly Traditional Plan-Driven Practices	☐
Fully Traditional Plan-Driven	☐

7) Please indicate how often your project team utilizes each of the following practices:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
Release planning	☐	☐	☐	☐	☐
Short iterations	☐	☐	☐	☐	☐
Team estimation	☐	☐	☐	☐	☐
Sprint or iteration planning	☐	☐	☐	☐	☐
Daily standup meetings	☐	☐	☐	☐	☐
Sprint or iteration review meetings	☐	☐	☐	☐	☐
Retrospectives or lessons learned meetings	☐	☐	☐	☐	☐
Common work area	☐	☐	☐	☐	☐
Fully integrated project team, including developers and testers	☐	☐	☐	☐	☐
Dedicated customer or Product Owner involvement	☐	☐	☐	☐	☐

Note: Developed using survey data published by CollabNet VersionOne (2019) - Permission granted by organization (see Appendix D). Scoring: (1 = *not at all* and 5 = *frequently, if not always*); Agile Practices = mean of all item scores.

Leadership Questions

8) What is your primary role on your current project team? (Select One)	
Project Sponsor	☐
Project Manager	☐
Product Manager	☐
Customer	☐
Product Owner	☐
Scrum Master	☐
Team Member / Developer	☐
Functional Manager	☐
Other (please specify)	☐

9) Please evaluate how well each of the following statements applies to you:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
I talk optimistically about the future	☐	☐	☐	☐	☐
I spend time teaching and coaching	☐	☐	☐	☐	☐
I avoid making decisions	☐	☐	☐	☐	☐

Note: Question 9 is the Multifactor Leadership questionnaire (Bass & Avolio, 1995). This survey instrument is subject to copyright restrictions. License for use purchased from Mind Garden, Inc., www.mindgarden.com (see Appendix D). While the survey included 45 prompts for the participants, license restrictions limit publication to the 3 example prompts presented herein.

Organizational Context Questions

10) Please indicate the degree to which you agree with the following statements:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
The management systems in this organization work coherently to support the overall objectives of this organization.	☐	☐	☐	☐	☐
The management systems in this organization cause us to waste resources on unproductive activities.	☐	☐	☐	☐	☐
People in this organization often end up working at cross-purposes because our management systems give them conflicting objectives.	☐	☐	☐	☐	☐
The management systems in this organization encourage people to challenge outmoded traditions/practices/sacred cows.	☐	☐	☐	☐	☐
The management systems in this organization are flexible enough to allow us to respond quickly to changes in our markets.	☐	☐	☐	☐	☐
The management systems in this organization evolve rapidly in response to shifts in our business priorities.	☐	☐	☐	☐	☐

(Gibson & Birkinshaw, 2004) Permission granted from author (see Appendix D). Scoring: (1 = *not at all* and 5 = *frequently, if not always*); Alignment = mean of items 1, 2(R), 3(R); Adaptability = mean of items 4, 5, 6.

11) Please indicate the extent to which organizational systems encourage people at your level to:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
Set challenging/aggressive goals	☐	☐	☐	☐	☐
Issue creative challenges to people, instead of narrowly defining tasks	☐	☐	☐	☐	☐
Be more focused on getting the job done well than on getting promoted	☐	☐	☐	☐	☐
Make a point of stretching the team	☐	☐	☐	☐	☐
Reward or punish based on rigorous measurement of business performance against goals.	☐	☐	☐	☐	☐
Hold people accountable for their performance	☐	☐	☐	☐	☐
Use appraisal feedback to improve performance	☐	☐	☐	☐	☐
Devote considerable effort to developing subordinates	☐	☐	☐	☐	☐
Give everyone sufficient authority to do their jobs well	☐	☐	☐	☐	☐
Push decisions down to the lowest appropriate level	☐	☐	☐	☐	☐
Give ready access to information that others need	☐	☐	☐	☐	☐
Work hard to develop the capabilities needed to execute the overall strategy/vision	☐	☐	☐	☐	☐
Base decisions on facts and analysis; not politics	☐	☐	☐	☐	☐
Treat failure (in a good effort) as a learning opportunity; not something to be ashamed of	☐	☐	☐	☐	☐
Be willing and able to take prudent risks	☐	☐	☐	☐	☐
Set realistic goals	☐	☐	☐	☐	☐

(Gibson & Birkinshaw, 2004) Permission granted from author (see Appendix D). Scoring: (1 = *not at all* and 5 = *frequently, if not always*); Performance management context = mean of items 1-7; Social context = mean of items 8-16.

Motivation Questions

12) I am motivated to do my work because:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I care about benefitting others through my work.	☐	☐	☐	☐	☐
I want to help others through my work.	☐	☐	☐	☐	☐
I want to have a positive impact on others	☐	☐	☐	☐	☐
It is important for me to do good for others through my work.	☐	☐	☐	☐	☐

(Grant, 2008) Permission granted from author (see Appendix D). Scoring: (1 = *strongly disagree* and 5 = *strongly agree*); Prosocial motivation = mean of all items.

13) I put effort into my current job because:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I have to prove to myself that I can.	☐	☐	☐	☐	☐
It makes me feel proud of myself.	☐	☐	☐	☐	☐
Otherwise I will feel ashamed of myself.	☐	☐	☐	☐	☐
Otherwise I will feel bad about myself.	☐	☐	☐	☐	☐
I personally consider it important to put efforts in this job.	☐	☐	☐	☐	☐
Putting efforts in this job aligns with my personal values.	☐	☐	☐	☐	☐
Putting efforts in this job has a personal significance to me.	☐	☐	☐	☐	☐
I have fun doing my job.	☐	☐	☐	☐	☐
What I do in my work is exciting.	☐	☐	☐	☐	☐
The work I do is interesting.	☐	☐	☐	☐	☐

(Gagné et al., 2016) Permission granted from author (see Appendix D). Scoring: (1 = *strongly disagree* and 5 = *strongly agree*); Introjected regulation = mean of items 1-4; Identified regulation = mean of items 5-7; Intrinsic motivation = mean of items 8-10.

Need for Closure Questions

14) Please indicate your level of agreement with each of the following statements:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I do not like situations that are uncertain	☐	☐	☐	☐	☐
I dislike questions which could be answered in many different ways	☐	☐	☐	☐	☐
I find that a well-ordered life with regular hours suits my temperament	☐	☐	☐	☐	☐
I feel uncomfortable when I don't understand the reason why an event occurred in my life	☐	☐	☐	☐	☐
I feel irritated when one person disagrees with what everyone else in a group believes	☐	☐	☐	☐	☐
I do not like to go into a situation without knowing what I can expect from it	☐	☐	☐	☐	☐
When I have made a decision, I feel relieved	☐	☐	☐	☐	☐
When I am confronted with a problem, I'm dying to reach a solution very quickly	☐	☐	☐	☐	☐
I would quickly become impatient and irritated if I would not find a solution to a problem immediately	☐	☐	☐	☐	☐
I do not like to be with people who are capable of unexpected actions	☐	☐	☐	☐	☐
I dislike it when a person's statement could mean many different things	☐	☐	☐	☐	☐
I find that establishing a consistent routine enables me to enjoy life more	☐	☐	☐	☐	☐
I enjoy having a clear and structured mode of life	☐	☐	☐	☐	☐
I do not usually consult many different opinions before forming my own view	☐	☐	☐	☐	☐
I dislike unpredictable situations	☐	☐	☐	☐	☐

(Roets & Van Hiel, 2011) Permission granted from author (see Appendix D). Based on longer version of scale. (Webster & Kruglanski, 1994) Permission also granted from author of longer scale (see Appendix D). Scoring: (1 = *completely disagree* and 5 = *completely agree*); Order = mean of items 3, 12, 13; Predictability = mean of items 6, 10, 15; Decisiveness = mean of items 7, 8, 9; Ambiguity = mean of items 1, 4, 11; Closed-mindedness = mean of items 2, 5, 14.

Functional Creativity Questions

15) **Please evaluate the planned or actual project outcome (product, service, or result) based on the following criteria:**	Not at all	Very little	Somewhat	To a reasonable degree	Very much
The solution represents conventional knowledge and/or techniques.	☐	☐	☐	☐	☐
The solution does what it is supposed to do.	☐	☐	☐	☐	☐
The solution fits within task constraints.	☐	☐	☐	☐	☐
The solution is easy to use.	☐	☐	☐	☐	☐
The solution is safe to use.	☐	☐	☐	☐	☐
The solution is reasonably robust.	☐	☐	☐	☐	☐
The solution shows how existing solutions could be improved.	☐	☐	☐	☐	☐
The solution helps the user anticipate likely benefits of use.	☐	☐	☐	☐	☐
The solution draws attention to shortcomings in other existing solutions.	☐	☐	☐	☐	☐
The solution helps the user see new and different ways of using the solution.	☐	☐	☐	☐	☐
The solution indicates a radically new approach.	☐	☐	☐	☐	☐
The solution offers a fundamentally new perspective on other possible solutions.	☐	☐	☐	☐	☐
The solution shows how to extend the known in a new direction.	☐	☐	☐	☐	☐
The solution shows that a previously abandoned approach is still useful.	☐	☐	☐	☐	☐
The user finds the solution neat and well done.	☐	☐	☐	☐	☐
The solution is well worked out and effective.	☐	☐	☐	☐	☐
The solution is environmentally friendly.	☐	☐	☐	☐	☐
The solution is well-proportioned and aesthetically pleasing.	☐	☐	☐	☐	☐
The user sees the solution as skillfully executed and well-finished.	☐	☐	☐	☐	☐
The elements of the solution fit together in a consistent way.	☐	☐	☐	☐	☐

15) Please evaluate the planned or actual project outcome (product, service, or result) based on the following criteria:	Not at all	Very little	Somewhat	To a reasonable degree	Very much
The beholder sees at once that the solution makes sense.	☐	☐	☐	☐	☐
The solution suggests new norms for judging other solutions, existing or new.	☐	☐	☐	☐	☐
The solution offers ideas for solving apparently unrelated problems.	☐	☐	☐	☐	☐
The solution draws attention to previously unnoticed problems.	☐	☐	☐	☐	☐
The solution opens up a new conceptualization of the issues.	☐	☐	☐	☐	☐
The solution suggests new ways of looking at existing problems.	☐	☐	☐	☐	☐
The solution suggests a novel basis for further work.	☐	☐	☐	☐	☐

(Cropley et al., 2011) Permission granted from author (see Appendix D). Scoring: (1 = *not at all* and 5 = *very much*); Relevance & Effectiveness = mean of items 1-6; Problematization = mean of items 7-9; Propulsion = mean of items 10-14; Elegance = mean of items 15-21; Genesis = mean of items 22-27.

Project Performance Questions

16) Please rate the project performance based on the following criteria.	Very poor	Somewhat poor	Satisfactory	Well	Very Well
How is the project doing in meeting project budget goals?	☐	☐	☐	☐	☐
How is the project doing in meeting project time goals?	☐	☐	☐	☐	☐
How is the project doing in meeting project scope and requirement goals?	☐	☐	☐	☐	☐
How do the project sponsors and stakeholders rate the success of the project so far?	☐	☐	☐	☐	☐
How do you rate the project team's satisfaction with the project so far?	☐	☐	☐	☐	☐
How do you rate the client's satisfaction with the project's results so far?	☐	☐	☐	☐	☐
How do you rate the end users' satisfaction with the project's results so far?	☐	☐	☐	☐	☐

(Serrador & Pinto, 2015) Permission granted from author (see Appendix D). Scoring: (1 = *very poor* and 5 = *very well*); Efficiency factor = mean of items 1-3; Stakeholder success factor = mean of items 4-7.

Business Unit Performance Questions

17) Reflecting on the last five years, indicate the degree to which you agree with the following statements:	Not at all	Once in a while	Sometimes	Fairly often	Frequently, if not always
This organization is achieving its full potential.	☐	☐	☐	☐	☐
People at my level are satisfied with the level of organizational performance.	☐	☐	☐	☐	☐
This organization does a good job of satisfying our customers.	☐	☐	☐	☐	☐
This organization gives me the opportunity and encouragement to do the best work I am capable of.	☐	☐	☐	☐	☐

(Gibson & Birkinshaw, 2004) Permission granted from author (see Appendix D). Scoring: (1 = *not at all* and 5 = *frequently, if not always*); Performance = mean of all scores

Demographics Questions

18) What is your age?	
18 to 24	☐
25 to 34	☐
35 to 44	☐
45 to 54	☐
55 to 64	☐
65 and over	☐

19) What is your gender?	
Female	☐
Male	☐
Other	☐
Prefer not to answer	☐

20) What is the highest level of school you have completed or the highest degree you have received?	
High school degree or equivalent (e.g. GED)	☐
Some college but no degree	☐
Associate's degree	☐
Bachelor's degree	☐
Master's degree	☐
Doctoral degree	☐

21) How long have you worked for your current organization?	
Less than 2 years	☐
2 to 6 years	☐
6 to 10 years	☐
More than 10 years	☐

22) How long have you worked in your current field?	
Less than 2 years	☐
2 to 6 years	☐
6 to 10 years	☐
10 to 15 years	☐
More than 15 years	☐

23) Which of the following best describes your current job level?	
Entry Level	☐
Intermediate	☐
Middle Management	☐
Senior Management	☐
Owner/Executive/C-Level	☐
Other (please specity)	☐

24) In what sector do you work?	
Privately owned for-profit	☐
Publicly owned for-profit	☐
Nonprofit	☐
Government	☐

25) In what industry do you work?	
Education	☐
High Technology	☐
Manufacturing	☐
Health Care	☐
Professional Services	☐
Construction	☐
Retail	☐
Financial Services	☐
Utilities	☐
Government	☐
Telecommunications	☐
Other (please specify)	☐

(Serrador & Pinto, 2015): Permission granted from author.

26) What is the size of your organization?	
1 to 99 employees	☐
100 to 499 employees	☐
500 to 2,499 employees	☐
2,500 or more employees	☐

27) Which project management certifications do you currently hold?	
Project Management Professional (PMP)®	☐
Certified Associate in Project Management (CAPM)®	☐
Agile Certified Practitioner (PMI-ACP)®	☐
Certified ScrumMaster (CSM)®	☐
Certified Scrum Product Owner (CSPO)®	☐
No Formal Certification	☐
Other (please specify)	☐

Survey Conclusion

Thank you for taking the time to participate in this survey and for sharing your valuable insights. Your responses will help to advance the state of practice within the project management community!

Appendix B

Institutional Review Board Application and Authorization

This appendix contains a copy of the Hood College Institutional Review Board application, along with a copy of the notice of approval of the application from the Chair of the Hood College Institutional Review Board.

Application

Hood College

Institutional Review Board

Research Proposal

1. **Title of Proposal**: Ambidextrous Project Management: The Influences of Leadership Style, Project Management Practices, and Team Characteristics on Creativity and Innovation

2. **Principal Investigator (PI):** Brian Crilly

3. **PI Department:** George B. Delaplaine Jr. School of Business

4. **PI Contact Information**: bcc4@hood.edu; 301-312-0816

5. **Faculty Sponsor and Contact Information (if PI is a student):** Anita Jose, Ph.D., Professor of Management

6. **Other Investigators**: Dissertation Committee Members:

   Kathleen C. Bands, Ph.D.
   Professor of Education
   Director, Doctoral Program in Organizational Leadership
   Hood College

   Megan J. D. Shaine, Ph.D.
   Assistant Professor of Psychology and Counseling
   Practicum and Internship Coordinator
   Department of Psychology and Counseling
   Hood College

   Michael Jewett, MBA
   Executive-in-Residence, Adjunct Professor

George B. Delaplaine Jr. School of Business
Hood College

7. **Date of this Submission:** October 2, 2019

8. **Proposed Duration of the Project** (indicate starting and ending dates): Starting October 10, 2019; Ending July 31, 2020.

9. **Background Information and Research Questions/Hypotheses**:

The purpose of this study is to investigate the influences of leadership styles, various project management practices, and team characteristics on project outcomes of creativity and innovation. The two primary research questions to be addressed by this study are:

1. How do leadership styles, project management practices , and team characteristics influence creative and innovative project outcomes?
2. How does motivation mediate the relationship between leadership styles, project management practices, team characteristics and creative and innovative project outcomes?

10. **Human Participants**:

A. **Who are the participants?** Participants include project managers and project team members, primarily recruited from local chapters of the Project Management Institute (PMI), and their colleagues. Other project management professionals and project team members will be recruited through my professional networks.

Please see the attached email from Dan Mantine, Director of the Frederick Site, Baltimore Chapter, of the Project Management Institute indicating his support for distributing the survey to members of the Frederick Site.

B. **How many participants do you plan to have in your study?** This study seeks to have 200 or more survey respondents.

C. **How will the participants be contacted or recruited?** Respondents will be requested to participate via invitation emails distributed by PMI chapter leaders. Invitations will also be extended to project management colleagues in my professional network. Further, several of my colleagues have indicated their willingness to extend the invitation to project management colleagues in their professional networks. The invitations will contain a link to the online survey.

I have been working in project-based design and development for my entire career. Further, I have been involved with the Project Management Institute and extending my professional network in this domain for the past six years. Attached is a copy of my resume that provides some context for my experience in project management and my relationship with the project management community.

D. **Will the participants be compensated for participating? If so, describe:** Participants will not receive any financial compensation. If the participants choose the option of submitting their email address, they will be offered a summary of their personal responses, as well as a summary of overall findings once the analysis is complete. I have also offered to present research findings at PMI chapter meetings.

11. **Procedures**: The survey will be hosted on SurveyMonkey. A copy of the survey instrument is attached. The intended procedure is as follows:

- Potential participants will be invited by email from the leader of a local PMI chapter or by direct contact through my professional network. The invitation will include the same introduction letter as presented in the survey attachment and a link to the survey on SurveyMonkey.
- Once the survey is opened, the participants will be presented with the same introduction letter and the informed consent notice. Participants will then be asked if they agree with the notice. A response of yes will allow the survey to continue, while a response of no will end the survey.
- Participants will be given the opportunity to submit their email address if they wish to receive follow-up information regarding the findings of the survey. The following will be made clear: (1) submitting an email address is optional, (2) it will remain confidential, and (3) it will only be used for providing the specified feedback to the participant.
- Survey responses will be downloaded from SurveyMonkey and processed offline using IBM SPSS and IBM SPSS AMOS software packages.

12. **Consent:** The informed consent notice will be provided to the potential participants as soon as the survey is opened. The participants will be asked if they agree with the informed consent notice. If a participant indicates agreement with the notice, the survey will continue. Otherwise, the survey will end.

13. **Risks and Debriefing:** There are no identified risks to participating in the survey. Therefore, no debriefing of the participants is planned. There will be follow-up presentations of the findings to the project management community. These presentations will only use aggregated data.

14. **Privacy and Storage of Data**: The survey will be conducted using SurveyMonkey. The raw data will be downloaded from SurveyMonkey to my Hood OneDrive storage. The only individuals who will be given access to the raw data will be the Principal Investigator and the members of the dissertation committee.

Notice of IRB Approval

October 21, 2019

Mr. Brian Crilly
Hood College
401 Rosemont Ave.
Frederick, MD 21701

Dear Mr. Crilly,

The Hood College Institutional Review Board reviewed your study entitled *"Ambidextrous Project Management: The Influences of Leadership Style, Project Management Practices, and Team Characteristics on Creativity and Innovation"* (Proposal Number 1920-8). The committee has voted to approve this study following an expedited review. This approval is limited to the activities described in the procedure narrative and extends to the performance of these activities. In accordance with this approval, the specific conditions for the conduct of this research and informed consent from participants must be obtained as indicated. All individuals engaged in human subjects research are responsible for compliance with all applicable Hood Research Policies:

(https://www.hood.edu/sites/default/files/Hood%20IRB%20Policy%20revised%20September%202013.pdf).

The Lead Researcher of the study is ultimately responsible for assuring all study team members review and adhere to applicable policies for the conduct of human sciences research. The Hood College IRB approval expiration date is October 21, 2020. As a courtesy, approximately 30-60 days prior to expiration of this approval, it is your responsibility to apply for continuing review and receive continuing approval for the duration of the study as applicable. Lapses in approval should be avoided to protect the safety and welfare of enrolled participants.

No substantive changes are to be made to the approved protocol or the approved consent and assent forms without the prior review and approval of the Hood IRB. All substantive changes (e.g. change in procedure, number of subjects, personnel, study locations, study instruments, etc.) must be prospectively reviewed and approved by the IRB before they are implemented.

Sincerely,

Diane R. Graves, PhD
Chair, Hood College Institutional Review Board

Appendix C

PROCESS Macro Output for Models 1 and 2

This appendix contains the raw PROCESS Macro output for Models 1 and 2 directly from SPSS. The PROCESS Macro output formed the basis for analysis of Models 1 and 2 as presented in Chapter 4.

Model 1 PROCESS Output

```
 Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : Creativi
    X  : LdTxform
    M  : Mot_Intr

Covariates:
 LdTxact  DegAgile TeamSize TeamExp  CtxtSoc  ProjCplx

Sample
Size:  202

**************************************************************************
OUTCOME VARIABLE:
 Mot_Intr

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4303      .1852      .6430     6.2992     7.0000   194.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    1.3974      .6080     2.2985      .0226      .1983     2.5965
LdTxform     .2886      .1298     2.2223      .0274      .0325      .5446
LdTxact      .1367      .1208     1.1316      .2592     -.1016      .3751
DegAgile    -.0213      .0664     -.3202      .7491     -.1522      .1097
TeamSize    -.0442      .0526     -.8414      .4012     -.1479      .0594
TeamExp     -.0349      .0999     -.3489      .7275     -.2319      .1622
CtxtSoc      .3418      .0718     4.7607      .0000      .2002      .4834
ProjCplx     .0080      .0601      .1330      .8944     -.1106      .1266

Standardized coefficients
             coeff
LdTxform     .1630
LdTxact      .0819
DegAgile    -.0226
TeamSize    -.0600
TeamExp     -.0243
CtxtSoc      .3251
ProjCplx     .0094

**************************************************************************
OUTCOME VARIABLE:
 Creativi
```

```
Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5082      .2583      .2075     8.4014     8.0000   193.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    1.2104      .3501     3.4575      .0007      .5199     1.9008
LdTxform     .3261      .0747     4.3657      .0000      .1788      .4734
Mot_Intr     .0408      .0408     1.0014      .3179     -.0396      .1213
LdTxact      .1430      .0689     2.0761      .0392      .0071      .2789
DegAgile     .0368      .0377      .9746      .3310     -.0376      .1112
TeamSize    -.0042      .0299     -.1391      .8895     -.0632      .0548
TeamExp      .0100      .0568      .1758      .8606     -.1020      .1219
CtxtSoc      .0963      .0431     2.2348      .0266      .0113      .1813
ProjCplx     .0326      .0342      .9543      .3411     -.0348      .1000

Standardized coefficients
             coeff
LdTxform     .3102
Mot_Intr     .0688
LdTxact      .1442
DegAgile     .0659
TeamSize    -.0095
TeamExp      .0117
CtxtSoc      .1543
ProjCplx     .0644

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 Creativi

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .5044      .2544      .2075     9.4583     7.0000   194.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant    1.2674      .3454     3.6695      .0003      .5862     1.9487
LdTxform     .3379      .0738     4.5806      .0000      .1924      .4834
LdTxact      .1486      .0687     2.1643      .0317      .0132      .2840
DegAgile     .0359      .0377      .9518      .3424     -.0385      .1103
TeamSize    -.0060      .0299     -.1999      .8418     -.0649      .0529
TeamExp      .0086      .0567      .1508      .8803     -.1034      .1205
CtxtSoc      .1103      .0408     2.7040      .0075      .0298      .1907
ProjCplx     .0329      .0342      .9639      .3363     -.0344      .1003

Standardized coefficients
             coeff
LdTxform     .3214
LdTxact      .1498
DegAgile     .0643
TeamSize    -.0136
TeamExp      .0100
CtxtSoc      .1766
ProjCplx     .0651

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_ps       c_cs
      .3379      .0738     4.5806      .0000      .1924      .4834      .6519      .3214

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_ps      c'_cs
      .3261      .0747     4.3657      .0000      .1788      .4734      .6292      .3102

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr     .0118      .0147     -.0120      .0467

Partially standardized indirect effect(s) of X on Y:
```

```
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr      .0227      .0286     -.0230      .0904

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr      .0112      .0141     -.0112      .0449

********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

WARNING: Variables names longer than eight characters can produce incorrect output
when some variables in the data file have the same first eight characters. Shorter
variable names are recommended. By using this output, you are accepting all risk
and consequences of interpreting or reporting results that may be incorrect.

------ END MATRIX -----
```

Model 2 PROCESS Output

```
Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5 *****************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : ProjPerf
    X  : LdTxform
    M  : Mot_Intr

Covariates:
 LdTxact  DegAgile TeamSize TeamExp  CtxtSoc  ProjCplx

Sample
Size:  202

**************************************************************************
OUTCOME VARIABLE:
 Mot_Intr

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4303      .1852      .6430     6.2992     7.0000   194.0000      .0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.3974      .6080     2.2985      .0226      .1983     2.5965
LdTxform      .2886      .1298     2.2223      .0274      .0325      .5446
LdTxact       .1367      .1208     1.1316      .2592     -.1016      .3751
DegAgile     -.0213      .0664     -.3202      .7491     -.1522      .1097
TeamSize     -.0442      .0526     -.8414      .4012     -.1479      .0594
TeamExp      -.0349      .0999     -.3489      .7275     -.2319      .1622
CtxtSoc       .3418      .0718     4.7607      .0000      .2002      .4834
ProjCplx      .0080      .0601      .1330      .8944     -.1106      .1266

Standardized coefficients
              coeff
LdTxform      .1630
LdTxact       .0819
DegAgile     -.0226
TeamSize     -.0600
```

```
TeamExp      -.0243
CtxtSoc       .3251
ProjCplx      .0094

************************************************************************
OUTCOME VARIABLE:
 ProjPerf

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4621      .2135      .5288     6.5486     8.0000   193.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant      .9943      .5588     1.7792      .0768     -.1079     2.0965
LdTxform      .3220      .1192     2.7006      .0075      .0868      .5572
Mot_Intr      .1563      .0651     2.3997      .0174      .0278      .2847
LdTxact       .1990      .1100     1.8096      .0719     -.0179      .4158
DegAgile     -.0026      .0602     -.0436      .9652     -.1214      .1161
TeamSize     -.0162      .0478     -.3401      .7342     -.1104      .0779
TeamExp       .2620      .0906     2.8913      .0043      .0833      .4407
CtxtSoc       .0679      .0688      .9864      .3252     -.0678      .2036
ProjCplx     -.1461      .0545    -2.6800      .0080     -.2537     -.0386

Standardized coefficients
             coeff
LdTxform      .1976
Mot_Intr      .1697
LdTxact       .1294
DegAgile     -.0030
TeamSize     -.0239
TeamExp       .1983
CtxtSoc       .0701
ProjCplx     -.1863

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 ProjPerf

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .4359      .1900      .5418     6.5019     7.0000   194.0000      .0000

Model
             coeff         se          t          p       LLCI       ULCI
constant     1.2126      .5581     2.1728      .0310      .1119     2.3134
LdTxform      .3671      .1192     3.0801      .0024      .1320      .6022
LdTxact       .2203      .1109     1.9863      .0484      .0016      .4391
DegAgile     -.0059      .0609     -.0976      .9223     -.1261      .1142
TeamSize     -.0231      .0482     -.4798      .6319     -.1183      .0720
TeamExp       .2566      .0917     2.7980      .0057      .0757      .4374
CtxtSoc       .1213      .0659     1.8402      .0673     -.0087      .2513
ProjCplx     -.1449      .0552    -2.6253      .0093     -.2537     -.0360

Standardized coefficients
             coeff
LdTxform      .2253
LdTxact       .1433
DegAgile     -.0069
TeamSize     -.0341
TeamExp       .1942
CtxtSoc       .1253
ProjCplx     -.1847

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_ps       c_cs
      .3671      .1192     3.0801      .0024      .1320      .6022      .4569      .2253

Direct effect of X on Y
```

```
     Effect         se          t          p       LLCI       ULCI      c'_ps      c'_cs
      .3220      .1192     2.7006      .0075      .0868      .5572      .4008      .1976

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr      .0451      .0286     -.0008      .1072

Partially standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr      .0561      .0359     -.0011      .1353

Completely standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
Mot_Intr      .0277      .0177     -.0005      .0676

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

WARNING: Variables names longer than eight characters can produce incorrect output
when some variables in the data file have the same first eight characters. Shorter
variable names are recommended. By using this output, you are accepting all risk
and consequences of interpreting or reporting results that may be incorrect.

------ END MATRIX -----
```

Appendix D

Licenses and Permissions for Use of Survey Instruments

This section contains copies of license and permission notifications for the various survey instruments used in this study.

Mind Garden, Inc. License Notice

Two licenses were purchased from Mind Garden, Inc., to administer the Multifactor Leadership Questionnaire (MLQ). The first license of 50 copies was purchased to allow initiation of the survey. The second license of 175 copies was purchased to cover the balance due based on the number of responses received. Of the 263 individuals who started the survey, 50 individuals abandoned the survey at some point prior to viewing the MLQ questions. In addition to the 213 individuals who viewed the MLQ section, 12 individuals completed the MLQ section as part of the pilot test of the survey, for a total of 225 views of the survey instrument. Thus, 225 copies of the MLQ survey were purchased in total from Mind Garden, Inc. Both licenses are presented below in Figure 23 and Figure 24.

Figure 23

MLQ Initial License (50 copies)

Multifactor Leadership Questionnaire™

Instrument (Leader and Rater Form)

and Scoring Guide (Form 5X-Short)

by Bruce Avolio and Bernard Bass

Published by Mind Garden, Inc.

info@mindgarden.com
www.mindgarden.com

Figure 24

MLQ Follow-on Licenses (175 copies)

Multifactor Leadership Questionnaire™

Instrument (Leader and Rater Form)

and Scoring Guide (Form 5X-Short)

by Bruce Avolio and Bernard Bass

Published by Mind Garden, Inc.

info@mindgarden.com
www.mindgarden.com

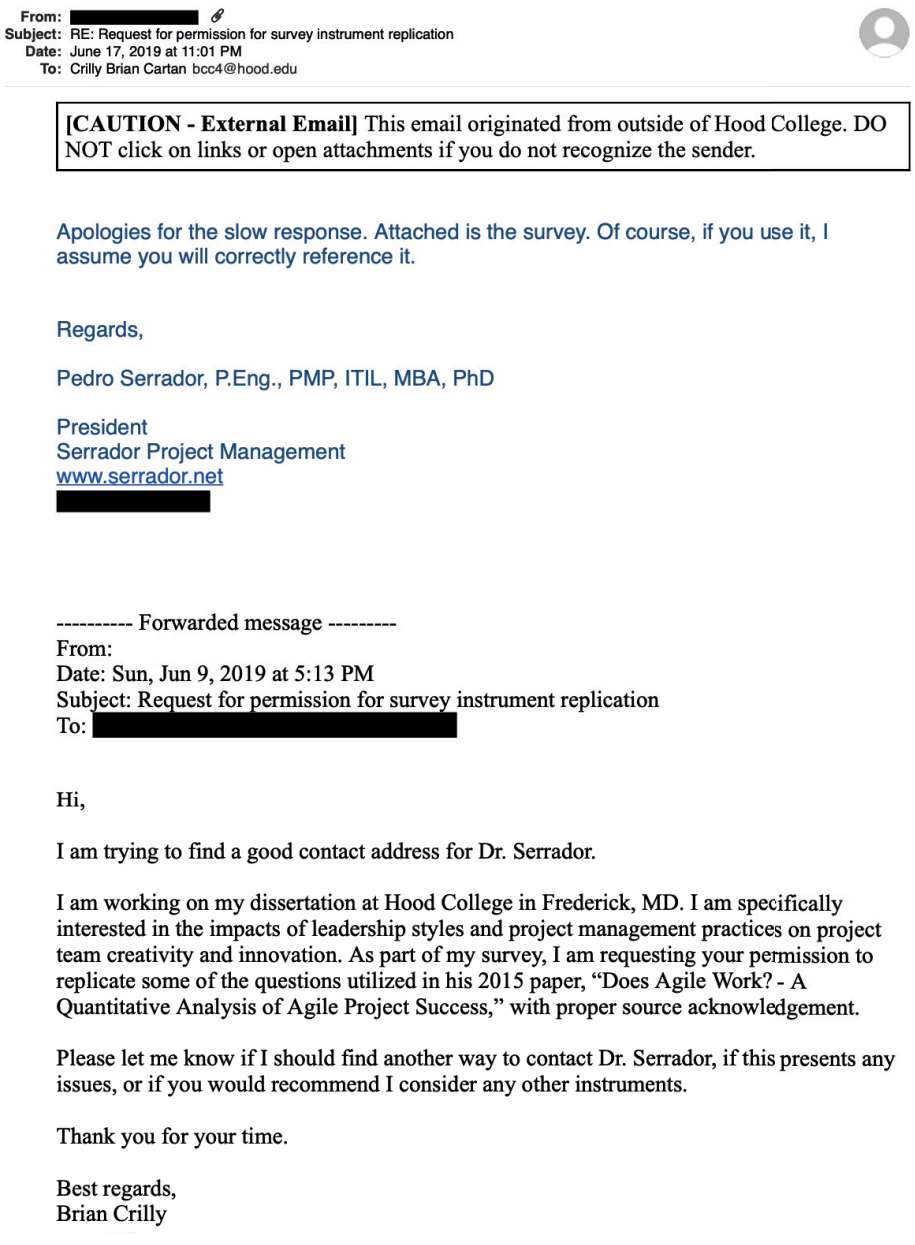
Permissions Granted by Email

This section contains copies of the permissions for instrument use received by email. The senders of the email have been notified that their permission is acknowledged herein. Email addresses and telephone numbers have been redacted out of respect for the privacy of the authors. The copies of the emails in this section are presented in the order in which the respective instruments first appear in the survey. Permissions were received for the following survey instruments:

- Serrador and Pinto (2015): See Figure 25 and Figure 26
- CollabNet Version One (2019): See Figure 27
- Gibson and Birkinshaw (2004): See Figure 28
- Grant (2008): See Figure 29
- Gagné et al. (2016): See Figure 30
- Roets and Van Hiel (2011): See Figure 31
- Webster and Kruglanski (1994): See Figure 32
- Cropley et al. (2011) Figure 33

Figure 25

Permission Received from Serrador



From: [redacted]
Subject: RE: Request for permission for survey instrument replication
Date: June 17, 2019 at 11:01 PM
To: Crilly Brian Cartan bcc4@hood.edu

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Apologies for the slow response. Attached is the survey. Of course, if you use it, I assume you will correctly reference it.

Regards,

Pedro Serrador, P.Eng., PMP, ITIL, MBA, PhD

President
Serrador Project Management
www.serrador.net
[redacted]

---------- Forwarded message ---------
From:
Date: Sun, Jun 9, 2019 at 5:13 PM
Subject: Request for permission for survey instrument replication
To: [redacted]

Hi,

I am trying to find a good contact address for Dr. Serrador.

I am working on my dissertation at Hood College in Frederick, MD. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate some of the questions utilized in his 2015 paper, "Does Agile Work? - A Quantitative Analysis of Agile Project Success," with proper source acknowledgement.

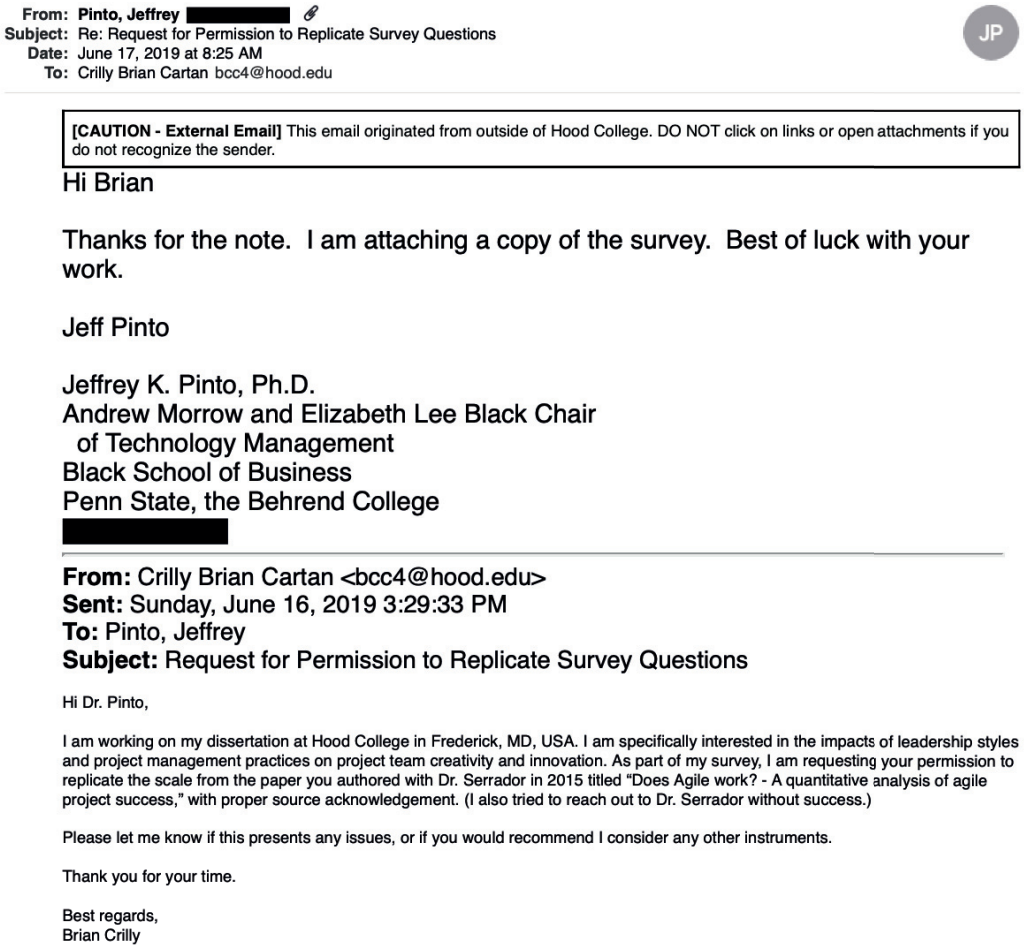
Please let me know if I should find another way to contact Dr. Serrador, if this presents any issues, or if you would recommend I consider any other instruments.

Thank you for your time.

Best regards,
Brian Crilly

Figure 26

Permission Received from Pinto



From: Pinto, Jeffrey [redacted]
Subject: Re: Request for Permission to Replicate Survey Questions
Date: June 17, 2019 at 8:25 AM
To: Crilly Brian Cartan bcc4@hood.edu

JP

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Hi Brian

Thanks for the note. I am attaching a copy of the survey. Best of luck with your work.

Jeff Pinto

Jeffrey K. Pinto, Ph.D.
Andrew Morrow and Elizabeth Lee Black Chair
of Technology Management
Black School of Business
Penn State, the Behrend College
[redacted]

From: Crilly Brian Cartan <bcc4@hood.edu>
Sent: Sunday, June 16, 2019 3:29:33 PM
To: Pinto, Jeffrey
Subject: Request for Permission to Replicate Survey Questions

Hi Dr. Pinto,

I am working on my dissertation at Hood College in Frederick, MD, USA. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate the scale from the paper you authored with Dr. Serrador in 2015 titled "Does Agile work? - A quantitative analysis of agile project success," with proper source acknowledgement. (I also tried to reach out to Dr. Serrador without success.)

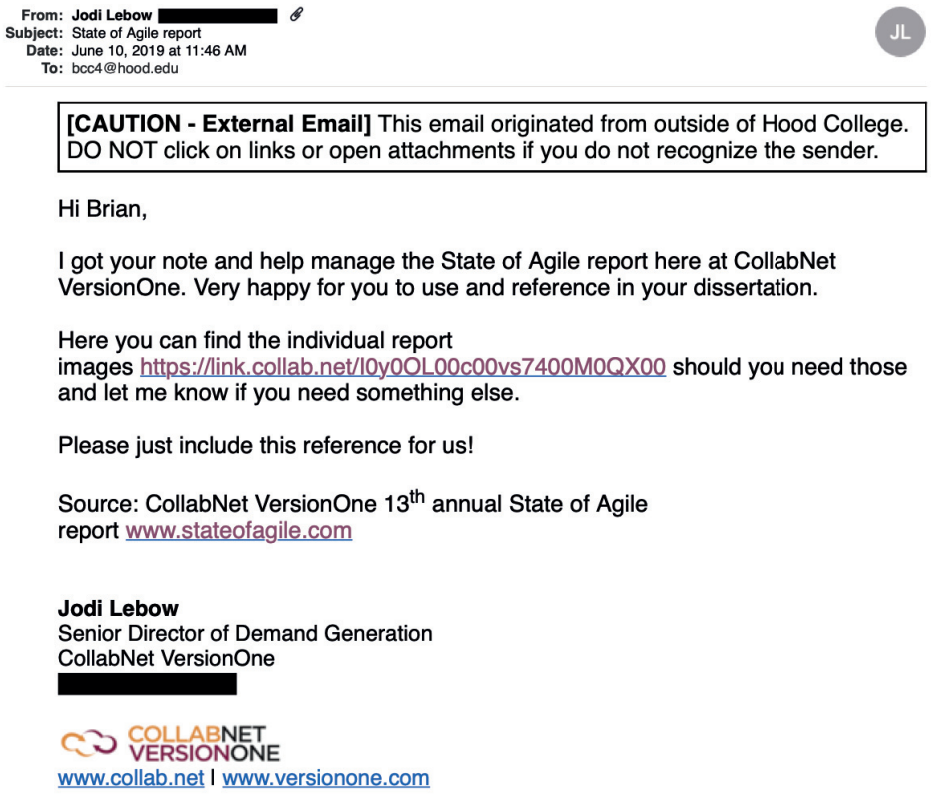
Please let me know if this presents any issues, or if you would recommend I consider any other instruments.

Thank you for your time.

Best regards,
Brian Crilly

Figure 27

Permission Received from CollabNet VersionOne



From: Jodi Lebow [redacted]
Subject: State of Agile report
Date: June 10, 2019 at 11:46 AM
To: bcc4@hood.edu

JL

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Hi Brian,

I got your note and help manage the State of Agile report here at CollabNet VersionOne. Very happy for you to use and reference in your dissertation.

Here you can find the individual report images https://link.collab.net/l0y0OL00c00vs7400M0QX00 should you need those and let me know if you need something else.

Please just include this reference for us!

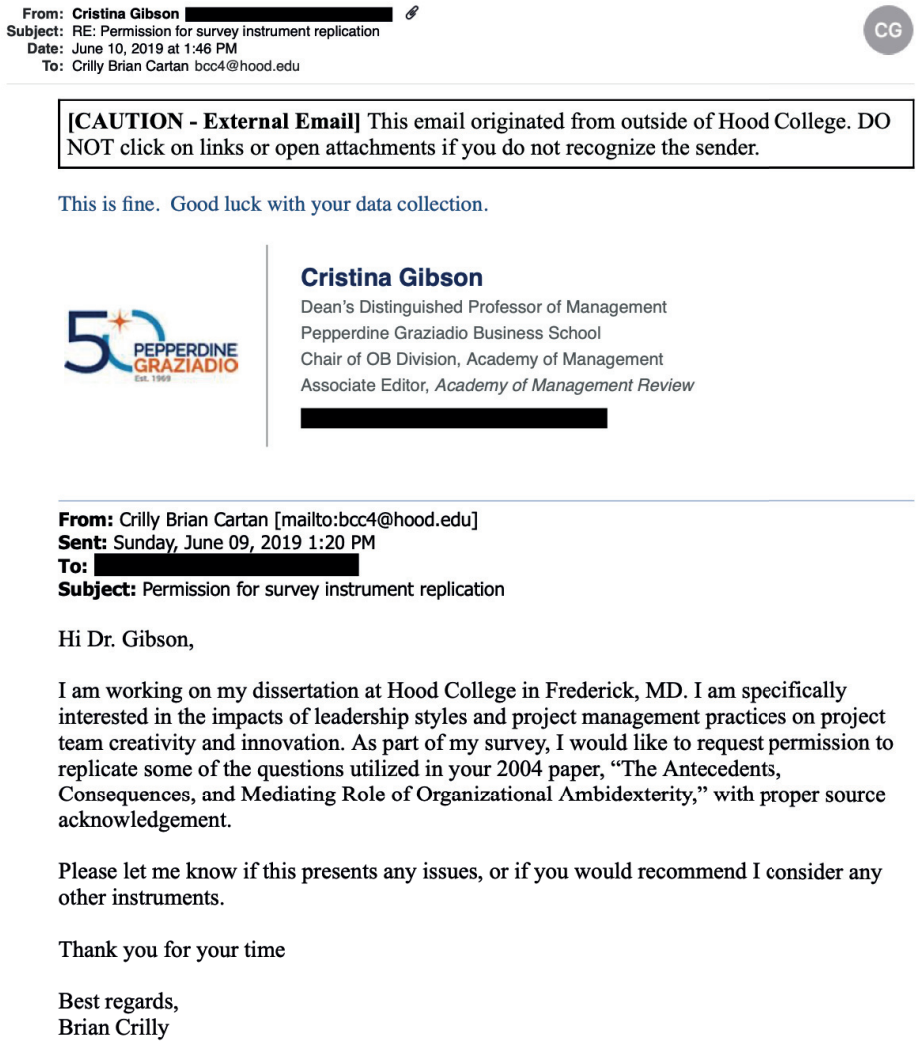
Source: CollabNet VersionOne 13th annual State of Agile report www.stateofagile.com

Jodi Lebow
Senior Director of Demand Generation
CollabNet VersionOne
[redacted]

COLLABNET VERSIONONE
www.collab.net | www.versionone.com

Figure 28

Permission Received from Gibson



From: Cristina Gibson [redacted]
Subject: RE: Permission for survey instrument replication
Date: June 10, 2019 at 1:46 PM
To: Crilly Brian Cartan bcc4@hood.edu

CG

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

This is fine. Good luck with your data collection.

PEPPERDINE GRAZIADIO Est. 1969

Cristina Gibson
Dean's Distinguished Professor of Management
Pepperdine Graziadio Business School
Chair of OB Division, Academy of Management
Associate Editor, *Academy of Management Review*
[redacted]

From: Crilly Brian Cartan [mailto:bcc4@hood.edu]
Sent: Sunday, June 09, 2019 1:20 PM
To: [redacted]
Subject: Permission for survey instrument replication

Hi Dr. Gibson,

I am working on my dissertation at Hood College in Frederick, MD. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I would like to request permission to replicate some of the questions utilized in your 2004 paper, "The Antecedents, Consequences, and Mediating Role of Organizational Ambidexterity," with proper source acknowledgement.

Please let me know if this presents any issues, or if you would recommend I consider any other instruments.

Thank you for your time

Best regards,
Brian Crilly

Figure 29

Permission Received from Grant

From: Grant, Adam M [redacted]
Subject: RE: Request for Permission for Survey Instrument Replication
Date: June 9, 2019 at 8:11 PM
To: Crilly Brian Cartan bcc4@hood.edu

AG

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Go for it, Brian—no permission needed. Good luck with your research.
Adam

--
Adam Grant, Ph.D.
Podcast: WorkLife
Books: ORIGINALS | GIVE AND TAKE | OPTION B | POWER MOVES
TED talks: Are you a giver or a taker? | The surprising habits of original thinkers

From: Crilly Brian Cartan <bcc4@hood.edu>
Sent: Sunday, June 9, 2019 4:26 PM
To: [redacted]
Subject: Request for Permission for Survey Instrument Replication

Hi Dr. Grant

I am working on my dissertation at Hood College in Frederick, MD. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate some of the questions utilized in your 2008 paper, "Does Intrinsic Motivation Fuel the Prosocial Fire? Motivational Synergy in Predicting Persistence, Performance, and Productivity," with proper source acknowledgement.

Please let me know if this presents any issues, or if you would recommend I consider any other instruments.

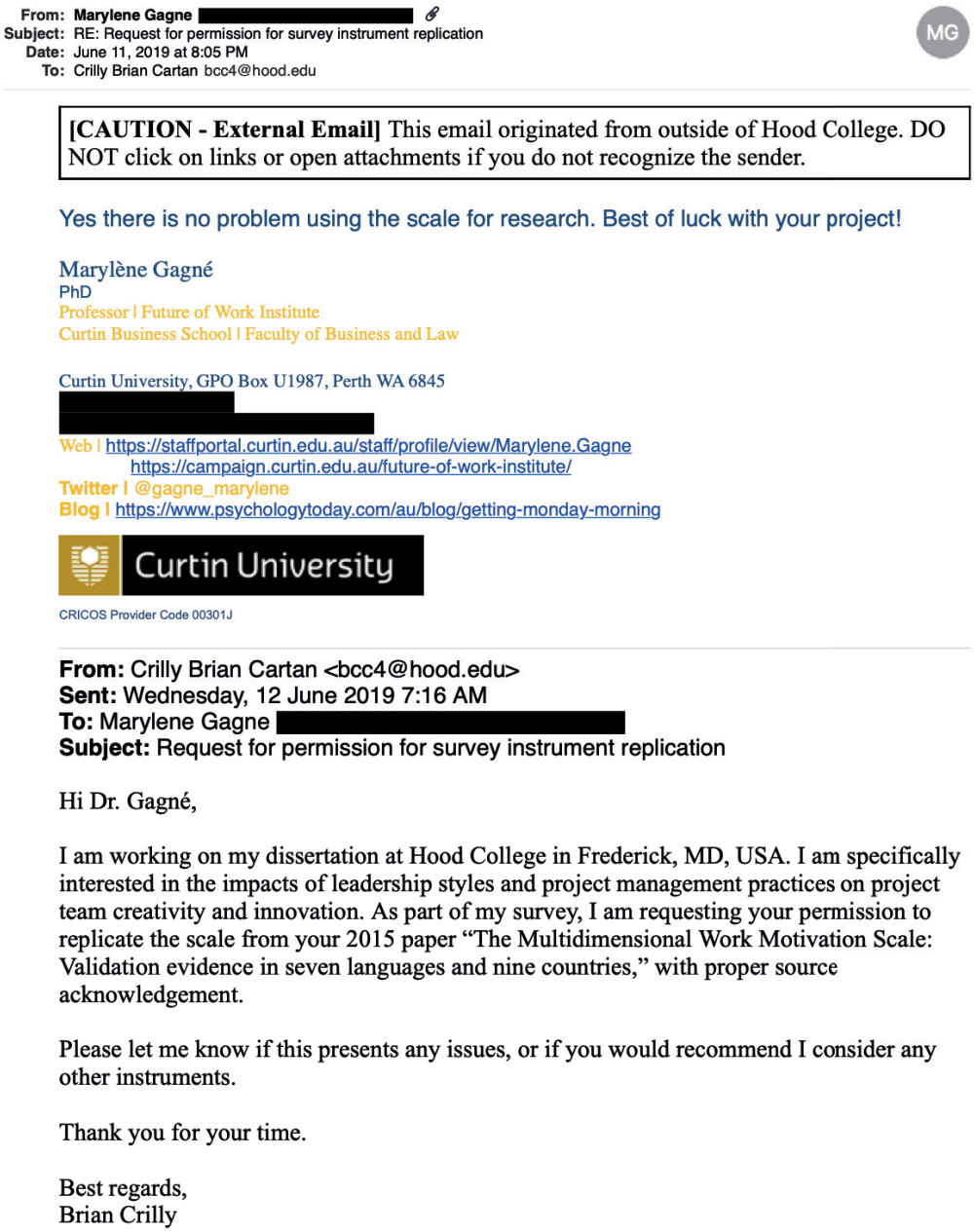
Thank you for your time.

Best regards,
Brian Crilly

Permission from Gagné

Figure 30

Permission Received from Gagné



From: Marylene Gagne [redacted]
Subject: RE: Request for permission for survey instrument replication
Date: June 11, 2019 at 8:05 PM
To: Crilly Brian Cartan bcc4@hood.edu

MG

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Yes there is no problem using the scale for research. Best of luck with your project!

Marylène Gagné
PhD
Professor | Future of Work Institute
Curtin Business School | Faculty of Business and Law

Curtin University, GPO Box U1987, Perth WA 6845
[redacted]
Web | https://staffportal.curtin.edu.au/staff/profile/view/Marylene.Gagne
https://campaign.curtin.edu.au/future-of-work-institute/
Twitter | @gagne_marylene
Blog | https://www.psychologytoday.com/au/blog/getting-monday-morning

Curtin University

CRICOS Provider Code 00301J

From: Crilly Brian Cartan <bcc4@hood.edu>
Sent: Wednesday, 12 June 2019 7:16 AM
To: Marylene Gagne [redacted]
Subject: Request for permission for survey instrument replication

Hi Dr. Gagné,

I am working on my dissertation at Hood College in Frederick, MD, USA. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate the scale from your 2015 paper "The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries," with proper source acknowledgement.

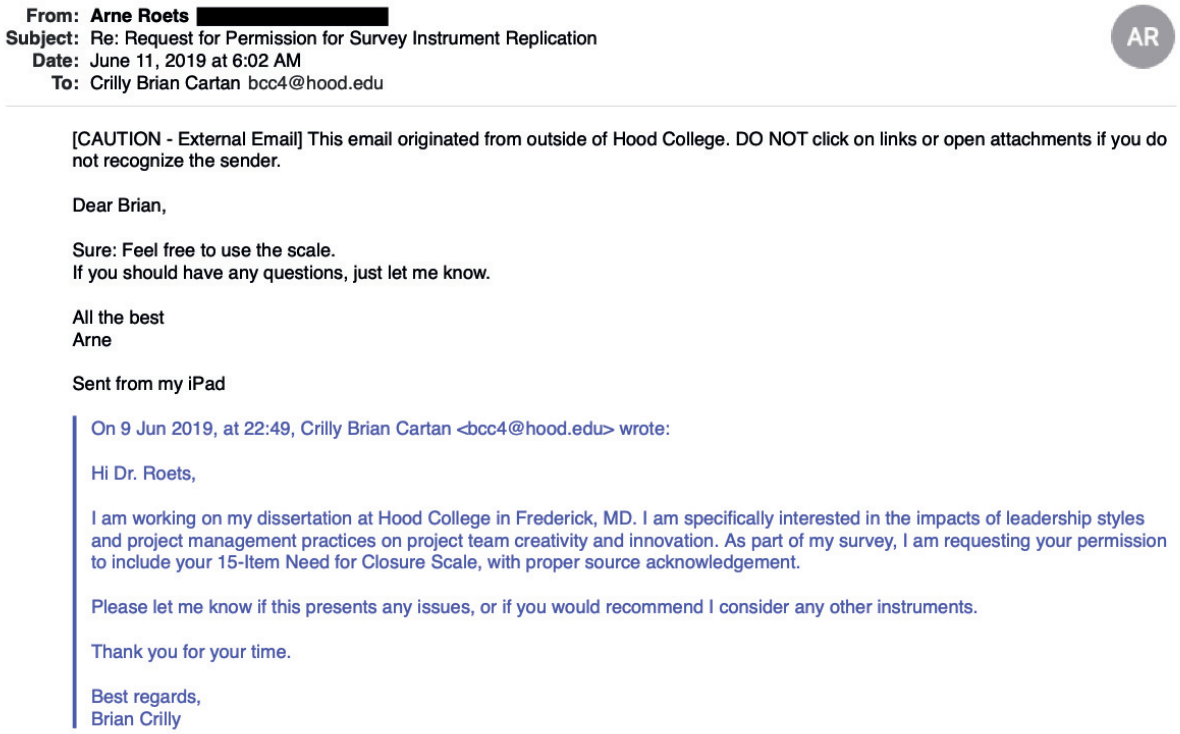
Please let me know if this presents any issues, or if you would recommend I consider any other instruments.

Thank you for your time.

Best regards,
Brian Crilly

Figure 31

Permission Received from Roets



From: **Arne Roets** [redacted]
Subject: Re: Request for Permission for Survey Instrument Replication
Date: June 11, 2019 at 6:02 AM
To: Crilly Brian Cartan bcc4@hood.edu

AR

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Dear Brian,

Sure: Feel free to use the scale.
If you should have any questions, just let me know.

All the best
Arne

Sent from my iPad

> On 9 Jun 2019, at 22:49, Crilly Brian Cartan <bcc4@hood.edu> wrote:
>
> Hi Dr. Roets,
>
> I am working on my dissertation at Hood College in Frederick, MD. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to include your 15-Item Need for Closure Scale, with proper source acknowledgement.
>
> Please let me know if this presents any issues, or if you would recommend I consider any other instruments.
>
> Thank you for your time.
>
> Best regards,
> Brian Crilly

Figure 32

Permission Received from Kruglanski

From: **Arie Kruglanski** [redacted]
Subject: Re: Request for Permission for Survey Instrument Replication
Date: June 9, 2019 at 11:31 PM
To: Crilly Brian Cartan bcc4@hood.edu

AK

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Hi Brian;
Thanks for asking. Yes, you have my permission to replicate these statements with proper source acknowledgement. Good luck on your dissertation.
All best,
Arie K

On Sun, Jun 9, 2019 at 11:57 PM Crilly Brian Cartan <bcc4@hood.edu> wrote:

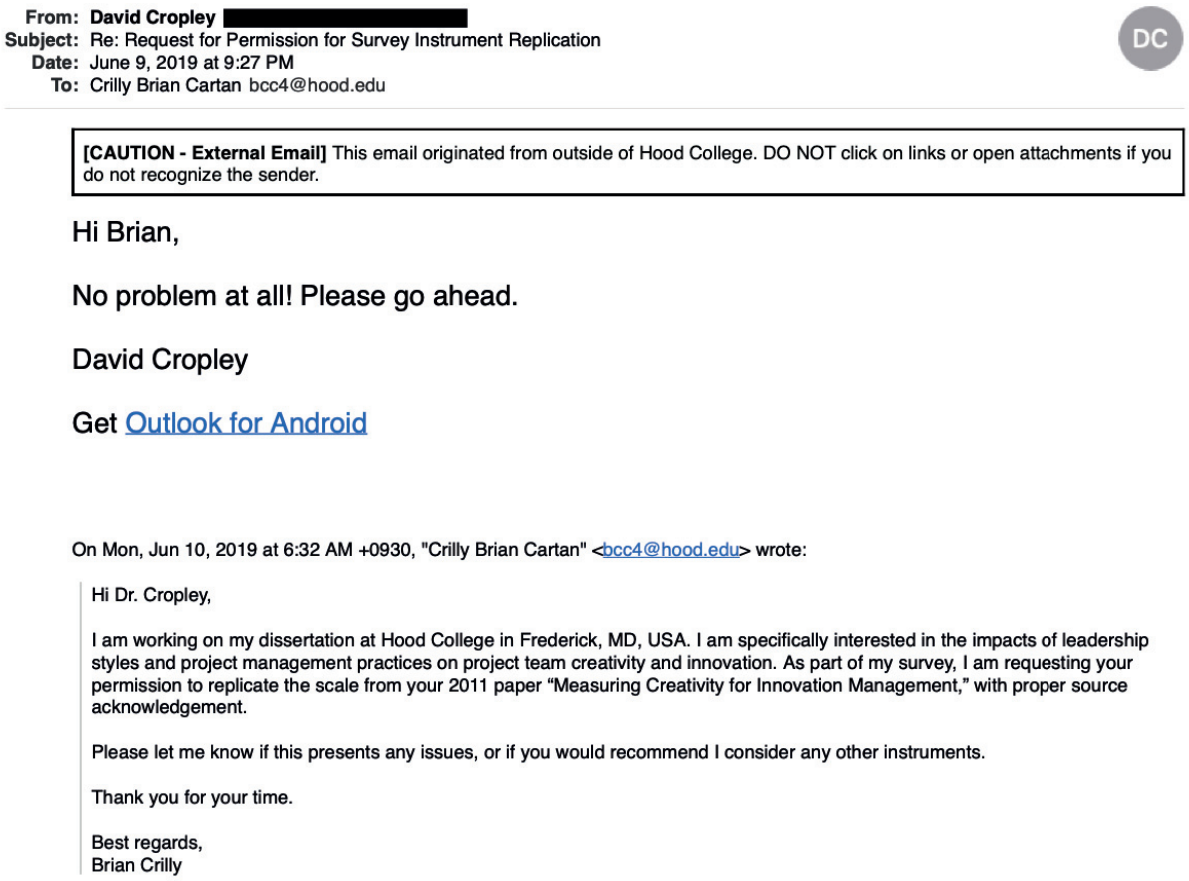
> Hi Dr. Kruglanski,
>
> I am working on my dissertation at Hood College in Frederick, MD. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate some of the statements utilized in your Need for Closure Scale, with proper source acknowledgement.
>
> Please let me know if this presents any issues, or if you would recommend I consider any other instruments.
>
> Thank you for your time. And Go Terps! I am a former Terp (BS / MS) and my daughter is currently a student at UMCP.
>
> Best regards,
> Brian Crilly

--
Arie W. Kruglanski
Distinguished University Professor
Department of Psychology
University of Maryland, College Park
College Park, MD 20742
[redacted]
www.wam.umd.edu/~hannahk/

Now Available to Order (for release on May 13, 2019):
The Three Pillars of Radicalization:
Needs, Narratives, and Networks:

Figure 33

Permission Received from Cropley



From: **David Cropley** [redacted]
Subject: Re: Request for Permission for Survey Instrument Replication
Date: June 9, 2019 at 9:27 PM
To: Crilly Brian Cartan bcc4@hood.edu

DC

[CAUTION - External Email] This email originated from outside of Hood College. DO NOT click on links or open attachments if you do not recognize the sender.

Hi Brian,

No problem at all! Please go ahead.

David Cropley

Get Outlook for Android

On Mon, Jun 10, 2019 at 6:32 AM +0930, "Crilly Brian Cartan" <bcc4@hood.edu> wrote:

> Hi Dr. Cropley,
>
> I am working on my dissertation at Hood College in Frederick, MD, USA. I am specifically interested in the impacts of leadership styles and project management practices on project team creativity and innovation. As part of my survey, I am requesting your permission to replicate the scale from your 2011 paper "Measuring Creativity for Innovation Management," with proper source acknowledgement.
>
> Please let me know if this presents any issues, or if you would recommend I consider any other instruments.
>
> Thank you for your time.
>
> Best regards,
> Brian Crilly