FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

SITUATIONAL AWARENESS IN PROJECT MANAGEMENT: AN EMPIRICAL

EXAMINATION OF CONTRIBUTING FACTORS

A dissertation submitted in partial fulfillment of

the requirements for the degree of

DOCTOR OF BUSINESS ADMINISTRATION

by

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2024

To: Dean William G. Hardin
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This dissertation, written by Joseph Giampa Archer, and entitled Situational Awareness in Project Management: An Empirical Examination of Contributing Factors, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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Florida International University, 2024

DEDICATION

I dedicate this dissertation to my husband, Sean Archer. His steadfast love and unwavering support have fortified my resolve throughout my arduous academic pursuits. I sought his guidance and reassurance throughout years of late-night research and writing sessions that felt interminable. Amidst a world at times marked by unkindness, he has remained my refuge—a secure haven absent apprehension or bias. This dissertation serves as a testament to our collective achievements.

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I wish to express my profound gratitude to my Dissertation Chair, Dr. Amin Shoja, for his indispensable guidance and resolute dedication to my academic advancement. Dr. Shoja's expert counsel and discerning feedback have substantially contributed to the successful completion of this dissertation and have been pivotal in fostering my broader scholarly development. He inspired me to push the boundaries of knowledge and strive for academic distinction. It has been a true honor to have had the privilege of working under his esteemed mentorship.

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Lastly, I wish to acknowledge the support of my family and friends. Their encouragement and understanding have served as a steady anchor during challenging moments. I hold a profound appreciation for their unyielding faith in my abilities and their consistent encouragement regarding the importance of determination and resilience.

ABSTRACT OF THE DISSERTATION

SITUATIONAL AWARENESS IN PROJECT MANAGEMENT: AN EMPIRICAL

EXAMINATION OF CONTRIBUTING FACTORS

by

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Florida International University, 2024

Miami, Florida

Professor Amin Shoja, Major Professor

Firms invest billions of dollars in projects annually to achieve their strategic

initiatives but do not always capture the expected value. Organizations waste

approximately $1 million every 20 seconds due to the ineffective implementation of

business strategy through poor project management practices, resulting in roughly $2

trillion in annual waste, an average of 9.9% of every dollar, to poor project performance.

Approximately 31% of projects do not meet their objectives, 43% exceed their budget,

and nearly 48% are not completed on schedule. Yet alarmingly, 85% of executives

believe their organizations effectively deliver projects that achieve strategic outcomes.

Projects are and have always been complex. The concept of complexity

concerning project management is commonly discussed in extant literature. However,

scholars have not scrutinized project complexity extensively, and the factors that manage

or influence project complexity are unknown. Given these complexities, leaders must be

technically proficient in project management. Still, they must also possess the requisite

leadership skills to adapt to constantly evolving situations, listen to various organizational

perspectives, and stay abreast of all happenings, both near and far. Should projects fail,

companies suffer sizable financial losses that could impact their ability to innovate

products and services beyond their competitors, increase market share, or adhere to

regulatory requirements. Like jet fighter pilots, project managers must grasp and interpret

information from their operating environment as they plan and execute a series of

coordinated tasks that lead to mission (project) success.

Situational awareness is a significant component of everything sentient creatures

do, yet the concept's application remains generally limited to high-reliability

organizations, including aviation and military operations. The role of the project manager

requires comprehending and deciphering the current state of a project, including its

context, risks, and progress. There is a large body of scholarly research on project

management; however, situational awareness in project management has not received the

same academic focus. This dissertation aims to adapt situational awareness concepts to

the management of firms, specifically project management. In this context, applying

situational awareness concepts may have profoundly remarkable effects on improving the

firm's innovative and competitive advantages and may create more value.

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I. INTRODUCTION

Problem Statement

In 2016, I began leading an Information Technology consulting engagement that included a portfolio of vital finance transformation projects for a worldwide hospitality company. The overall project scope and the business impact were extensive, and the changes were highly complex. The project outcomes affected over thirty-five thousand employees across ninety countries and approximately seven thousand managed and franchised hotels. The project initially intended to standardize the global financial chart of accounts. Implementing a global chart of accounts would generate millions of dollars in annual savings and derisking financial data translations and controlled transformations for a cluster of supporting technologies during the month-end close, corporate consolidation, and investor reporting processes.

At that time, this transformative initiative's scope, complexity, and risks represented the most significant magnitudes of my twenty-plus years of managing transformation projects. For perspective, over one hundred ancillary systems were in scope, and six accounting software systems were consolidated down to two. The two remaining accounting systems needed upgrading since they had not received updates in over a decade. Finally, the technical infrastructure and security, including on-premise servers and hardware, were migrated to the cloud or a hosted data center. Governance was co-held between two predominant functions: Information Technology and Finance. Both functions had unique and sometimes conflicting requirements.

Our mandate was to minimize business disruptions and tackle the entire scope simultaneously (chart of accounts, accounting software consolidation and upgrade, and

infrastructure migration). As the lead international project manager for this enormous undertaking, I orchestrated a geographically dispersed, culturally diverse team of five hundred matrixed staff members, vendors, stakeholders, and executive sponsors. I was accountable for promptly attaining outcomes and results identified in the business case and within budget constraints. The successful transformation depended on my ability to balance the competing and frequently conflicting demands of regional and corporate Information Technology, Finance, Security, and Internal Audit departments. I knew that I would have to bring a lifetime of business transformation and strategic leadership experiences to accomplish, at times, what felt like an impossible objective.

How would I effectively manage this massive initiative and balance the scope, schedule, and cost constraints? There were many factors and uncertainties that I had to identify, plan, and control beyond traditional project mechanics, including new technologies, cultural perspectives, individual personalities, locality constraints, vendors, varying country requirements, the impact of unknown dependencies, etc. How would I preemptively respond to constantly evolving circumstances, issues, risks, and threats without jeopardizing the project's credibility and success?

Firms invest billions of dollars in projects annually to achieve their strategic initiatives but are not attaining the intended value (Lutas et al., 2020). The amount of money that firms invest annually in projects can vary greatly depending on the company's size and industry, the nature of the projects, and the overall economic climate; however, investments in global projects are substantial (Lutas et al., 2020). Organizations invest $215 million in projects for every $1 billion in revenue, approximating the proportion of a company's revenue allocated to projects (PMI, 2019). Firms encounter

inadequate attention towards individuals, procedures, and results. Consequently, the firm's strategic initiatives experience an average loss of $109M for every $1B billion expended on projects (PMI, 2019).

It is essential to note that project investments encompass not only Information Technology (IT) projects but numerous other projects in various industries. Large organizations with complex operations may have multiple concurrent projects in areas including R&D, infrastructure, marketing, and product development. According to the latest forecast by Gartner, Inc., worldwide information technology spending is forecasted to be more than $4.6 trillion, which reflects a substantial increase of 5.5% from the prior year in 2022 (Lovelock, 2023). The COVID-19 pandemic led to an unprecedented surge in corporate investment in technology, with a weekly increase of $15 billion (Boesler, 2022). The current trend in investment strategies has transitioned from acquiring technology to developing and arranging technology (Burnett, 2023).

IT systems are a vital competitive element in many industries. As a result, technology projects are getting bigger, affecting more parts of the organization and putting the company at risk if something goes wrong. Quite often, things do go wrong. Research conducted by the University of Oxford and McKinsey & Company shows that half of all large IT projects having an initial cost of more than $15 million go way over budget. On average, large IT projects cost 45 percent more than planned, take 7 percent longer, and deliver 56 percent less value than expected. Cost and time overruns are most likely for software projects (Bloch et al., 2012).

It is well known that failed IT projects can result in significant financial losses for organizations. According to various studies and reports, the amount of money wasted on

failed IT projects can vary widely depending on the source, industry, and project size. The 2018 Pulse of the Profession®, a global survey conducted by the Project Management Institute (PMI), reveals that organizations waste approximately $1 million every 20 seconds due to the ineffective implementation of business strategy through poor project management practices, resulting in roughly $2 trillion in annual waste (PMI, 2017a). The study reveals that organizations waste an average of 9.9 percent of every dollar due to poor project performance and that approximately one-third of projects (31 percent) do not meet their objectives, 43 percent are not completed within budget, and nearly half (48 percent) are not completed on schedule (PMI, 2017a).

Alarmingly, 85 percent of executives surveyed believe their organizations are effective at delivering projects that achieve strategic outcomes (PMI, 2017a). These factors are causing colossal financial losses for businesses across the globe and have a significant impact on the global economy (PMI, 2017a). It's important to note that estimating the amount of money spent on failed IT projects is challenging because organizations may not always disclose the full extent of project failures (PMI, 2017a). Moreover, the definition of failure can vary, ranging from outright canceled projects to those that don't meet their objectives or suffer from cost overruns and delays.

Expected project outcomes may include improved operational effectiveness, lowered overhead costs, increased competitive advantages, or compliance with regulations. Projects can run the full spectrum of complexity and investment, from simple digital modernization efforts to complex multinational information technology infrastructure renovations. Business transformation leaders shepherd these changes, invariably balancing the triple constraints of scope, time, and cost while addressing

emergent issues that jeopardize success. Executive sponsors understandably scrutinize corporate funding when projects can cost millions of dollars.

Projects are and have always been complex. The concept of complexity concerning project management is commonly discussed in extant literature. The Great Wall of China and the Roman Aqueducts are prime examples of early civilization projects with insurmountable scope and complexity (Frame, 2002). Geraldi and Adlbrecht (2007) posit that projects are and have always been complex. From an academic perspective, the factors that manage or influence project complexity are unknown (Geraldi & Adlbrecht, 2007). The concept of complexity concerning project management is commonly discussed in extant literature. However, project complexity has not been extensively scrutinized (Baccarini, 1996). Scholars have not scrutinized project complexity extensively, and the factors that manage or influence project complexity are unknown.

Given these complexities, leaders must be technically proficient in project management, resource management, and organizational change management competencies. They must also possess the requisite leadership skills to adapt to constantly evolving situations, listen to various organizational perspectives, and stay abreast of all happenings, both near and far. Should projects fail, companies suffer sizable financial losses that could impact their ability to innovate products and services beyond their competitors, increase market share, or adhere to regulatory requirements. With so much at stake, it begs the question, what factors contribute to situational awareness in project management?

Significance of the Problem

Empirical data indicates a rising trajectory in the number of positions, employment prospects in project management, and the variety of market sectors. According to the Project Management Job Growth and Talent Gap 2017-2027 (PMI, 2017b), there is a dramatically increasing trend in the number of jobs that require project management-oriented skills, most notably in emerging economies like China and India. Interestingly, PMI (2017b) also found that project management approaches are expanding into atypical sectors, including finance, health care, insurance, and services. PMI's 2012 survey forecasted the number of project-oriented jobs at 52.4 million by 2020; however, by early 2017, the number of project management jobs had reached 66 million (McGrath & Košťálová, 2020).
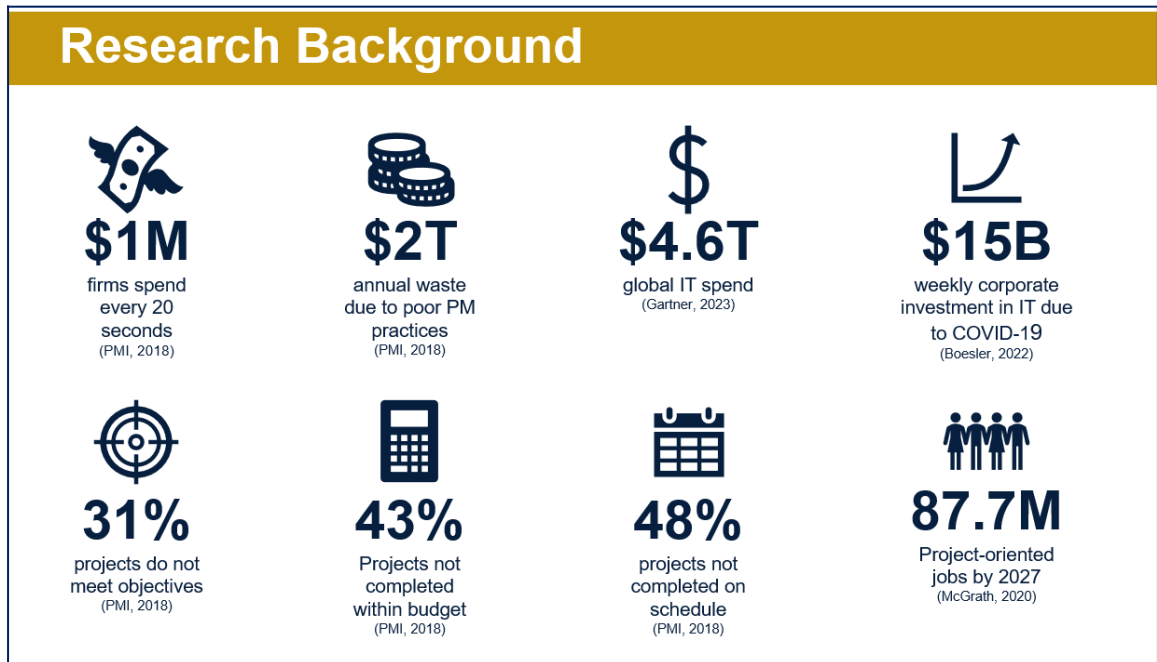
Figure 1: Research Background (Joseph Archer, Dissertation Proposal Defense, 2023):

The upward trend in project management jobs is expected to continue. By 2027, the Project Management Institute estimates employers will require 87.7 million employees to work project management-oriented jobs (PMI, 2017b). Further compounding the challenges due to the increasing project management-oriented talent demand is the forecasted gap created by 13 million project manager retirements (PMI, 2021a). If project management talent demands and gaps are not addressed, they can create massive financial losses of up to $346B in global GDP by 2030 (PMI, 2021b).

Today, there is no academic consensus on assessing project performance because projects vary significantly across many dimensions, including scope, scale, complexity, and type. Existing measurement models do not separately evaluate the project's success from the perspective of the project staff (Zwikael & Meredith, 2019). Young et al. (2020) found a linkage between project governance and project success, concluding that top management support is necessary for project success. This study is the first to identify project control mechanisms that correlate with project success: Change, Key Performance Indicators (KPI), Monitor, Sponsor, and Vision. Researchers gathered data from 51 global organizations and collected 66,817 survey responses for their quantitative analysis. The study further found at which point in the project lifecycle each governance mechanism is most effective.

Project failure remains highly prevalent today, even with the increased usage of project management tools and tactics. Researchers define early warning signs to identify and thwart project failure preemptively. Othman et al. (2018a) build on contemporary project failure research to provide deeper insights into warning signs that precede project failure. Information systems development (ISD) projects fail at exceptionally high rates,

and this issue has plagued the ISD discipline for many years Baghizadeh et al. (2020).

Over the decades, numerous studies have primarily focused on project failures.

As ISD projects become increasingly complex, Baghizadeh et al. (2020) identified

gaps in academic literature and concentrated on closing them in ISD project failure

literature. Further research moves away from ISD project failures and proposes 'ISD

project distress.' Baghizadeh et al. (2020) state that ISD project distress is "a harmful

project condition involving a dynamic and fluid constellation of critical problems that are

difficult to identify, understand, and resolve." ISD project distress may impact projects

significantly, yet early identification and proposed responses are largely unknown

(Baghizadeh et al., 2020).

In 1995, Dr. Mica Endsley presented a theoretical situation awareness (SA) model

based on its role in dynamic human decision-making. Endsley describes the relationship

between SA and numerous factors, including environmental and individual

characteristics. Interestingly, there is a critical relationship between low levels of SA,

attention, and working memory. Project managers must grasp and interpret information

from their operating environment as they plan and execute projects.

Following her 1995 publication on the theoretical framework of situational

awareness, Endsley (2021) published "A Systematic Review and Meta-Analysis of Direct

Objective Measures of Situation Awareness: A Comparison of SAGAT and SPAM."

Endsley's SA model provides a valuable theoretical framework for discussing SA

competence and its relationship to successful project management. Endsley investigates

evidence of sensitivity, predictive power, and methodological concerns related to direct,

objective situational awareness (SA) measures. Endsley conducted a meta-analysis of 243

studies on two SA measurement techniques: the Situation Awareness Global Assessment Technique (SAGAT) and the Situation Present Assessment Technique (SPAM). Endsley concluded that SAGAT and SPAM were equally predictive of performance. Endsley's research on objective measurement of SA using the SAGAT and SPAM techniques provides a framework and lessons learned to measure project management leadership competencies. This meta-analysis is relevant to understanding the factors contributing to project management situational awareness.

Research Gap

The concept of situational awareness is widely recognized and utilized primarily in high-reliability organizations, including aviation, military operations, and healthcare (Endsley, 1995) (Stanton et al., 2001) (Patterson & Wears, 2010). Although not specific to project management, research and literature from these fields can provide valuable insights and frameworks applicable to project management. The role of the project manager requires comprehending and deciphering the current state of a project, including its context, risks, and progress. Without question, situational awareness is an essential concept in project management. There is a large body of scholarly research on project management, including aspects of project monitoring, control, and decision-making (Guide, 2008) (Kerzner, 2017) (Pinto, 2004); however, situational awareness in project management has not received the same academic focus as other project management areas. Therefore, it is a worthy endeavor to explore and bridge the gap by conducting empirical studies to investigate the concept's application and implications within the project management domain further. Future research may prove that project managers

with high situational awareness favorably adapt to evolving situations more quickly than those with low situational awareness levels.

Research Question

This research proposal will address the following research question:

What are the factors that contribute to situational awareness in project management?

Research Contributions

Situational awareness is a concept that has been deeply rooted and applied in militaristic settings, most notably aviation, safety, and controlling complex systems (Stanton et al., 2001). The concept of situational awareness was first identified by Oswald Boelcke, a German Ace fighter jet pilot during World War I (Franks, 1993). Oswald Boelcke is credited with many accomplishments in air-to-air combat tactics, early-warning systems, and fighter squadron organization. According to Franks (1993), Boelcke realized the strategic and tactical advantages of gaining an awareness of the enemy before the enemy did the same. He was the first to devise methods for accomplishing these advantages (Franks, 1993).

Previous research studies have successfully adapted militaristic studies of situational awareness from one discipline to a new environment (i.e., physiology). Theoretical adaptations of situational awareness concepts serve as direct and meaningful guidance. The extant literature will guide this dissertation's seminal research objective to adapt situational awareness concepts to the management of firms, specifically project management. Situational awareness is a significant component of everything sentient creatures do Gilson (1994). The role of the project manager requires comprehending and

deciphering the current state of a project, including its context, risks, and progress. There is a large body of scholarly research on project management (Padalkar & Gopinath, 2016) (Kwak & Anbari, 2009) (Söderlund, 2004) (Floricel et al., 2014); however, situational awareness in project management has not received the same academic focus. Without question, situational awareness is an essential concept in project management. Therefore, it is a worthy endeavor to explore and bridge the gap by conducting empirical studies to investigate the concept's application and implications within the project management domain further. This study aims to adapt situational awareness concepts to the management of firms, specifically project management. In this context, applying situational awareness concepts may have profoundly remarkable effects on improving the firm's innovative and competitive advantages and may create more value. With so much at stake, it begs the question, what factors contribute to situational awareness in project management?

II. BACKGROUND LITERATURE REVIEW AND THEORY

Alami (2016) delved into the reasons behind the failure of Information Technology projects. He first highlighted the ambiguity surrounding the exact definitions of project success and failure. His second key observation was the impact of elements such as uncertainty, volatility, and unknown factors on the project ecosystem, which can potentially lead to project failure. He emphasized that in order to understand why some project managers outperform others, there needs to be a universally accepted definition of success and failure. Alami's findings should be considered by future researchers, especially if gaps were identified in previous studies. Interestingly, he also drew parallels between low situational awareness levels and uncertainty, volatility, and unknowns.

Zhang et al. (2020) identified a gap in the literature on applying Situation Awareness (SA) in the physiological domain. Primarily studied in military and healthcare domains, this study assessed the consistency and strength of the relationship between the direct and indirect SA measurements. There is a gap in the scholarly literature on applying SA in business, specifically project management. Seeing how the researchers adapted studies of SA from one discipline, such as healthcare, to a new environment (i.e., physiology) serves as direct and meaningful guidance for adapting SA concepts to business and project management.

Baghizadeh et al. (2020) reviewed and critiqued project failure literature for information systems development. Information systems development (ISD) projects fail at exceptionally high rates, and this issue has plagued the ISD discipline for many years. Over the decades, numerous studies have primarily focused on project failures. As ISD projects become increasingly complex, Baghizadeh et al. (2020) identified gaps in

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academic literature and concentrated on closing them in ISD project failure literature. Future research that moves away from ISD project failures and towards 'ISD project distress' is proposed. Baghizadeh et al. (2020) state that ISD project distress is "a harmful project condition involving a dynamic and fluid constellation of critical problems that are difficult to identify, understand, and resolve." ISD project distress may impact projects significantly, yet early identification and proposed responses are largely unknown.

Collins and Butler (2020) analyzed three separate professional project studies by the Institute of Management Consultants (IMC), Sturdy's (2011) desire to explore consulting projects further, and the Association of Project Management (APM) comparative study of projects by Hodgson et al. (2015). The authors identified four key themes relating to the corresponding investigations' outcomes. In conclusion, the researchers seek to disrupt and reshape the definition of traditional project success and failure.

Endsley (1995) investigated evidence of sensitivity, predictive power, and methodological concerns related to direct, objective situational awareness (SA) measures. Endsley (2021) conducted a meta-analysis of 243 studies on two SA measurement techniques: the Situation Awareness Global Assessment Technique (SAGAT) and the Situation Present Assessment Technique (SPAM). Endsley concluded that SAGAT and SPAM were equally predictive of performance. Endsley's research on objective measurement of SA using the SAGAT and SPAM techniques provides a framework and lessons learned to measure project management leadership competencies. This meta-analysis explains why some project managers are more successful than others. Future

research may prove that project managers with high SA favorably adapt to evolving situations more quickly than those with low SA.

Elezaj et al. (2020) published a peer-reviewed article that examines matrix structures and their relationship to successful project management. Characteristics expected to be positively related to project success mainly relate to successful project leaders. However, the anticipated factors that harm project success do not indicate such significant relationships. The research illustrates how organizational structures can increase project success rates. Elezaj et al. (2020) found that organizational structures directly impact project success. These findings could explain why some project managers are more successful than others. The questionnaire collected helps shape future surveys that yield intended results.

Horváth (2019) compares multiple definitions of project management competencies and models. Further, Horváth (2019) introduces a two-dimensional model to understand better project management skills and how to develop them. A comparative analysis of project management competency models provides excellent reference material to support research on project manager success and the impact of leadership skills. A cursory review of the fourteen different project management competency models supports assertions that situational awareness or understanding is absent from academic literature.

Yin et al. (2019) published a peer-reviewed article regarding an extended TODIM Method for Project Managers' competency evaluation. The authors of this article found that project management leadership skills are essential for the project's overall success. Correctly assessing the competence of project managers is the central research topic. The

research presents an extended methodology called TODIM, a Portuguese acronym for interactive and multi-criteria decision-making that considers the decision maker's behavior. The research supports and agrees that project management leadership proficiency is central to project success. Further, the study introduces a methodology to measure competence in project management decisions. Although written contextually for civil engineering, it remains relevant to broader business adaption.

Müller et al. (2011) examined the effect of project complexity on the relationship between project management leadership skills and project success. The researchers surveyed 119 respondents, and the results correlate emotional and managerial competencies with project success but are moderated differently by complexity. The study defines three types of complexity (belief, fact, and interaction) that serve as a common language across different project types. Finding why some project managers are more successful than others will require a common complexity baseline. Without a common complexity baseline to equalize projects, an uninformative and undesirable outcome could be that the project complexity exceeded the project manager's competence.

Novo et al. (2017) researched the leadership profiles of project managers and examined the evidence presented to identify the statistical significance between project managers' leadership and success in their projects. The results have shown that various leadership qualities are associated with successful project managers, and there is a strong correlation between the leadership skills of project managers and the success of their projects. This research provides information about the specific leadership qualities of successful project managers. Interestingly, the list of positive leadership qualities found

in the study is heavily interpersonal and communication-related. The researchers excluded leadership qualities related to situational awareness or adaptability. Future research could further analyze the excluded leadership qualities to uncover a gap in their findings (if any).

Othman et al. (2018a) researched the early warning signs of project failure. Project failure remains highly prevalent today, even with the increased usage of project management tools and tactics. Researchers define early warning signs to identify and thwart project failure preemptively. Othman et al. (2018a) build on contemporary project failure research to provide deeper insights into warning signs that precede project failure.

Saadé et al. (2015) researched the factors of Project Manager success. This research aims to analyze the factors that influence the success of a project concerning the characteristics of project managers. The context of the study includes a United Nations-type organization. The researchers adopted nineteen critical success factors from previous studies. The sixty-six-person survey showed a project manager's ability to communicate and ensure that the project creates and sustains positive perceptions is essential. The study profoundly explores project manager success and people's perceptions to evaluate positive project results. The survey methodology used in this research may support future approaches to determine why one project manager is more successful than another.

Young et al. (2020) found a link between project governance and success, concluding that top management support is necessary for project success. This study is the first to identify project control mechanisms that correlate with project success: Change, Key Performance Indicators (KPI), Monitor, Sponsor, and Vision. Researchers gathered data from 51 global organizations and collected 66,817 survey responses for

their quantitative analysis. The study further found at which point in the project lifecycle each governance mechanism is most effective.

Zwikael and Meredith (2019) evaluated a project's success and its leaders' performance. Today, there is no academic consensus on assessing project performance because projects vary significantly in scope, scale, complexity, and type. Existing measurement models do not separately evaluate project success from the performance of project staff. Zwikael et al. (2021) have developed, validated, and proposed measurement scales through two longitudinal studies based on satisficing theory. The success of any project and the performance of its two key executives: the project manager and owner. Measurement of three different project success dimensions includes 1) Project management success evaluates the performance of the project manager in achieving the project plan; 2) Project ownership success evaluates the project owner's performance in realizing the business case; 3) The project investment success evaluates the investment performance of the project for its financier (Zwikael & Meredith, 2019). This paper contributes to the literature by providing a robust, multidimensional assessment model that improves the performance assessment of both projects and their leaders.

Sterling (2016) published a white paper exploring the relationship between situational awareness and emotional intelligence in project management. The authors introduce the concepts of emotional intelligence, situational awareness, and SAGAT. The authors assert that situational awareness is critical in effective decision-making and increases degrees when project complexities are prevalent.

Endsley (1995) presents a theoretical situation awareness (SA) model based on its role in dynamic human decision-making. Endsley describes the relationship between SA

and numerous factors, including environmental and individual characteristics (Endsley, 1995). Interestingly, there is a critical relationship between low levels of SA, attention, and working memory (Endsley, 1995). Like jet fighter pilots, project managers must grasp and interpret information from their operating environment as they plan and execute a series of coordinated tasks that lead to mission/project success. Endsley's SA model provides a valuable theoretical framework for discussing SA competence and its relationship to project management.
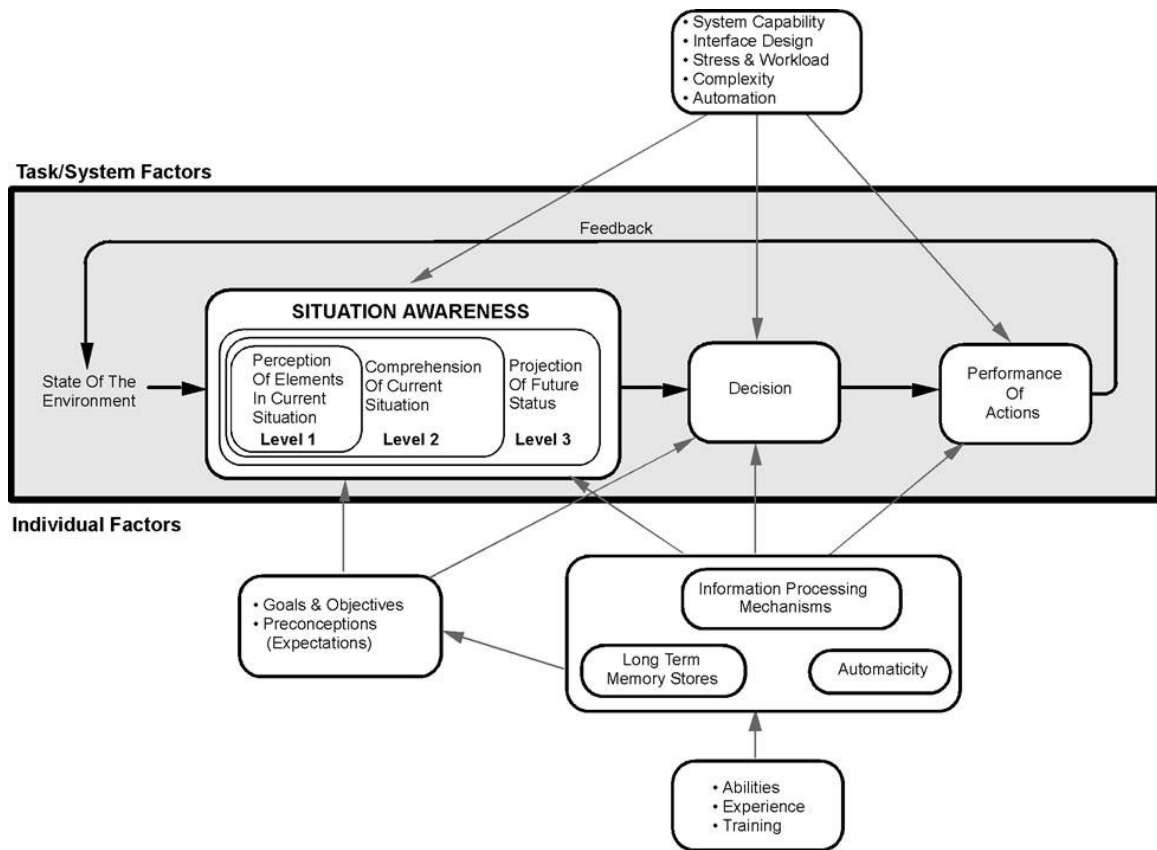
Figure 2: Endsley's Situational Awareness Theoretical Model

Stakeholder Management

Effective stakeholder management occurs when project managers involve people who may be affected by or influence project decisions and intended outcomes (Erkul et al., 2020). Stakeholder perceptions are balanced across individuals to achieve unification of interpretation. Project managers who identify their stakeholders and then adequately analyze and document their individual needs are more likely to manage stakeholder perceptions of the project, its success, and goal attainment. Stakeholder management facilitates the exchange of relevant information between the project manager and stakeholders, leading to enhanced situational awareness. The project manager gains valuable insights and a comprehensive understanding of the project's context by involving stakeholders in decision-making processes and informing them about its progress (Erkul et al., 2020). These insights, in turn, help the project manager anticipate potential issues, identify emerging risks, and make informed decisions.

Project managers can identify and address stakeholder concerns and expectations early in the project lifecycle through effective stakeholder management. Regular communication and stakeholder collaboration enables the project manager to understand their needs, expectations, and potential conflicts (Ninan, 2019). By proactively managing stakeholder perceptions, the project manager can gain situational awareness regarding potential risks or issues arising from dissatisfaction or non-alignment (perceived or actual). Additionally, effective stakeholder management fosters positive stakeholder relationships, builds trust, and promotes collaboration. When stakeholders are actively engaged in the project, they are more likely to provide valuable input, offer support, and actively participate in project activities (Rajablu et al., 2015). This collaborative

environment gives the project manager a broader understanding of the project's internal and external dynamics, enabling better situational awareness and informed decision-making.

Triple Constraint Management

Typically, firms undertake projects because they are a critical component of plans to meet business requirements and propel organizations to new performance levels. However, projects are constrained by competing priorities and competing demands within the project environment (Van Wyngaard et al., 2012). The triple constraints in project management are scope, schedule, and cost. Project managers balance these constraints with the knowledge and understanding that when a change occurs in one constraint, it affects the remaining two. Even if the project manager performs all other project tasks excellently, failure to manage these constraints accurately and effectively may be sufficient to condemn a project (Van Wyngaard et al., 2012). Highly competent project managers document scope, schedule, and cost baselines during the early project activities. Effective triple constraint management involves early identification of scope, schedule, and cost changes. Project managers gain a heightened situational awareness of potential risks, deviations, and opportunities by closely monitoring these elements and promptly assessing the impacts of any changes. Having heightened situational awareness allows them to make informed decisions and take appropriate actions to maintain project alignment and success.

Triple constraint management provides project managers with accurate and up-to-date information about the project's scope, schedule, and costs (Van Wyngaard et al., 2012). This comprehensive knowledge enhances their situational awareness, enabling

them to make well-informed decisions. By understanding the trade-offs between these constraints, project managers can effectively balance competing demands and optimize project outcomes (Armenia et al., 2019). Making triple constraints enables project managers to proactively identify and address potential risks associated with scope, schedule, and costs. By clearly understanding the interdependencies among these constraints, project managers can anticipate and mitigate risks promptly. This proactive risk management approach enhances the project manager's situational awareness by identifying and addressing potential issues before they escalate.

Progress Management

Project measurement categories of tasks, deliverables, and milestones indicate progress toward completion. Project managers document the initial task estimates within the baseline project schedule, including effort, duration, sequence, predecessors, dependencies, and ownership. Tasks, milestones, and deliverables are verified, stored, and retrievable upon completion. Effective progress management involves ongoing monitoring of project tasks against the baseline schedule.

Progress management enables project managers to compare actual progress against the baseline schedule, identifying variances and potential risks at an early stage. A project monitoring and control system aims to mitigate deviations from project plans. This system involves identifying and reporting the project's status, comparing it to the plan, analyzing any variations, and implementing corrective actions as necessary (Hazır, 2015). Project managers can detect trends, patterns, and deviations by monitoring and analyzing progress data. This early identification of variance and risks enhances their situational awareness, allowing them to promptly implement appropriate corrective

measures and risk mitigation strategies. Project managers improve their situational awareness by comprehensively understanding progress and resource utilization and can make informed decisions regarding task prioritization, resource allocation, and project adjustments.

Often, project failures are attributed to bounded rationality or when project managers fail to recognize shifting dynamics and changes in project planning and execution. In addition to bounded rationality, the likelihood of failure increases when the project manager fails to control the project baseline through practical progress assessment and measurement (Cicmil, 1997). The utilization of Earned Value Project Management (EVPM) is a proficient approach to managing the accuracy of cost and duration projections, including planned value for forecasting earned value and actual cost value (Chen et al., 2016). Predictive capabilities such as EVPM provide actionable insights and enhance the project manager's situational awareness. Increased situational awareness enables project managers to promptly identify deviations, delays, or bottlenecks and take appropriate actions to keep the project on track.

Risk Management

Issue management deals with adverse effects occurring in a project. In contrast, a risk has a probability of occurrence or may become an issue should it be triggered (actually happen or arise). The project manager proactively identifies, monitors, mitigates, and resolves actual, perceived, and potential issues and risks throughout the project lifecycle. By implementing robust risk management processes, project managers identify risks early and often, assess their potential impacts, and develop appropriate mitigation strategies. Risk management enhances the project manager's situational

awareness by ensuring that potential risks are proactively monitored and managed, reducing the likelihood of negative impacts on project outcomes.

Effective risk management gives project managers a comprehensive understanding of project risks, enabling them to make informed decisions (Kutsch et al., 2021). By systematically identifying and assessing risks, project managers gain situational awareness of potential uncertainties and their impact on project objectives (Kutsch et al., 2021). Proactive risk management empowers project managers to make data-driven decisions, consider risk-reward trade-offs, and allocate resources effectively (Kutsch et al., 2021). Further, risk management facilitates stakeholder management and communication. By proactively identifying and managing risks, project managers can communicate potential risks and their implications to stakeholders (Pauna et al., 2021). Open and transparent communication fosters stakeholder awareness and alignment, enabling project managers to obtain valuable input and support (Pauna et al., 2021).

The typical discourse surrounding the risk management process centers on establishing an analytical structure and process that outlines the necessary steps undertaken during the project's life. The previous statement elucidates the characteristics and extent of the undertaking; however, it lacks substantive information regarding the implementation of proficient risk mitigation strategies in a pragmatic setting (Ward, 1999). Said differently, project managers may follow the risk management process perfectly, but if they are unaware of emerging issues and risk-triggering events, the project may become adversely impacted, and the mitigation strategies may be ineffective. To achieve successful project outcomes, project managers must enhance their situational

awareness by integrating stakeholder perspectives, ensuring that all relevant issues and risks are timely and transparent during decision-making.

Influence Management

External project management influences originate from diverse sources, including the firm's direct/indirect competitors, customers, and clients. Economic, geopolitical, and social conditions may initiate additional external influences. Internal and external factors influencing or threatening the project's overall health, existence, or individual task completion are monitored and controlled throughout the project lifecycle. Political risks brought on by government and power groups' involvement impact the project's timely completion (Nasirzadeh et al., 2016).

Effective influence management involves actively managing internal project management influences, such as intercompany conditions, people, and organizational structures (Meredith & Zwikael, 2020). Project managers enhance their situational awareness by fostering open and transparent communication channels within the organization. Open and transparent communication channels improve the multidirectional flow of relevant information, facilitating timely decision-making and proactive responses to emerging situations. Further, influence management involves understanding and addressing the needs and expectations of various organizational stakeholders.

By actively managing these internal project management influences, project managers can increase the frequency and quality of effective stakeholder management (Rabechini, 2022). Enhanced Stakeholder management enables project managers to navigate internal complexities, build consensus, and align project activities with organizational goals. Bourne (2008) posits that project stakeholders' perceptions of the

project are directly related to [project] success and failure. Additionally, project managers must be capable and willing to navigate perceptions within the context of organizational politics (Bourne, 2008). Therefore, frequent stakeholder management and considering stakeholder perspectives are essential to diagnosing internal dynamics, concerns, and preferences, ultimately enhancing the project manager's situational awareness.

Lastly, influence management enhances optimal resource allocation. Project managers can better align resources to project requirements and constraints by understanding the dynamic interplay between complex internal factors, such as organizational structures and systems (Hanisch, 2011). Optimal resource allocation enhances situational awareness by ensuring effective and efficient resource allocation, reducing bottlenecks, and maximizing project performance.

Political Savvy

The interplay between power and politics has been a fundamental aspect of human history since the earliest civilizations. It is unsurprising to discover that the same phenomenon exists in the present day within the context of project management (Jeffrey Pinto, 1996). According to Frame (2002), political savvy is an ideal trait that project managers must possess. Project managers should understand what to do and what not to do. Successful project management largely depends on awareness and comprehension of the firm's organizational politics and, more importantly, how to employ them to the project's advantage (Helm & Remington, 2005). While most people dread corporate politics, it is evident that effective project managers are usually willing and able to employ appropriate political tactics to achieve their project objectives (Jeffrey Pinto, 1996). Project managers with high political savvy demonstrate an in-depth

understanding of the firm's interrelationships, roles, responsibilities, and functional teams (Cleland, 1995).

Strategy, influence, and timing contribute to demonstrating political savvy. Politically savvy project managers navigate complex stakeholder relationships with confidence and professional diplomacy. Project managers build strong relationships with stakeholders by understanding the political landscape and power dynamics within the project environment (Milosevic & Srivannaboon, 2006). In their published framework, Milosevic and Srivannaboon (2006) conclude that project management and business strategy alignment require a cohesive and structured relationship framework. Improved stakeholder relationship management enhances situational awareness by giving project managers insights into stakeholders' perspectives, interests, and potential influence on project outcomes.

Harnessing skillful political savvy enables project managers to navigate the organizational culture and dynamics. Project managers adapt their context-dependent judgment and situational ethics by understanding the informal networks, unwritten rules, and power structures (Cicmil, 2018). Heightened awareness of the organizational culture enhances situational awareness, allowing project managers to anticipate potential challenges, leverage support, and align project activities with the prevailing culture. Further, political savvy equips project managers with the skills to manage conflicts and negotiations within the project environment. By understanding special interests and potential conflicts, project managers can navigate stakeholder disagreements and find win-win solutions (Rouleau & Balogun, 2011). Skillful conflict management techniques

enhance situational awareness by enabling project managers to address underlying

tensions and maintain positive working relationships among stakeholders.

Project Management Situational Awareness

The researcher defines situational awareness in project management as the project

manager's perception of environmental elements and events concerning a project, the

comprehension of their meaning, and the projection of their future impact on the project.

This researcher posits that stakeholder management, political savvy, triple constraint

management, progress management, risk management, and influence management are the

critical, independent variables that positively affect project management situational

awareness (dependent variable). The researcher explores the significant effects of the

variables while controlling for age, gender, experience, education and training,

certification, project type (technical, non-technical, and construction), and scope and

complexity (project size).

Variable	Variable Type	Extent Literature
Stakeholder Management (Independent)	Stakeholders are engaged proactively and receive information promptly. The project manager builds consensus and stakeholder unification effectively.	Erkul et al. (2020); Ninan (2019); Rajablu et al. (2015)
Triple Constraint Management (Independent)	Throughout the project lifecycle, scope, schedule, and costs are controlled. Changes are identified early, and the impacts are clearly articulated, socialized, and approved.	Van Wyngaard et al. (2012); Armenia et al. (2019)
Progress Management (Independent)	Incremental project tasks are assessed against the baseline project schedule throughout the project life cycle.	Hazır (2015); Cicmil (1997) Chen et al. (2016)
Risk	The project manager manages issues and	Kutsch et al. (2021);

Variable	Variable Type	Extent Literature
Management (Independent)	risks throughout the project lifecycle to avoid failure.	Pauna et al. (2021); Ward (1999)
Influence Management (Independent)	Common internal project management influences include intercompany conditions, events, factors, people, organizational structures, and systems generally under the firm's direct control.	Nasirzadeh et al. (2016); Meredith & Zwikael (2020); Rabechini (2022); Bourne (2008); Hanisch (2011)
Political Savvy (Moderator)	The project manager can exhibit confidence and professional diplomacy while effectively relating to various stakeholders.	Pinto (1996); Helm & Remington (2005); Cleland (1995); Milosevic & Srivannaboon (2006); Cicmil (2018); Rouleau & Balogun, (2011)
Project Management Situational Awareness (Dependent)	The project manager's perception of environmental elements and events concerning a project, the comprehension of their meaning, and the projection of their future impact on the project.	Endsley (1995)
Control Variables	The researcher will control for survey participant variables of age, gender, experience, education, certification, project type (technical, non-technical, and construction), and scope and complexity (project size) will be controlled during the experiment.	Dao et al. (2017)

Table 1: Definition of Constructs

RESEARCH DESIGN

Conceptual Framework
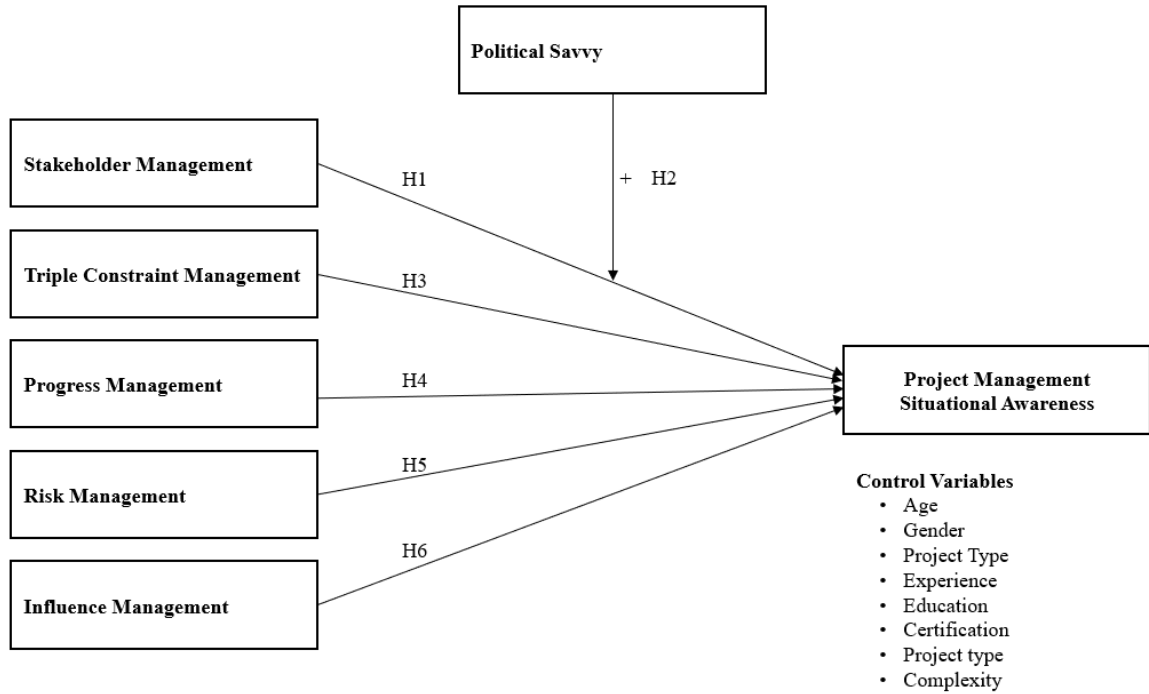
Figure 3: The Conceptual Research Model

Summary of Hypotheses

Hypothesis	Definition
H1	Effective stakeholder management has a positive effect on project managers' situational awareness.
H2	Political savvy positively moderates the relationship between effective stakeholder management and project management situational awareness, such that the relationship between effective stakeholder management and project management situational awareness becomes stronger when political savvy is high.
H3	Effective triple constraint management has a positive impact on project

Hypothesis	Definition
	managers' situational awareness.
H4	Effective progress management has a positive impact on project managers' situational awareness.
H5	Effective risk management has a positive impact on project managers' situational awareness.
H6	Effective influence management has a positive impact on project managers' situational awareness.

Table 2: Summary of Hypotheses

Theoretical Development

H1. Effective stakeholder management has a positive effect on project managers' situational awareness.

Endsley's theoretical situation awareness (SA) model describes the relationship between SA and numerous factors, including environmental and individual characteristics. As project managers plan and execute projects, they must grasp and interpret information from their operating environment, including project stakeholders' input and perceptions. Actively engaging stakeholders and managing their project perceptions enables project managers to achieve unification.

Effective stakeholder management occurs when project managers involve people who may be affected by or influence project decisions and intended outcomes (Erkul et al., 2020). Stakeholder perceptions are balanced across individuals to achieve unification of interpretation. Project managers who identify their stakeholders and then adequately analyze and document their individual needs are more likely to manage stakeholder

perceptions of the project, its success, and goal attainment. Stakeholder management facilitates the exchange of relevant information between the project manager and stakeholders, leading to enhanced situational awareness. The project manager gains valuable insights and a comprehensive understanding of the project's context by involving stakeholders in decision-making processes and informing them about its progress (Erkul et al., 2020). These insights, in turn, help the project manager anticipate potential issues, identify emerging risks, and make informed decisions.

Project managers can identify and address stakeholder concerns and expectations early in the project lifecycle through effective stakeholder management. Regular communication and stakeholder collaboration enables the project manager to understand their needs, expectations, and potential conflicts (Ninan, 2019). By proactively managing stakeholder perceptions, the project manager can gain situational awareness regarding potential risks or issues arising from dissatisfaction or non-alignment (perceived or actual). Additionally, effective stakeholder management fosters positive stakeholder relationships, builds trust, and promotes collaboration. When stakeholders are actively engaged in the project, they are more likely to provide valuable input, offer support, and actively participate in project activities (Rajablu et al., 2015). This collaborative environment gives the project manager a broader understanding of the project's internal and external dynamics, enabling better situational awareness and informed decision-making.

H2. Political savvy positively moderates the relationship between effective stakeholder management and project management situational awareness, such that

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the relationship between effective stakeholder management and project

management situational awareness becomes stronger when political savvy is high.

Political savvy is defined as the project manager's ability to exhibit confidence and professional diplomacy while effectively relating to various stakeholders, which indicates political savvy in a project environment. Politically savvy project managers will navigate organizational constructs while effectively engaging stakeholders and managing their perceptions throughout the project lifecycle.

Socialization in organizational politics concerns individuals' success in gaining information regarding formal and informal work relationships and power structures (Louis, 1980). Effective stakeholder management and project management could be more efficient through a heightened awareness of which people are more knowledgeable and influential (Louis, 1980).

The interplay between power and politics has been a fundamental aspect of human history since the earliest civilizations. It is unsurprising to discover that the same phenomenon exists in the present day within the context of project management (Jeffrey Pinto, 1996). According to Frame (2002), political savvy is an ideal trait that project managers must possess. Project managers should understand what to do and what not to do. Successful project management largely depends on awareness and comprehension of the firm's organizational politics and, more importantly, how to employ them to the project's advantage (Helm & Remington, 2005). While most people dread corporate politics, it is evident that effective project managers are usually willing and able to employ appropriate political tactics to achieve their project objectives (Jeffrey Pinto, 1996). Project managers with high political savvy demonstrate an in-depth

understanding of the firm's interrelationships, roles, responsibilities, and functional teams (Cleland, 1995).

Strategy, influence, and timing contribute to demonstrating political savvy. Politically savvy project managers navigate complex stakeholder relationships with confidence and professional diplomacy. Project managers build strong relationships with stakeholders by understanding the political landscape and power dynamics within the project environment (Milosevic & Srivannaboon, 2006). In their published framework, Milosevic and Srivannaboon (2006) conclude that project management and business strategy alignment require a cohesive and structured relationship framework. Improved stakeholder relationship management enhances situational awareness by giving project managers insights into stakeholders' perspectives, interests, and potential influence on project outcomes.

Harnessing skillful political savvy enables project managers to navigate the organizational culture and dynamics. Project managers adapt their context-dependent judgment and situational ethics by understanding the informal networks, unwritten rules, and power structures (Cicmil, 2018). Heightened awareness of the organizational culture enhances situational awareness, allowing project managers to anticipate potential challenges, leverage support, and align project activities with the prevailing culture. Further, political savvy equips project managers with the skills to manage conflicts and negotiations within the project environment. By understanding special interests and potential conflicts, project managers can navigate stakeholder disagreements and find win-win solutions (Rouleau & Balogun, 2011). Skillful conflict management techniques

enhance situational awareness by enabling project managers to address underlying tensions and maintain positive working relationships among stakeholders.

Political savvy requires knowing how and when to engage others in pursuit of the desired project outcomes. It requires an in-depth understanding of organizational influence, authority, and diplomacy. Project managers must understand and interpret information from the project's operating environment, including stakeholders' input and perceptions. Project managers can enhance their situational awareness by actively involving stakeholders and effectively managing their perceptions. This enables them to understand the project's context better and make informed decisions during planning and execution. Therefore, they will attain increased situational awareness. For these reasons, it is hypothesized that Political savvy positively moderates the relationship between effective stakeholder management and project management situational awareness, such that the relationship between effective stakeholder management and project management situational awareness becomes stronger when political savvy is high.

H3. Effective triple constraint management has a positive impact on project managers' situational awareness.

Organizations typically charter projects to achieve business outcomes and improve performance. All projects have constrained scope, schedule, and cost (Van Wyngaard et al., 2012). These constraints may compete for resources and may result in conflict. Failure to balance project constraints can result in dire consequences for achieving the desired effects. Van Wyngaard et al. (2012) concluded that neglecting the natural tension of the triple constraints may lead to project failure even if all other project management activities are executed flawlessly.

One could argue that a project manager with accurate and timely knowledge of project activities (e.g., task completion, slippages, or delays) has more situational awareness than a project manager who has become out of touch from the same activities. Endsley (1995) developed a three-level situational awareness model (see Figure 1), in which level two states that comprehension of the current environment is a predecessor to predicting future events. Applying this situational awareness model to project management is relevant to balancing the triple constraints of scope, schedule, and cost because shifting one constraint will likely impact the others. For example, an increase in scope could cause a project to take longer to deliver or require additional resources (e.g., people, tools, materials, other costs, etc.) to complete the project.

Typically, firms undertake projects because they are a critical component of plans to meet business requirements and propel organizations to new performance levels. However, projects are constrained by competing priorities and competing demands within the project environment (Van Wyngaard et al., 2012). The triple constraints in project management are scope, schedule, and cost. Project managers balance these constraints with the knowledge and understanding that when a change occurs in one constraint, it affects the remaining two. Even if the project manager performs all other project tasks excellently, failure to manage these constraints accurately and effectively may be sufficient to condemn a project (Van Wyngaard et al., 2012). Highly competent project managers document scope, schedule, and cost baselines during the early project activities. Effective triple constraint management involves early identification of scope, schedule, and cost changes. Project managers gain a heightened situational awareness of potential risks, deviations, and opportunities by closely monitoring these elements and

promptly assessing the impacts of any changes. Having heightened situational awareness allows them to make informed decisions and take appropriate actions to maintain project alignment and success.

Triple constraint management provides project managers with accurate and up-to-date information about the project's scope, schedule, and costs (Van Wyngaard et al., 2012). This comprehensive knowledge enhances their situational awareness, enabling them to make well-informed decisions. By understanding the trade-offs between these constraints, project managers can effectively balance competing demands and optimize project outcomes (Armenia et al., 2019). Making triple constraints enables project managers to proactively identify and address potential risks associated with scope, schedule, and costs. By clearly understanding the interdependencies among these constraints, project managers can anticipate and mitigate risks promptly. This proactive risk management approach enhances the project manager's situational awareness by identifying and addressing potential issues before they escalate.

H4. Effective progress management has a positive impact on project managers' situational awareness.

Othman et al. (2018b) compiled research to explore project failure and the early warning signs. One of the primary findings articulates the need to identify the early warning signs of project failure preemptively. Given that tasks, deliverables, and milestones are incremental steps in project completion, planned versus actual comparisons help to forecast or predict timely completion or inform the project manager of alternate paths to completion to achieve the intended project outcome on time and within budget.

Project measurement categories of tasks, deliverables, and milestones indicate progress toward completion. Project managers document the initial task estimates within the baseline project schedule, including effort, duration, sequence, predecessors, dependencies, and ownership. Tasks, milestones, and deliverables are verified, stored, and retrievable upon completion. Effective progress management involves ongoing monitoring of project tasks against the baseline schedule.

Progress management enables project managers to compare actual progress against the baseline schedule, identifying variances and potential risks at an early stage. A project monitoring and control system aims to mitigate deviations from project plans. This system involves identifying and reporting the project's status, comparing it to the plan, analyzing any variations, and implementing corrective actions as necessary (Hazır, 2015). Project managers can detect trends, patterns, and deviations by monitoring and analyzing progress data. This early identification of variance and risks enhances their situational awareness, allowing them to promptly implement appropriate corrective measures and risk mitigation strategies. Project managers improve their situational awareness by comprehensively understanding progress and resource utilization and can make informed decisions regarding task prioritization, resource allocation, and project adjustments.

Often, project failures are attributed to bounded rationality or when project managers fail to recognize shifting dynamics and changes in project planning and execution. In addition to bounded rationality, the likelihood of failure increases when the project manager fails to control the project baseline through practical progress assessment and measurement (Cicmil, 1997). The utilization of Earned Value Project Management

(EVPM) is a proficient approach to managing the accuracy of cost and duration projections, including planned value for forecasting earned value and actual cost value (Chen et al., 2016). Predictive capabilities such as EVPM provide actionable insights and enhance the project manager's situational awareness. Increased situational awareness enables project managers to promptly identify deviations, delays, or bottlenecks and take appropriate actions to keep the project on track.

H5. Effective risk management has a positive impact on project managers' situational awareness.

Planning for issues and risks and monitoring and controlling them serve Project Managers in numerous ways. One is to avoid project delays, budget overruns, or project failure. (Alami, 2016) researched why Information Technology projects fail. In his research, Alami's second main point is that uncertainty, volatility, and unknowns can affect a project ecosystem and lead to project failure. Early risk identification and mitigation strategies and identification of triggers indicate high levels of situational awareness in project management.

Issue management deals with adverse effects occurring in a project. In contrast, a risk has a probability of occurrence or may become an issue should it be triggered (actually happen or arise). The project manager proactively identifies, monitors, mitigates, and resolves actual, perceived, and potential issues and risks throughout the project lifecycle. By implementing robust risk management processes, project managers identify risks early and often, assess their potential impacts, and develop appropriate mitigation strategies. Risk management enhances the project manager's situational

awareness by ensuring that potential risks are proactively monitored and managed, reducing the likelihood of negative impacts on project outcomes.

Effective risk management gives project managers a comprehensive understanding of project risks, enabling them to make informed decisions (Kutsch et al., 2021). By systematically identifying and assessing risks, project managers gain situational awareness of potential uncertainties and their impact on project objectives (Kutsch et al., 2021). Proactive risk management empowers project managers to make data-driven decisions, consider risk-reward trade-offs, and allocate resources effectively (Kutsch et al., 2021). Further, risk management facilitates stakeholder management and communication. By proactively identifying and managing risks, project managers can communicate potential risks and their implications to stakeholders (Pauna et al., 2021). Open and transparent communication fosters stakeholder awareness and alignment, enabling project managers to obtain valuable input and support (Pauna et al., 2021).

The typical discourse surrounding the risk management process centers on establishing an analytical structure and process that outlines the necessary steps undertaken during the project's life. The previous statement elucidates the characteristics and extent of the undertaking; however, it lacks substantive information regarding the implementation of proficient risk mitigation strategies in a pragmatic setting (Ward, 1999). Said differently, project managers may follow the risk management process perfectly, but if they are unaware of emerging issues and risk-triggering events, the project may become adversely impacted, and the mitigation strategies may be ineffective. To achieve successful project outcomes, project managers must enhance their situational

awareness by integrating stakeholder perspectives, ensuring that all relevant issues and risks are timely and transparent during decision-making.

H6. Effective influence management has a positive impact on project managers' situational awareness.

Baghizadeh et al. (2020) found that information systems development (ISD) projects fail at exceptionally high rates, and this issue has plagued the ISD discipline for many years. Their research proposes shifting the perception from project failure to 'ISD project distress.' Internal and external factors can impact project environments; therefore, project managers must exercise situational awareness to adapt to evolving circumstances.

Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is a practical framework for analyzing a project during the early start-up phases to identify internal and external influences to guide project planning activities. Strengths are internal assets, capabilities, expertise, or resources (i.e., technology, processes) to help meet or achieve project objectives and goals (Sabbaghi, 2004). Weaknesses are internal challenges that must be shored up, reduced, or eliminated in a specific period to achieve project goals and objectives (Sabbaghi, 2004). Opportunities are external circumstances, market conditions, or other realities that may be exploited during or after the project to improve organizational performance (Sabbaghi, 2004). Threats are external circumstances, market conditions, or other realities that may hinder or prohibit successful project outcomes (Sabbaghi, 2004).

External project management influences originate from diverse sources, including the firm's direct/indirect competitors, customers, and clients. Economic, geopolitical, and social conditions may initiate additional external influences. Internal and external factors

influencing or threatening the project's overall health, existence, or individual task completion are monitored and controlled throughout the project lifecycle. Political risks brought on by government and power groups' involvement impact the project's timely completion (Nasirzadeh et al., 2016).

Effective influence management involves actively managing internal project management influences, such as intercompany conditions, people, and organizational structures (Meredith & Zwikael, 2020). Project managers enhance their situational awareness by fostering open and transparent communication channels within the organization. Open and transparent communication channels improve the multidirectional flow of relevant information, facilitating timely decision-making and proactive responses to emerging situations. Further, influence management involves understanding and addressing the needs and expectations of various organizational stakeholders.

By actively managing these internal project management influences, project managers can increase the frequency and quality of effective stakeholder management (Rabechini, 2022). Enhanced Stakeholder management enables project managers to navigate internal complexities, build consensus, and align project activities with organizational goals. Bourne (2008) posits that project stakeholders' perceptions of the project are directly related to [project] success and failure. Additionally, project managers must be capable and willing to navigate perceptions within the context of organizational politics (Bourne, 2008). Therefore, frequent stakeholder management and considering stakeholder perspectives are essential to diagnosing internal dynamics, concerns, and preferences, ultimately enhancing the project manager's situational awareness.

Lastly, influence management enhances optimal resource allocation. Project

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understanding the dynamic interplay between complex internal factors, such as

organizational structures and systems (Hanisch, 2011). Optimal resource allocation

enhances situational awareness by ensuring effective and efficient resource allocation,

reducing bottlenecks, and maximizing project performance.

Summary of Theoretical Constructs

Variable	Definition	Literature
Stakeholder Engagement	Stakeholders are engaged proactively and receive information promptly. The project manager builds consensus and stakeholder unification effectively.	Erkul et al. (2020); Ninan (2019); Rajablu et al. (2015)
Triple Constraint Management	Throughout the project lifecycle, scope, schedule, and costs are controlled. Changes are identified early, and the impacts are clearly articulated, socialized, and approved.	Van Wyngaard et al. (2012); Armenia et al. (2019)
Progress Management	Incremental project tasks are assessed against the baseline project schedule throughout the project life cycle.	Hazır (2015); Cicmil (1997) Chen et al. (2016)
Risk Management	The project manager manages issues and risks throughout the project lifecycle to avoid failure.	Kutsch et al. (2021); Pauna et al. (2021); Ward (1999)
Influence Management	Common internal project management influences include intercompany conditions, events, factors, people, organizational structures, and systems generally under the firm's direct control.	Nasirzadeh et al. (2016); Meredith & Zwikael (2020); Rabechini (2022); Bourne (2008); Hanisch (2011)
Political Savvy	The project manager can exhibit confidence and professional diplomacy while effectively relating to various stakeholders.	Pinto (1996); Helm & Remington (2005); Cleland (1995); Milosevic &

Variable	Definition	Literature
		Srivannaboon (2006); Cicmil (2018); Rouleau & Balogun, (2011)
Project Management Situational Awareness	The project manager's perception of environmental elements and events concerning a project, the comprehension of their meaning, and the projection of their future impact on the project.	Endsley (1995)

Table 3: Summary of Theoretical Constructs

III. RESEARCH METHODOLOGY

The primary goal of this section is to describe the research methodology and design methods employed to investigate and substantiate the conceptual research model and hypotheses. A concise summary of the research design is presented, followed by a summary of the research instruments, and an overview of the measurement scales and their associated meanings is provided.

Research Design

Situational awareness is the perception of environmental elements and events concerning a project, the comprehension of their meaning, and the projection of their future impact on the project. This study aims to validate the independent variables and moderators identified in the research model and their positive effect on a project manager's situational awareness in a project environment (dependent variable). The goal is to contribute to scholarly literature to attribute situational awareness to the behaviors

that enable the intended project benefits and outcomes. The unit of analysis is situational awareness in project management. The unit of observation is the project manager.

Instruments

The principal tool for gathering respondent data is an online survey deployed using Qualtrics. Qualtrics is a widely used web-based survey platform that facilitates the creation, dissemination, collection, and evaluation of online surveys. The subject data collected and analyzed from Qualtrics was processed using various statistical software tools, including Microsoft Excel, IBM's SPSS v26, and RStudio. The researcher will use Excel to facilitate his data review and cleanse the imported data from Qualtrics. Descriptive statistics, frequencies, exploratory factor, and reliability analyses will be conducted using SPSS. Structural equation modeling (SEM) and confirmatory factor analysis will be performed using RStudio.

Measurement Scales

Extensive literature reviews and academic research were conducted to identify valid quantitative measurement scales. The researcher adapted measurement scales for three factors from extant literature: Situational Awareness, Stakeholder Management, and Political Savvy. The researcher used their assigned 5-point or 7-point Likert scale for the three aforementioned variables without any modification or harmonization. Situational Awareness and Political Savvy retained their 7-point Likert scales. Stakeholder Management retained its 5-point Likert scale. The researcher created Triple Constraint Management, Progress Management, Risk Management, and Influence Management using a 7-point Likert scale. By deploying 5-point or 7-point Likert scales, the researcher

enables the survey respondents to indicate their levels of agreement or disagreement with each question.

The measurement scales described below were developed based on the previous hypotheses in this dissertation. After receiving approval from FIU's Institutional Review Board (IRB), a Qualtrics survey was disseminated online to project management professionals and subject matter experts. The researcher sourced respondents from the Project Management Institute's (PMI) local chapters (groups) on LinkedIn. An anonymous link to participate in the study and the IRB's online consent form will be included. Participation in the survey was entirely voluntary, and the researcher did not offer any compensation. The following measurements were included in the design of the final quantitative survey:

Variable	Measurement Scale
Stakeholder Management	• In our company, ideas and concepts are communicated cross-departmentally. • Our management emphasizes cross-departmental support to solve problems. • In our company, there is a quick information flow, e.g., if a unit/employee obtains important information, it will be communicated promptly to others. • Our management demands periodical cross-departmental meetings to interchange new ideas, problems, and achievements.
Political Savvy	• I am able to make most people feel comfortable and at ease around me. • I am good at getting others to respond positively to me. • I find it easy to envision myself in the position of others. • I understand people well. • I usually try to find common ground with others. • It is easy for me to develop a good rapport with most people.

Variable	Measurement Scale
Triple Constraint Management	• The project scope was managed throughout the project. • The project schedule was managed throughout the project. • The project costs were managed throughout the project. • The impact of project changes was clearly articulated. • Project changes were formally approved.
Progress Management	• The project schedule was baselined at the onset of the project. • Completed project tasks were assessed against the baseline project schedule throughout the project's life cycle. • Completed project tasks were verified upon completion. • Project deliverables were retrievable upon the project's completion.
Risk Management	• Technical-operative risks were managed (e.g., technology selection, risks related to materials and equipment, risks related to change requests and its implementation, design risks, etc.). • Organizational risks related to human factors were managed (e.g., organizational, individual, project team, or risks derived from regulations, policies, behavior, lack of coordination, integration, human mistakes related to lack of knowledge, etc.). • Contract risks were managed (i.e., risks of the contract related to the project). • Financial risks were managed (e.g., inflation, interest rate fluctuation, exchange rate fluctuation, etc.). • Political risks were managed (e.g., environmental authorizations, governmental authorizations, etc.).
Influence Management	• The project's internal strengths were managed throughout the project. • The project's internal weaknesses were managed throughout the project. • The project's external opportunities were managed throughout the project. • The project's external threats were managed throughout the project.
Project Management Situational Awareness Measurement	*Reflecting on the last project that I managed, I understood the…* • Instability of situation, or the likeliness of situation to change suddenly. • Variability of situation, or the number of variables that require your attention. • The situation's complexity or the degree of complication

Variable	Measurement Scale
	(number of closely connected parts) of the situation. • Arousal, or the degree to which you are ready for activity; the ability to anticipate and keep up with the flow of events. • Spare mental capacity, or the amount of mental (cognitive) ability available to apply to new tasks. • Concentration, or the degree to which your thoughts are brought to bear on the situation; the degree to which you focus on important elements and events. • Division of attention, or the ability to divide your attention among several key issues during the mission [project]; the ability to simultaneously concern yourself with many aspects of current and future events. • Information quantity or the amount of knowledge received and understood. • Information quality or the degree of goodness or value of knowledge communicated. • Familiarity or the degree of acquaintance with the situation.

Table 4: Summary of Measurement Scales

Stakeholder Management Measurement Scale

Linking stakeholder engagement to profitability through sustainability-oriented innovation: A quantitative study of the minerals industry (Ghassim & Bogers, 2019). This qualitative measurement instrument was initially published and validated as a 5-point Likert scale. The researcher eliminated two survey questions related to external knowledge because they did not align with stakeholder management in project management research.

For each item, the project manager (respondent) indicates the extent to which the contents of the statement correspond/do not correspond to what transpired in the project (1 strongly disagrees and 5 fully agrees):

- In our company, ideas and concepts are communicated cross-
  departmentally.

- Our management emphasizes cross-departmental support to solve
  problems.

- In our company, there is a quick information flow, e.g., if a unit/employee
  obtains important information, it will be communicated promptly to
  others.

- Our management demands periodical cross-departmental meetings to
  interchange new ideas, problems, and achievements.

Political Savvy Measurement Scale

Development and Validation of the Political Skill Inventory (Ferris, 1999). This
qualitative measurement instrument was initially published and validated as a 7-point
Likert scale. For each item, the survey respondent (project manager) indicates the extent
to which the contents of the statement correspond or do not correspond to what transpired
in the project where strongly disagrees is 1 and strongly agrees is 7:

- I am able to make most people feel comfortable and at ease around me

- I am good at getting others to respond positively to me

- I find it easy to envision myself in the position of others

- I understand people well

- I usually try to find common ground with others

- It is easy for me to develop a good rapport with most people

Triple Constraint Measurement Scale

Exploratory Factor Analysis from Joseph Archer's DBA Summer Research Project. This qualitative measurement instrument was initially published and validated as part of the researcher's final qualification examination (DBA year 1 Summer Research Project). This qualitative measurement instrument was validated as a 7-point Likert scale. For each item, the survey respondent (project manager) indicates the extent to which the contents of the statement correspond or do not correspond to what transpired in the project where strongly disagree is 1 and strongly agree is 7:

- The project scope was managed throughout the project.

- The project schedule was managed throughout the project.

- The project costs were managed throughout the project.

- The impact of project changes was clearly articulated.

- Project changes were formally approved.

Progress Management Measurement Scale

Exploratory Factor Analysis from Joseph Archer's DBA Summer Research Project. This qualitative measurement instrument was initially published and validated as part of the researcher's final qualification examination (DBA year 1 Summer Research Project). This qualitative measurement instrument was validated as a 7-point Likert scale. For each item, the survey respondent (project manager) indicates the extent to which the

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contents of the statement correspond or do not correspond to what transpired in the project where strongly disagree is 1 and strongly agree is 7:

Proposed revisions for final dissertation (pilot with project management SMEs):

- The project schedule was baselined at the onset of the project.

- Completed project tasks were assessed against the baseline project schedule throughout the project's life cycle.

- Completed project tasks were verified upon completion.

- Project deliverables were retrievable upon the project's completion.

Risk Management Measurement Scale

Exploratory Factor Analysis from Joseph Archer's DBA Summer Research Project. This qualitative measurement instrument was initially published and validated as part of the researcher's final qualification examination (DBA year 1 Summer Research Project). This qualitative measurement instrument was validated as a 7-point Likert scale. For each item, the survey respondent (project manager) indicates the extent to which the contents of the statement correspond or do not correspond to what transpired in the project where strongly disagree is 1 and strongly agree is 7:

Proposed revisions for final dissertation (pilot with project management SMEs):

- Technical-operative risks were managed (e.g., technology selection, risks related to materials and equipment, risks related to change requests and its implementation, design risks, etc.).

- Organizational risks related to human factors were managed (e.g., organizational, individual, project team, or risks derived from regulations, policies, behavior, lack of coordination, integration, human mistakes related to lack of knowledge, etc.).

- Contract risks were managed (i.e., risks of the contract related to the project).

- Financial risks were managed (e.g., inflation, interest rates fluctuation, exchange rate fluctuation, etc.).

- Political risks were managed (e.g., environmental authorizations, governmental authorizations, etc.).

Influence Management Measurement Scale

Exploratory Factor Analysis from Joseph Archer's DBA Summer Research Project. This qualitative measurement instrument was initially published and validated as part of the researcher's final qualification examination (DBA year 1 Summer Research Project). This qualitative measurement instrument was validated as a 7-point Likert scale. For each item, the survey respondent (project manager) indicates the extent to which the contents of the statement correspond or do not correspond to what transpired in the project where strongly disagree is 1 and strongly agree is 7:

- The project's internal strengths were managed throughout the project.

- The project's internal weaknesses were managed throughout the project.

- The project's external opportunities were managed throughout the project.

- The project's external threats were managed throughout the project.

Project Management Situational Awareness Measurement Scale

The Situation Awareness Rating Technique (SART) is a multidimensional scale for pilots to report their perceived Situational Awareness (SA). SART uses ten dimensions to measure operator SA. SART is typically administered after each mission and involves the participant rating each dimension on a seven-point scale (1 = low, 7 = high) to gain a subjective measure of SA (Salmon et al., 2006). SART was developed as an evaluation tool for designing aircrew systems (Taylor, 1994) and assessed three components of SA: understanding, supply, and demand. These components are subcategories that contain the following ten dimensions:

- Familiarity with the situation

- Focusing of attention

- Information quantity

- Information quality

- Instability of the situation

- Concentration of attention

- The complexity of the situation

- Variability of the situation

- Arousal

- Spare mental capacity

Taylor (1994) proposed that SA depends on the pilot's understanding (U) (e.g., quality of information they receive) and the difference between the demand (D) on the pilot's resources (e.g., the complexity of mission) and the pilot's supply (S) (e.g., ability to concentrate). When D exceeds S, there is a negative effect on U and an overall reduction of SA. The formula $SA = U - (D - S)$ derives the overall SART score. The SART is one of the most thoroughly tested rating scales for estimating SA (Endsley, 2000).

Definitions of SART Dimensions

Component	Category	Dimension
Demand	Instability of situation	The likeliness of the situation changing suddenly
Demand	Variability of situation	Number of variables that require your attention
Demand	Complexity of situation	Degree of complication (number of closely connected parts) of the situation
Supply	Arousal	The degree to which you are ready for activity; ability to anticipate and keep up with the flow of events
Supply	Spare mental capacity	Amount of cognitive ability available to apply to new tasks
Supply	Concentration	The degree to which thoughts impact the situation; the degree to which you focus on essential elements and events

Component	Category	Dimension
Supply	Division of attention	Ability to divide your attention among several key issues during the mission; ability to concern yourself with many aspects of current and future events simultaneously
Understanding	Information quantity	Amount of knowledge received and understood
Understanding	Information quality	Degree of goodness or value of knowledge communicated
Understanding	Familiarity	Degree of acquaintance with the situation

Table 5: Definition of SART Dimensions

Dr. Mica Endsley's second book, *Situation Awareness Analysis and Measurement (2000),* provided insight into situational awareness measurement scales. However, Dr. Endsley's research (and several other scholars) solely focuses on military aircraft pilots. There is a gap in the academic literature on situational awareness applied to project management. The researcher has adapted the Situation Awareness Rating Technique (SART) with slight modifications to the survey questions by changing the term "fighter jet pilot" to "project manager" to support the validity of his research model.

For each item, the survey respondent (project manager) indicates the extent to which the contents of the statement correspond/do not correspond to what transpired in the project using a 7-point Likert scale where strongly disagree is 1 and strongly agree is 7:

Reflecting on the last project that I managed, I understood the…

- Instability of situation, or the likeliness of situation to change suddenly.

- Variability of situation, or the number of variables that require your attention.

- The situation's complexity or the degree of complication (number of closely connected parts) of the situation.

- Arousal, or the degree to which you are ready for activity; the ability to anticipate and keep up with the flow of events.

- Spare mental capacity, or the amount of mental (cognitive) ability available to apply to new tasks.

- Concentration, or the degree to which your thoughts are brought to bear on the situation; the degree to which you focus on important elements and events.

- Division of attention, or the ability to divide your attention among several key issues during the mission [project]; the ability to simultaneously concern yourself with many aspects of current and future events.

- Information quantity or the amount of knowledge received and understood.

- Information quality or the degree of goodness or value of knowledge communicated.

- Familiarity or the degree of acquaintance with the situation.

Control Variables

The informed pilot and the final research survey had controlling variables, including age, gender, years of project management experience, education and training, professional certifications, project type, and scope and complexity.

Project Scope and Complexity

According to (Baccarini, 1996), project characteristics play a critical role in identifying the managerial actions necessary for successful project completion. Projects with many interrelated parts are considered complex (Baccarini, 1996). As project complexity increases, managerial coordination and efforts increase (Baccarini, 1996). Managerial tactics that facilitate project execution for projects with lower levels of complexity do not have the same effect on complex projects (Baccarini, 1996). Therefore, complexity is an essential project characteristic that guides managerial actions (Baccarini, 1996).

Project Complexity Measurement Scale

Crawford–Ishikura Factor Table for Evaluating Roles (CIFTER) (Dao et al., 2017)

In 2007, the Global Alliance for Project Performance Standards (GAPPS) developed a measurement scale called the Crawford–Ishikura Factor Table for Evaluating Roles (CIFTER). The CIFTER provides a quantitative seven-factor assessment model to measure project management complexity (Dao et al., 2017). To control project

complexity, a subset of CIFTER survey questions will be used for this research study, precisely three of the five questions most relevant to the conceptual research model depicted in Table 3.

For each item, the project manager (respondent) indicates the extent to which the contents of the statement correspond/do not correspond to what transpired in the project using a 4-point Likert scale of (1) Low; (2) Moderate; (3) High; (4) Very high. The total CIFTER score is used to categorize each project as either Global Level 1 (scores 12 to 18), Global Level 2 (scores 19 or more), or neither (scores less than 12):

- The magnitude of legal, social, or environmental implications of performing the project

- The strategic importance of the project to the organization or the organizations involved

- Number and variety of interfaces between the project and other organizational entities

Participants and Procedure

Population of Interest

The research will focus on project managers with varying years of experience, backgrounds, education, training, and industries. Ideal survey respondents are project managers from well-defined areas of functional expertise in technical and non-technical (e.g., business-related and research) and construction. The researcher will source survey participants from LinkedIn, primarily from the Project Management Institute's (PMI) local chapters in large metropolitan areas.

Target Sample Size

The target sample size is approximately 300 to 700 survey responses collected through an online Qualtrics survey of no more than 39 questions to satisfy the subject research requirements. A quick check of the PMI WDC and Miami membership statistics confirms a robust membership of more than twelve thousand active members. Total membership, including PMI chapter members inside and outside the LinkedIn groups, is estimated at fifteen thousand.

Subject Recruitment

Following FIU's Institutional Review Board's (IRB) unconditional approval, the researcher recruited participants for the informed pilot from his professional network of project management experts in business and academia. Upon completion of the informed pilot, the researcher recruited blind study and final study participants from various project management groups exclusively on LinkedIn who identify as experienced project managers. Recruitment verbiage, IRB disclosure, and informed pilot instructions are available in the Appendix section of this document.

Data Collection

While the pilot and final studies were active, the researcher engaged the academic and membership contact points at each PMI chapter to drive awareness and interest in the research. A six-week communication strategy was executed to target respondents using a progressive series of electronic mail communications. Initial messages engaged participants in raising awareness about the intended research and requested their participation. A series of weekly reminders to complete the survey increased response rates.

Response Rate

The realistic goal is to achieve a survey response rate between 2.5% and 5.8% from approximately twelve thousand members, equating to roughly 300 to 700 actual responses collected.

Nonresponse Bias

Given the large sample size, nonresponse bias was unlikely to impact the survey results. Wave-testing methods were performed against early and late variables to analyze those responses for comparison purposes using an independent sample t-test (Rogelberg & Stanton, 2007). Responses from the blind pilot were analyzed and compared at numerous survey points, concluding that the responses did not vary significantly. In that case, the researcher will further explore the data.

Threats to Experiment Validity

The researcher conducted tests to identify and measure threats to experiment validity. Experiment validity refers to the extent to which a study accurately measures what it intends to measure. There are several types of threats to experiment validity, and they can be identified and measured through various methods. Here's how to go about it: Internal validity refers to whether their covariation resulted from a causal relationship (experimental treatment, history, maturation, attrition). Statistical conclusion validity refers to the appropriate use of statistics to infer whether the presumed independent and dependent variables covary (cases producing chance or lack of statistical power). Construct validity refers to whether inferences can be generalized to higher-order constructs that represent sampling procedures in a study (definition, measures, and treatments don't reflect theory). External validity - refers to whether inferences of causal

relationships hold over variations in persons, settings, treatment, and measurement variables (sample findings don't generalize to the intended population).

The research took a systematic approach to identify and address potential threats to validity to enhance the robustness of the study's findings. The researcher employed rigorous control measures to address threats to internal validity. Pre- and post-testing, combined with utilizing control groups, minimized the influence of history, maturation, and testing effects. The research design incorporated counterbalancing and alternated testing items to mitigate instrumentation effects. Concerning external validity, a sampling strategy was adopted to ensure that the selected participants represented the broader target population, enhancing the study's generalizability. Construct validity threats were systematically managed through comprehensive testing of measurement instruments, expert reviews, and the execution of pilot studies. In addressing potential conclusion validity threats, the researcher implemented random assignment and effect size calculations to mitigate selection bias. Additionally, regression patterns were carefully examined, lending further robustness to the study's conclusions. These measures collectively demonstrate the commitment to preserving this research's integrity and ensuring its outcomes' validity.

IV. PILOT STUDIES

Following the successful dissertation proposal defense, the researcher conducted two pilot studies: an informed pilot was proceeded by a blind pilot study. The researcher has provided details of both pilot studies below.

Informed Pilot

The researcher conducted an informed pilot test of the initial survey with ten participants over two weeks. The purpose of the informed pilot was to assess the feasibility of the broader study. The informed pilot participants received a brief overview of the research with requisite context. The researcher subsequently tasked participants with completing an online Qualtrics survey. Each page (section) of the online survey had a feedback section for the respondent's input.

Informed Pilot Results

On average, the informed pilot survey completion time was approximately twenty-one minutes. The participant's ages ranged from thirty years old to fifty-four years old. There were five female and four male participants (one declined to provide their gender). In terms of education, nine out of ten participants reported holding a college degree; seven had a master's degree, two had a bachelor's degree, and one preferred not to say. Five of the ten informed pilot participants are Project Management Professionals (PMP) certified by the Project Management Institute (PMI).

The pilot survey feedback received was largely positive and supportive. Minimal action was required to revise (or improve) the content of the informed pilot survey. There was one resonating feedback note - several participants highlighted a single opportunity to clarify the jet-fighter pilot "arousal" terminology. This language was inherent in the

Situation Awareness Review Technique (SART) measurement scale. To address this thematic feedback, "engagement" was placed in parentheses next to "arousal" in the subsequent surveys to signify the intent to measure project manager engagement.

The researcher made an evidence-based decision to replace the risk management measurement scale after closing out the informed pilot. Barki et al.'s *Integrative Contingency Model of Software Project Risk Management* (2001) was partially adopted (not wholly), causing it to become disconnected from the purpose of this study, which is to validate the factors contributing to project manager situational awareness. As you can see below, when taken out of the full context of the study, Barki et al.'s risk management questions were misaligned:

- The project team met frequently.

- Project team members were kept informed about major decisions concerning the project.

- Every effort was made to keep project team turnover at a minimum.

- Project team members actively participated in the definition of project goals and schedules.

Instead, the researcher replaced Barki et al.'s scale with the researcher's self-created project risk management measurement scale. This newly created scale is aligned with the extant literature and further validated by the researcher's twenty-plus years as a project management practitioner-scholar. The researcher will seek to validate this measurement scale during the blind pilot. The researcher has provided the revised project risk management measurement scale below for quick comparison.

- Technical-operative risks were managed (e.g., technology selection, risks related to materials and equipment, risks related to change requests and its implementation, design risks, etc.).

- Organizational risks related to human factors were managed (e.g., organizational, individual, project team, or risks derived from regulations, policies, behavior, lack of coordination, integration, human mistakes related to lack of knowledge, etc.).

- Contract risks were managed (i.e., risks of the contract related to the project).

- Financial risks were managed (e.g., inflation, interest rates fluctuation, exchange rate fluctuation, etc.).

- Political risks were managed (e.g., environmental authorizations, governmental authorizations, etc.).

Blind Pilot

Following the informed pilot, the researcher conducted a blind pilot study using Qualtrics online survey software. Participation in the survey was entirely voluntary, and the researcher did not offer any compensation. The researcher sourced 202 project management respondents from LinkedIn, the premier social media and professional networking website. According to Comrey and Lee (2013), attaining 200 survey responses represents a fair sampling size for a blind pilot study. Given the sampling approach, 202 participants were deemed sufficient for the blind pilot study.

The blind pilot survey data was exported from Qualtrics (all fields) into IBM's SPSS software for further analysis. The researcher completed a series of data-cleansing steps. Of the 202 total responses (cases in SPSS), the researcher removed 72 cases due to incomplete survey submissions and speeding.

Blind Pilot Results

After the researcher completed the data cleansing actions described previously, 136 valid cases remained. Among the 136 valid cases, 73 (52.5%) were male, 65 (46.8%) were female, and 1 (0.7%) preferred not to answer. The largest segment of participants (68.4%) were between the ages of 35 and 54. From a higher education perspective, 27.3% reported having a Bachelor's degree, 53.2% reported having a Graduate degree, and 7.2% reported having a Doctoral degree. Over half (53.2%) of the participants are Project Management Professional (PMP) certification holders. The predominant number of years of project management experience (24.5%) ranged from 7-10 years, followed by 11-15 years at 19.4%. When comparing the project types, 78.4% of the respondents aligned to functional areas within IT, Business, or Research projects unrelated to Construction. Most participants (25.9%) recently managed projects under $250K, while 18.0% recently managed projects between $500K-$1M, followed by 15.8% under $5M. And lastly, 56.8% of the participants reside in the United States of America.

Characteristics		Frequency	% of Population
Gender	Male	73	52.5
	Female	65	46.8
	I prefer not to say	1	0.7
Age	18-24 years old	2	1.4
	25-34 years old	13	9.4
	35-44 years old	45	32.4

Characteristics		Frequency	% of Population
	45-54 years old	15	36.0
	55-64 years old	18	12.9
	65-74 years old	10	7.2
	Greater than 75 years old	1	0.7
Education	Some high school or less	2	1.4
	High school diploma or GED	4	2.9
	Some college but no degree	5	3.6
	Associate's or technical degree	5	3.6
	Bachelor's degree	38	27.3
	Master's degree	74	53.2
	Doctoral degree	10	7.2
	Prefer not to say	1	0.7
PMP certification	No	65	46.8
	Yes	74	53.2
Years of project management experience	Less than 1 year	5	3.6
	1-3 years	9	6.5
	4-6 years	18	12.9
	7-10 years	34	24.5
	11-15 years	27	19.4
	16-20 years	19	13.7
	21-25 years	18	12.9
	Greater than 25 years	9	6.5
Most recent project type	Information Technology (IT)	42	30.2
	Business, Management, or Research	36	25.9
	Combination IT and non-IT	31	22.3
	Construction	17	12.2
	Other	13	9.4
Dollar value of the most recent project	$0-$250K	36	25.9
	$250K-$500K	17	12.2
	$500K-$1M	25	18.0
	$1M-$5M	22	15.8
	$5M-$10M	11	7.9
	$10M-$25M	10	7.2
	$25M-$50M	3	2.2
	$50M-$100M	4	2.9
	$100-$250M	2	1.4
	$250M-$500M	3	2.2
	$500M-$750M	1	0.7
	$750-$1B	3	2.2
	Greater than $1B	2	1.4
Country	United States of America	79	56.8

Characteristics		Frequency	% of Population
	Other	60	43.2

Table 6: Blind Pilot Descriptive Statistics (Demographic Data)

The researcher has presented the descriptive details and reliability scores for all items utilized in the blind pilot study and their construct-level reliability in Figures 3 – 11 and Table 3 (below). Overall, these outcomes suggest that the measurement tool employed in the pilot study was reliable and exhibited satisfactory construct validity.

The blind pilot study revealed a factor structure that effectively gauges the seven primary factors: Situational Awareness (SIT), Stakeholder Management (SM), Political Savvy (POL), Triple Constraint Management (TCM), Progress Management (PGM), Risk Management (RSK), and Influence Management (INF). Detailed statistics for the blind pilot data are outlined in Table 4 below, featuring the item identifiers, means, standard deviations, number of responses, and alpha scores for each measurement scale.

Construct Name and Reference	Item Code	Mean	Std. Deviation	Number of Responses	Alpha
Situational Awareness in Project Management SART, Taylor (1994)	SIT_1	28.99	1.115	136	.860
	SIT_2	27.71	1.096		
	SIT_3	27.78	1.191		
	SIT_4	28.04	1.039		
	SIT_5	27.34	1.357		
	SIT_6	27.76	1.056		
	SIT_7	27.85	1.173		
	SIT_8	27.85	.950		
	SIT_9	15.86	1.097		
	SIT_10	28.01	.856		
Stakeholder Management	STK_11	20.99	1.109	136	.787
	STK_12	21.12	1.082		

Construct Name and Reference	Item Code	Mean	Std. Deviation	Number of Responses	Alpha
Ghassim & Bogers (2019)	STK_13	20.67	1.199		
	STK_14	20.82	1.264		
Political Savvy Ferris (1999)	POL_16	28.01	1.092	136	.897
	POL_17	27.97	1.095		
	POL_18	27.88	1.036		
	POL_19	27.82	1.046		
	POL_20	28.29	0.928		
	POL_21	28.10	1.063		
Triple Constraint Management Archer (2023)	TCM_22	27.72	1.370	136	.862
	TCM_23	27.53	1.445		
	TCM_24	27.37	1.646		
	TCM_25	27.65	1.353		
	TCM_26	27.49	1.682		
Progress Management Archer (2023)	PGM_27	27.51	1.582	136	.743
	PGM_28	27.18	1.588		
	PGM_29	27.96	1.164		
	PGM_30	28.12	1.040		
Risk Management Archer (2023)	RSK_31	39.59	1.220	136	.851
	RSK_32	39.26	1.583		
	RSK_33	39.47	1.490		
	RSK_34	39.19	1.653		
	RSK_35	15.03	1.582		
Influence Management Archer (2023)	INF_36	18.44	1.216	136	.891
	INF_37	27.20	1.392		
	INF_38	27.29	1.288		
	INF_39	27.05	1.574		

Table 7: Blind Pilot Construct Reliability

Table 5 below is a pattern matrix from an extraction method using Principal Component Analysis (PCA) to which an oblique rotation method (Oblimin with Kaiser Normalization) was applied. The fact that the rotation converged in thirteen iterations indicates that the rotation process successfully found a stable solution for interpreting the relationships between variables and components. The researcher generated this pattern

matrix using SPSS to identify and confirm underlying patterns or latent variables within

the blind pilot dataset. The rotation helps to simplify and interpret these patterns visually.

The pattern matrix shows the loadings of observed variables (indicated by the labels like

TCM_24, POL_17, INF_36, etc.) on the extracted components (1 through 7). Each row's

load represents the correlation between the observed variables and the components.

Loadings closer to 1 or -1 (regardless of sign) suggest a strong association between the

variable and the component, while loadings closer to 0 indicate a weak association.

Variables with higher loadings on a component are more strongly related to that

component, suggesting that they contribute more to its definition (discriminate validity).

	BLIND STUDY PATTERN MATRIX						
	1	2	3	4	5	6	7
TCM_24	.711						
TCM_23	.690						
TCM_22	.675						
TCM_25	.421						
POL_17		.831					
POL_21		.829					
POL_16		.819					
POL_19		.811					
POL_20		.783					
POL_18		.559					
INF_36			.844				
INF_37			.833				
INF_38			.826				
INF_39			.673				
PGM_27				.864			
PGM_28				.845			
STK_14					.788		
STK_12					.749		
STK_11					.609		
STK_13					.514		
SIT_03						.825	
SIT_01						.744	
SIT_02						.641	
SIT_08						.421	

	BLIND STUDY PATTERN MATRIX						
	1	2	3	4	5	6	7
RSK_33							-.792
RSK_31							-.703
RSK_34							-.642
RSK_32							-.545
RSK_35							-.510

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 13 iterations.

 Note:

- SIT = Project Manager Situational Awareness
- RSK = Risk Management
- STK = Stakeholder Management
- PGM = Program Management
- INF = Influence Management
- TCM = Triple Constraint Management
- CPX = Complexity
- POL = Political Savvy
- INT = Moderating interaction between STK and POL
- EXP = Years of project management experience

Table 8: Blind Study Pattern Matrix: Blind Study Pattern Matrix

The researcher has interpreted the pattern matrix using the results from the

provided loadings:

- **Triple Constraint Management**, or TCM, represents component 1 and is

  associated with survey questions TCM_24 (.711), TCM_23 (,690),

  TCM_22 (.675), and TCM_25 (.421). These variables are positively

  related to each other within this component, indicating high levels of

  discriminate validity.

- **Political Savvy**, or POL, represents component 2 and is associated with variables POL_17 (.831), POL_21 (.829), POL_16 (.819), POL_19 (.811), POL_20 (.783), and POL_18 (.559). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Influence Management**, or INF, represents component 3 and is associated with variables INF_36 (.844), INF37 (.833), INF_38 (.826), and INF_39 (.673). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Progress Management**, or PGM, represents component 4 and is associated with variables PGM_27 (.864) and PGM_28 (.845). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Stakeholder Management**, or STK, represents component 5 and is associated with variables STK_14 (.788), STK_12 (.749), STK_11 (.609), and STK_13 (.514). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Situational Awareness**, or SIT, represents component 6 and is associated with variables SIT_03 (.825), SIT_01 (.744), SIT_02 (.641), and SIT_08 (.421). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Risk Management**, or RSK, represents component 7 and is associated with variables RSK_33 (.792), RSK_31 (.703), RSK_34 (.642), RSK_32 (.545), and RSK_35 (.510). These variables have negative loadings on all components, suggesting an inverse relationship between these variables and the corresponding elements. The RSK variables are strongly correlated to each other within this component, indicating high levels of discriminate validity.

V. FINAL STUDY

Following the blind study, the researcher conducted the final study using Qualtrics online survey software. Participation in the survey was entirely voluntary, and the researcher did not offer any compensation. The researcher sourced 569 project management respondents from LinkedIn, the premier social media and professional networking website. According to Comrey and Lee (2013), attaining 500 survey responses represents a very good sampling size for a final study. Given the sampling approach, 569 participants were deemed sufficient for the final study.

The final survey data was exported from Qualtrics (all fields) into IBM's SPSS software for further analysis. Given the online format of the pilot and final research studies, the researcher analyzed response quality as part of the actions performed during the data cleansing phase immediately following the survey closeout. The researcher evaluated response quality to identify those respondents whose contributions may provide inaccurate information due to speeding and straightlining. Lastly, the researcher completed a series of data-cleansing steps. Of the 569 total responses (cases in SPSS), the researcher removed 123 cases due to incomplete survey submissions and speeding.

Data analysis

Descriptive Analytics and Frequencies

After the researcher completed the data cleansing actions described previously, 446 valid cases remained. According to Comrey and Lee (2013), 446 valid cases represent a good-verygood sample size. Among the 446 valid cases, 286 (64.1%) were male, 152 (34.1%) were female, and 8 (1.8%) preferred not to answer. The largest segment of participants (61.4%) were between 45 and 64. From a higher education

perspective, 25.8% reported having a Bachelor's degree, 58.3% reported having a

Graduate degree, and 9.6% reported having a Doctoral degree. More than two-thirds

(69.7%) of the participants are Project Management Professional (PMP) certification

holders. The predominant number of years of project management experience (24.5%)

ranged from 11-15 years at 21.5%, followed by 19.1% having greater than 25 years of

project management experience. When comparing the project types, 78.7% of the

respondents aligned to functional areas within IT, Business, or Research projects

unrelated to Construction. Most participants (20.2%) recently managed projects under

$250K, while nearly two-thirds (65.1%) recently managed under $5M. Lastly, three-

quarters (74.2%) of the participants reside in the United States of America.

Characteristics		Frequency	% of Population
Gender	Male	286	64.1
	Female	152	34.1
	Other	8	1.8
Age	18-24 years old	0	0.0
	25-34 years old	35	7.8
	35-44 years old	84	18.8
	45-54 years old	145	32.5
	55-64 years old	129	28.9
	65-74 years old	50	11.2
	Greater than 75 years old	3	0.7
Education	Some high school or less	0	0.0
	High school diploma or GED	1	0.2
	Some college but no degree	16	3.6
	Associate's or technical degree	9	2.0
	Bachelor's degree	115	25.8
	Master's degree	260	58.3
	Doctoral degree	43	9.6
	Prefer not to say	3	0.7
PMP certification	No	135	30.3
	Yes	311	69.7
Years of project	Less than 1 year	3	0.7
	1-3 years	11	2.5

Characteristics		Frequency	% of Population
management experience	4-6 years	44	9.9
	7-10 years	64	14.3
	11-15 years	96	21.5
	16-20 years	80	17.9
	21-25 years	63	14.1
	Greater than 25 years	85	19.1
Most recent project type	Information Technology (IT)	151	33.9
	Business, Management, or Research	70	15.7
	Combination IT and non-IT	130	29.1
	Construction	56	12.6
	Other	39	8.7
Dollar value of the most recent project	$0-$250K	90	20.2
	$250K-$500K	53	11.9
	$500K-$1M	60	13.5
	$1M-$5M	87	19.5
	$5M-$10M	39	8.7
	$10M-$25M	36	8.1
	$25M-$50M	21	4.7
	$50M-$100M	18	4.0
	$100-$250M	16	3.6
	$250M-$500M	8	1.8
	$500M-$750M	4	0.9
	$750-$1B	4	0.9
	Greater than $1B	10	2.2
Country	United States of America	331	74.2
	Other	115	25.8

Table 9: Final Study Descriptive Statistics (Demographic Data)

A note about Gender and Project Management

Among the 446 valid cases in the Final Study, 64.1% were male, and 34.1% were female. The researcher examined the extant literature to understand the perceived gender disparity and concluded that the sample size was representative of the project management population. While the realm of project management has witnessed increasing participation of women, it continues to be a predominantly male-dominated field. The 2022 Global Megatrends Report by the Project Management Institute (PMI)

reveals a significant gender disparity in project management. Male project managers outnumber their female counterparts by a ratio of 3:1. The predominance of male project managers (67%) surpasses that of their female counterparts (33%) on a global scale and across several sectors (PMI, 2022). However, the extent of these disparities varies significantly depending on the geographical region and industry in question (PMI, 2022).

Historical gender studies within the project management literature remain somewhat limited, aligning with a historical pattern observed in organizational literature. More recent research efforts within project management have begun to address gender-related concerns, assumptions, and inherent dynamics (Lindgren & Packendorff, 2006). However, no prior studies have explored the distinctions and associations between gender and pivotal contextual elements in managing contemporary projects (Thomas & Buckle-Henning, 2007). Even though there has been a rise in the number of women working in project management (Neuhauser, 2007), the field is still seen as being mostly male-dominated (Mulenburg, 2002).

A Note About Data Cleansing, Speeding, and Straightlining

Online surveys provide researchers with excellent opportunities to collect data that may otherwise be unobtainable (Krosnick, 1991). Online survey software, like Qualtrics, is a remarkable tool for researchers to collect respondent data. Survey software helps reduce the incidence and severity of the many challenges of missing data, unsatisfactory responses, duplicate submissions, and exploiting paid survey opportunities (Schmidt, 1997).

The terms "optimizing" and "satisficing" were initially introduced by Simon (1957) and (Stedry, 1968) in the context of economic decision-making and choice

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behavior (Krosnick, 1991). In Krosnick's (1991) publication, "*Response Strategies for Coping with the Cognitive Demands of Attitude Measures in Surveys,*" he asserts that the contemplation of optimal responses to survey questions requires respondents to exert significant cognitive effort. Krosnick (1991) further portends that certain respondents are inclined to record seemingly satisfactory responses that are not necessarily accurate to limit their efforts (Krosnick, 1991).

Krosnick (1991) provides the earliest definitions of satisficing behavior in the extant literature during online surveys. His examples include the following tactics: (1) selecting the first reasonable answer; (2) agreeing with a question; (3) endorsing the status quo; (4) failing to differentiate among diverse objects in ratings; (5) saying "I don't know" instead of sharing an opinion; (6) and randomly selecting among offered alternatives.

Speeding, or answering hastily to get to the end of the survey quickly, is another example of satisficing behavior (Krosnick, 1991). According to observations and publications by Zhang and Conrad (2014), speeding is one of the primary satisficing concerns associated with self-reported survey data. Speeding is increasingly associated with poor response quality (Zhang & Conrad, 2014).

Straightlining is another example of satisficing behavior (Kim et al., 2019). Straightlining occurs when survey participants provide identical or similar responses throughout a series of questions that employ the same scale for response options. (Kim et al., 2019). Straightlining is concerning because it can potentially compromise the quality of the collected data (Kim et al., 2019). Despite its potential significance, the research on straightlining lacks a standardized assessment technique (Kim et al., 2019).

Zhang and Conrad (2014) published a compelling article that examined speeding as a determinant of poor response quality, "*Speeding in Web Surveys: The tendency to answer very fast and its association with straightlining*." They concluded that satisficing behaviors drive speeders and straighliners, and the prevalence of both effects increases sharply with younger and less-educated respondents (Zhang & Conrad, 2014).

Exploratory Factor Analysis and Reliability

The researcher has presented the descriptive details and reliability scores for all items utilized in the final study and their construct-level reliability in Tables 12 and 13 (below). Overall, these outcomes suggest that the measurement tool employed in the pilot study was reliable and exhibited satisfactory construct validity.

The final study revealed a factor structure that effectively gauges the seven primary factors: Situational Awareness (SIT), Stakeholder Management (SM), Political Savvy (POL), Triple Constraint Management (TCM), Progress Management (PGM), Risk Management (RSK), and Influence Management (INF). Detailed statistics for the final study data are outlined in Table 12 below, featuring the item identifiers, means, standard deviations, number of responses, and alpha scores for each measurement scale.

Construct Name and Reference	Item Code	Mean	Std. Deviation	Number of Responses	Alpha
Situational Awareness in Project Management SART, Taylor (1994)	SIT1	6.05	.991	446	.858
	SIT2	5.85	1.037		
	SIT3	5.85	1.037		
	SIT4	6.04	.930		
	SIT5	5.60	1.204		
	SIT6	5.85	.956		
	SIT7	5.85	1.055		
	SIT8	5.84	1.022		
	SIT9	5.93	1.008		

Construct Name and Reference	Item Code	Mean	Std. Deviation	Number of Responses	Alpha
	SIT10	6.06	.785		
Stakeholder Management Ghassim & Bogers (2019)	STK11	5.54	1.371	446	.779
	STK12	5.78	1.332		
	STK13	5.09	1.402		
	STK14	5.39	1.554		
Political Savvy Ferris (1999)	POL16	6.13	.941	446	.876
	POL17	6.00	.949		
	POL18	5.95	.973		
	POL19	5.87	.950		
	POL20	6.34	.785		
	POL21	6.13	.903		
Triple Constraint Management Archer (2023)	TCM22	5.73	1.304	446	.843
	TCM23	5.54	1.445		
	TCM24	5.63	1.356		
	TCM25	5.67	1.279		
	TCM26	5.56	1.549		
Progress Management Archer (2023)	PGM27	5.54	1.531	446	.764
	PGM28	5.28	1.522		
	PGM29	5.84	1.178		
	PGM30	6.05	1.048		
Risk Management Archer (2023)	RSK31	5.50	1.327	446	.843
	RSK32	5.28	1.391		
	RSK33	5.54	1.341		
	RSK34	5.19	1.493		
	RSK35	5.06	1.510		
Influence Management Archer (2023)	INF36	5.63	1.112	446	.847
	INF37	5.28	1.297		
	INF38	5.20	1.315		
	INF39	5.18	1.321		

Table 10: Final Study Construct Reliability

Discriminate Validity

Table 13 below is a pattern matrix from an extraction method using Principal

Component Analysis (PCA) to which an oblique rotation method (Oblimin with Kaiser

Normalization) was applied. The fact that the rotation converged in thirteen iterations

indicates that the rotation process successfully found a stable solution for interpreting the

relationships between variables and components. The researcher generated this pattern

matrix using SPSS to identify and confirm underlying patterns or latent variables within

the final dataset. The rotation helps to simplify and interpret these patterns visually. The

pattern matrix shows the loadings of observed variables (indicated by labels like TCM24,

POL17, INF36, etc.) on the extracted components (1 through 7). Each row's load

represents the correlation between the observed variables and the components. Loadings

closer to 1 or -1 (regardless of sign) suggest a strong association between the variable and

the component, while loadings closer to 0 indicate a weak association. Variables with

higher loadings on a component are more strongly related to that component, suggesting

that they contribute more to its definition (discriminate validity). The researcher removed

all loadings where the coefficient absolute values were lower than 0.40. Cross-loaded

variables were also removed. In the end, 29 of the original 38 variables remained in the

model.

	PATTERN MATRIX FINAL STUDY						
	1	2	3	4	5	6	7
INF37	.788						
INF36	.728						
INF38	.700						
INF39	.630						
POL21		.828					
POL17		.826					
POL16		.805					
POL19		.774					
POL20		.737					
POL18		.675					

	1	2	3	4	5	6	7
		PATTERN MATRIX FINAL STUDY					
SIT03			.834				
SIT02			.808				
SIT01			.727				
SIT08			.468				
SIT05			.420				
STK12				.776			
STK11				.719			
STK13				.657			
STK14				.616			
PGM27					.845		
PGM28					.841		
PGM29					.404		
TCM23						-.783	
TCM22						-.724	
TCM25						-.598	
TCM26						-.525	
RSK34							-.854
RSK35							-.721
RSK33							-.704

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 13 iterations.

Note:

- SIT = Project Manager Situational Awareness
- RSK = Risk Management
- STK = Stakeholder Management
- PGM = Program Management
- INF = Influence Management
- TCM = Triple Constraint Management
- CPX = Complexity
- POL = Political Savvy
- INT = Moderating interaction between STK and POL
- EXP = Years of project management experience

Table 11: Final Study Pattern Matrix

The researcher has interpreted the pattern matrix using the results from the

provided loadings:

- **Influence Management**, or INF, represents component 1 and is

    associated with variables INF37 (.788), INF36 (.728), INF38 (.700), and

    INF39 (.630). These variables are positively related to each other within

    this component, indicating high levels of discriminate validity.

- **Political Savvy**, or POL, represents component 2 and is associated with

    variables POL21 (.828), POL17 (.826), POL16 (.805), POL19 (.774),

    POL20 (.737), and POL18 (.675). These variables are positively related to

    each other within this component, indicating high levels of discriminate

    validity.

- **Situational Awareness**, or SIT, represents component 5 and is associated

    with variables SIT03 (.834), SIT02 (.808), SIT01 (.727), SIT08 (.468), and

    SIT05 (.420). These variables are positively related to each other within

    this component, indicating high levels of discriminate validity.

- **Stakeholder Management**, or STK, represents component 5 and is

    associated with variables STK12 (.776), STK11 (.719), STK13 (.657), and

    STK14 (.616). These variables are positively related to each other within

    this component, indicating high levels of discriminate validity.

- **Progress Management**, or PGM, represents component 4 and is

    associated with variables PGM27 (.845), PGM28 (.841), and PGM29

(.404). These variables are positively related to each other within this

component, indicating high levels of discriminate validity.

- **Triple Constraint Management**, or TCM, represents component 1 and is associated with survey questions TCM23 (.783), TCM22 (.724), TCM25 (.598), and TCM26 (.525). These variables are positively related to each other within this component, indicating high levels of discriminate validity.

- **Risk Management**, or RSK, represents component 7 and is associated with variables RSK34 (.854), RSK35 (.721), and RSK33 (.704). These variables have negative loadings on all components, suggesting an inverse relationship between these variables and the corresponding elements. The RSK variables are strongly correlated to each other within this component, indicating high levels of discriminate validity.

Confirmatory Factor Analysis (CFA)

The researcher ran the Confirmatory Factor Analysis using the RStudio Lavan package to assess how well the proposed model fits the observed data. The Comparative Fit Index (CFI) is 0.913, and the Tucker-Lewis Index (TLI) is 0.901. Generally, CFI and TLI values above 0.90 indicate a reasonable fit to the data compared to the baseline model.

The Root Mean Square Error of Approximation (RMSEA) is a statistic used to assess the goodness of fit of a model. RMSEA values closer to 0 indicate a better fit. A commonly used rule of thumb is that RMSEA values less than 0.08 indicate a reasonable

fit. In the final study results, the RMSEA value is 0.054, which suggests that the model

fits the data relatively well. The p-value H_0: RMSEA >= 0.080 is very low (0.000),

indicating strong evidence against a poor fit. The Standardized Root Mean Square

(SRMR) value 0.055 suggests a reasonably good fit.

	CORRELATION MATRIX							
	INF	POL	SIT	PGM	STK	TCM	RSK	CPX
INF	1.000							
POL	0.429	1.000						
SIT	0.350	0.402	1.000					
PGM	.583	0.189	0.248	1.000				
STK	0.605	0.467	0.354	0.467	1.000			
TCM	0.679	0.44	0.425	0.589	0.601	1.000		
RSK	0.787	0.313	0.330	0.635	0.660	0.706	1.000	
CPX	0.288	0.253	0.180	0.247	0.316	0.131	0.340	1.000

Note:

- SIT = Project Manager Situational Awareness
- RSK = Risk Management
- STK = Stakeholder Management
- PGM = Program Management
- INF = Influence Management
- TCM = Triple Constraint Management
- CPX = Complexity
- POL = Political Savvy
- INT = Moderating interaction between STK and POL
- EXP = Years of project management experience

Table 12: Confirmatory Factor Analysis Correlation Matrix

Overall, the results suggest that the model's latent variables are interconnected,

with varying degrees of association.

INF is a latent variable, and the correlation of INF with itself is 1.000, which is a

perfect correlation (as expected, as it's correlated with itself). POL is another latent

variable. Its correlation with INF is 0.429, indicating a moderate positive correlation

between POL and INF. SIT is yet another latent variable. Its correlation with both INF and POL is 0.350 and 0.402, respectively. These values suggest a moderate positive correlation between SIT and INF and SIT and POL.

PGM is a latent variable. It has correlations of 0.583 with INF, 0.189 with POL, and 0.248 with SIT. These values indicate a moderate positive correlation between PGM and INF and a weak positive correlation with SIT, while the correlation with POL is weak and negative.

STK is another latent variable. It has correlations of 0.605 with INF, 0.467 with POL, and 0.354 with SIT. These values suggest a moderate positive correlation between STK and INF and STK and POL, while the correlation with SIT is moderate. TCM is a latent variable. Its correlation with INF is 0.679, POL is 0.422, and SIT is 0.425. These values indicate moderate positive correlations between TCM and INF, TCM and POL, and TCM and SIT.

RSK is another latent variable. It has correlations of 0.787 with INF, 0.313 with POL, and 0.330 with SIT. These values suggest strong positive correlations between RSK and INF and moderate positive correlations with POL and SIT. CPX is a latent variable. Its correlation with INF is 0.288, POL is 0.253, SIT is 0.180, and PGM is 0.247. These values indicate weak to moderate positive correlations between CPX and the other latent variables.

Findings

The researcher used RStudio's Lavaan package to test the hypotheses. Structured Equation Modeling (SEM) and regression analysis reported each factor's significance, relevance, and relationships within the conceptual research model.

STRUCTURAL EQUATION MODEL REGRESSION ANALYSIS						
	Estimate	Std. Err	z-value	p (>| z |)	std. lv	Std. all
SIT ~						
RSK	-0.038	0.057	-0.675	0.500	-0.055	-0.055
STK	0.181	0.060	3.011	**0.003**	0.211	0.211
PGM	0.053	0.044	1.183	0.237	0.077	0.077
INF	0.062	0.080	0.778	0.437	0.064	0.064
TCM	0.173	0.060	2.874	**0.004**	0.223	0.223
CPX	0.047	0.047	1.008	0.314	0.056	0.056
POL	0.393	0.061	6.490	**0.000**	0.362	0.362
INT	-0.001	0.000	-5.354	**0.000**	-0.001	-0.211
EXP	0.058	0.019	3.105	**0.002**	0.070	0.120

Note:

- SIT = Project Manager Situational Awareness
- RSK = Risk Management
- STK = Stakeholder Management
- PGM = Program Management
- INF = Influence Management
- TCM = Triple Constraint Management
- CPX = Complexity
- POL = Political Savvy
- INT = Moderating interaction between STK and POL
- EXP = Years of project management experience

Table 13: SEM Regression Model

Two of the six hypotheses tested were statistically significant, as demonstrated by p-values <= 0.005 and positive beta coefficients; specifically, Stakeholder Management (STK p-value 0.003 and β 0.181) and Triple Constraint Management (TCM p-value 0.004 and β 0.173). The moderating effect of Politically Savvy on Stakeholder Management (INT p-value 0.000 and β -.001) was statistically significant but not supported. The results of the conceptual model's regression analysis also indicate that Politically Savvy (POL p-value 0.000 and β 0.393) and Experience (EXP p-value 0.002

and β 0.058), when structured as independent variables, have statistically significant

positive effects on Project Manager Situational Awareness (SIT).

HYPOTHESES SUMMARY FINAL STUDY			
#	Hypothesis	Results	p<
H1	Effective stakeholder management (STK) has a positive effect on project managers' situational awareness.	**Supported**	**0.001**
H2	Political savvy positively (POL) moderates the relationship between effective stakeholder management and project management situational awareness, such that the relationship between effective stakeholder management and project management situational awareness becomes stronger when political savvy is high.	**Significant** **Not Supported**	**0.000**
H3	Effective triple constraint management (TCM) has a positive impact on project managers' situational awareness.	**Supported**	**0.004**
H4	Effective progress management (PGM) has a positive impact on project managers' situational awareness.	Not Supported	0.230
H5	Effective risk management (RSK) has a positive impact on project managers' situational awareness.	Not Supported	0.388
H6	Effective influence management (INF) has a positive impact on project managers' situational awareness.	Not Supported	0.362

Table 14: Hypotheses Summary (Final Study)

This final study tested six hypotheses to examine the relationships between various factors and project manager situational awareness. The results indicate the following findings:

Hypothesis 1 (H1), which posited that effective stakeholder management (STK) has a positive effect on project manager situational awareness, was supported with a significant p-value of 0.001. This finding suggests that effective stakeholder management enhances project manager situational awareness.

Hypothesis 2 (H2) proposed that political savvy (POL) positively moderates the relationship between effective stakeholder management and project management situational awareness, mainly when political savvy is high. Hypothesis 2 was not supported; however, it had a highly significant p-value of 0.000.

Hypothesis 2 postulated a positive moderation effect of political savvy on the relationship between effective stakeholder engagement and project management situational awareness. This hypothesis was predicated on the notion that increased political savvy, the ability to understand and navigate organizational politics effectively, would amplify the positive correlation between effective stakeholder engagement and project management situational awareness. The underlying assumption was that politically savvy project managers would be more adept at engaging stakeholders effectively, enhancing their situational awareness within the project context.

However, the empirical results did not corroborate this hypothesis. Despite the statistical significance of the findings, as evidenced by a p-value of 0.000, the negative beta coefficient ($\beta = -0.001$) contradicts the proposed positive moderation effect. This finding suggests that increased political savvy does not necessarily strengthen the

relationship between effective stakeholder engagement and project management situational awareness. The negative beta coefficient implies that higher levels of political savvy might slightly weaken this relationship.

This counterintuitive finding calls for reevaluating the assumed role of political savvy in this context. It suggests that the interplay between political savvy, stakeholder engagement, and situational awareness in project management may be more intricate than initially hypothesized. It is plausible that other intervening variables or contextual factors might be influencing this relationship. Alternatively, the measures used to operationalize these constructs could be revisited to ensure they accurately capture the nuances of these complex constructs.

While the results were statistically significant, Hypothesis 2 was not supported by the data. This finding highlights the need for further research to unravel the complexities of these relationships and provide more nuanced insights into the role of political savvy in project management. These findings underscore the importance of empirical validation in testing theoretical assumptions and contribute to the ongoing discourse on the determinants of effective project management.

Hypothesis 3 (H3) posited that effective triple constraint management (TCM) positively impacts project managers' situational awareness and received support with a p-value of 0.004. This finding suggests that effective management of the triple constraints enhances project manager situational awareness.

However, Hypotheses 4 (H4), 5 (H5), and 6 (H6) were not supported by the final research study. H4 suggested that effective progress management (PGM) positively impacts project managers' situational awareness, but the non-significant p-value of 0.230

indicates a lack of empirical support. Similarly, H5, proposing a positive impact of effective risk management (RSK) on situational awareness, and H6, suggesting a positive impact of effective influence management (INF), were not supported, as indicated by p-values of 0.388 and 0.362, respectively.

In summary, this study provides evidence for the crucial role of stakeholder management and triple constraint management in enhancing project manager situational awareness. However, the study did not find empirical support for the positive impacts of progress, risk, and influence management on project manager situational awareness. The lack of empirical support for the positive effects of progress, risk, and influence management on project manager situational awareness can be attributed to the complex and multifaceted nature of situational awareness, the interplay of various factors, contextual variations, measurement challenges, and potential limitations in the study. These findings underline the need for continued research to unravel the intricate dynamics of project management and the specific conditions under which these factors may influence situational awareness.

Interestingly, a salient revelation in the culmination of this research study underscores the substantial and affirmative influence of professional experience on project management situational awareness. Empirical substantiation affirms that a project manager's situational awareness experiences a commensurate augmentation directly correlating with accumulated years of professional expertise.

The study's results highlight the intricate dynamics in project management, where various factors converge to shape a project manager's situational awareness. Several theoretical aspects may help explain why these hypotheses were not supported.

Situational awareness in the context of project management is a multifaceted construct. It involves the project manager's ability to perceive and comprehend various aspects of the project environment, including stakeholders, constraints, and political dynamics. The complexity of this construct might mean that the impact of factors like progress management, risk management, and influence management is not direct or linear. These elements may contribute to situational awareness indirectly or under specific conditions.

Situational awareness in project management has been widely recognized as a complex and multifaceted construct. It encompasses a project manager's capacity to perceive, comprehend, and adapt to various dimensions of the project environment, which extend beyond the immediate tasks and objectives. As highlighted by (Liu et al., 2013), situational awareness in project management involves the awareness of stakeholders, constraints, political dynamics, and other contextual elements. Therefore, it is not limited to a narrow set of factors but encompasses a broad spectrum of variables that collectively shape a project manager's understanding of the project environment.

This complexity suggests that the impact of progress, risk, and influence management may not be direct or linear. Instead, these elements may influence situational awareness indirectly or under specific conditions. This notion aligns with the findings of research by Kerzner (2017) and Pinto and Kharbanda (1995), who emphasized that project management is an intricate field influenced by various interrelated factors. The intricate interplay of these elements means their effects on situational awareness are not straightforward and can vary depending on the project's context, nature, and the project manager's skills. A multitude of interrelated factors influence project management. The combined effect of these factors may mask the

individual impact of progress and risk and influence management on situational awareness.

Project environments can vary significantly (Joslin & Müller, 2016). What works in one project context may not be as effective in another (Petit, 2012). Factors such as organizational culture, project complexity, and team dynamics can influence the relevance and impact of progress risk and influence management (Rolstadås & Schiefloe, 2017) on situational awareness. Therefore, this study might not have captured the full range of contextual variations that impact these factors.

The measurement of progress management, risk management, and influence management can be challenging (Chapman & Ward, 2003). Quantifying these concepts in a way that accurately reflects their impact on situational awareness is very difficult (Endsley & Garland, 2000) and might not have been fully achieved in the study. Future research might benefit from more refined and context-specific measurement tools.

Lastly, every research study has inherent limitations (Crosby et al., 2009). It's possible that certain limitations in the research design, data collection methods, or sample characteristics influenced the results. Future research could address these limitations to provide a more comprehensive understanding of the relationships between these variables.

In summary, the lack of empirical support for the positive impacts of progress, risk, and influence management on project manager situational awareness can be attributed to the complex and multifaceted nature of situational awareness, the interplay of various factors, contextual variations, measurement challenges, and potential limitations in the study. These findings underline the need for continued research to

unravel the intricate dynamics of project management and the specific conditions under which these factors may influence situational awareness.

VI. SUMMARY, IMPLICATIONS, AND OUTCOMES

Summary of Findings

This seminal research study aimed to investigate the factors contributing to project manager situational awareness. Its contribution to scholarly knowledge enriches the field of project management by highlighting the multifaceted nature of situational awareness and the underlying factors that influence it. These findings empower project managers to approach their roles with a holistic perspective, emphasizing the critical importance of stakeholder engagement, political acumen, and tending to the scope, schedule, and cost management. By doing so, they can enhance their situational awareness, ultimately leading to more successful project outcomes, including the timely delivery of project objectives. This research thus serves as a valuable resource for project management practitioners and researchers seeking to optimize their strategies for project success. Future research can also build on these findings by examining additional factors within and outside the context of project management. Future research may benefit from the project management measurement scales created and validated during the blind and final studies.

Theoretical implications

This research study delves into the intricate realm of project management and situational awareness, offering theoretical implications of substantial significance. At its core, the study emphasizes the multifaceted nature of situational awareness. It underscores the various contributing factors that shape a project manager's ability to

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comprehend and adapt to the dynamic project environment. A comprehensive analysis of the findings underpins the theoretical implications of the results and is further enriched through reference to pertinent peer-reviewed research.

One of this study's most pivotal theoretical implications is elucidating the role of effective stakeholder management in bolstering project manager situational awareness. As Hypothesis 1 (H1) corroborates, this research aligns with previous studies that have emphasized the importance of stakeholders in project management (Hobbs & Petit, 2017). A project manager's capacity to engage stakeholders and incorporate their perspectives into decision-making processes is a cornerstone of stakeholder theory (Mitchell et al., 1997). It is now empirically demonstrated to be intertwined with situational awareness. This implication is in accordance with research that highlights the indispensable role of stakeholder management in project success and is critical for project managers seeking to navigate the intricate web of project dynamics (Kerzner, 2017).

Furthermore, the theoretical implications extend to political savvy, particularly as a moderator, as posited in Hypothesis 2 (H2). The study's findings resonate with research that underscores the political dimension of project management (Pinto & Kharbanda, 1995). The concept of political acumen (savvy), which shapes the dynamics of stakeholder relationships, emerges as a vital element influencing situational awareness. This implication aligns with research that recognizes the role of political intelligence in effective project leadership (Anantatmula, 2010). Project managers can benefit from this theoretical insight by acknowledging the importance of political astuteness and its role in enhancing situational awareness.

Additionally, this study advances theoretical implications related to effective triple constraint management, as supported by Hypothesis 3 (H3). The triple constraints of scope, time, and cost have long been central in project management theory (Kerzner, 2017). The study reiterates their theoretical significance, as adept constraint management is shown to contribute to a project manager's situational awareness. This finding underscores the interconnectedness of project parameters and situational awareness, aligning with research emphasizing the critical role of constraints in project success (Patanakul et al., 2016).

Hypotheses 4 (H4), 5 (H5), and 6 (H6) did not garner empirical support in the context of this research study. Yet, their theoretical implications are valuable in discerning the boundaries of factors that influence project manager situational awareness. While these hypotheses did not establish a direct relationship between the factors they represented and situational awareness, their significance is illuminated through their theoretical contributions. This finding aligns with existing research emphasizing project management's multifaceted and intricate nature, where not all variables directly influence situational awareness (Liu et al., 2011). Recognizing these boundaries contributes to a nuanced understanding of situational awareness within the context of project management.

Hypothesis 4 (H4) postulated that effective progress management (PGM) has a positive impact on project managers' situational awareness but failed to attain empirical support. The theoretical implications of this outcome highlight the nuanced relationship between progress management and situational awareness. Existing literature recognizes that progress monitoring and reporting are essential aspects of project management

(Zwikael & Smyrk, 2012). However, this non-significant result signifies that progress management is fundamental in project control and may not directly contribute to a project manager's situational awareness. As illuminated by the supported hypotheses, the theoretical implication underscores that situational awareness might encompass broader factors beyond monitoring progress, such as stakeholder engagement or political dynamics.

Hypothesis 5 (H5) proposed that effective risk management (RSK) positively impacts project managers' situational awareness but did not find empirical support. Theoretical implications suggest that the relationship between risk management and situational awareness is not linear. While effective risk management is vital in project management (Patanakul et al., 2016), this result highlights that it may not directly enhance a project manager's situational awareness. Theoretical insights from this non-significant finding suggest that risk management, while indispensable for mitigating potential threats, may not inherently contribute to a project manager's holistic awareness of the project's context.

Hypothesis 6 (H6) centered on the notion that effective influence management (INF) positively impacts project manager situational awareness, but it, too, did not receive empirical validation. This theoretical implication underscores the complex relationship between influence management and situational awareness. While influence management is a fundamental component of project leadership (Pinto & Kharbanda, 1995), this result implies that it may not directly impact a project manager's situational awareness. The theoretical implication is that situational awareness may be shaped by a broader spectrum of factors, including those not directly examined in this study.

In essence, these non-supported hypotheses offer crucial theoretical insights. They emphasize that the multifaceted nature of situational awareness in project management encompasses a myriad of factors, some of which may not have a direct and linear relationship with it. This recognition contributes to a nuanced understanding of situational awareness within the project management context, highlighting that it is shaped by various factors extending beyond traditional project management constructs. Future research can build upon these insights by exploring the intricate dynamics of these factors and their interplay in further shaping project manager situational awareness.

Discussion of Practical Implications

The theoretical implications of this research study are of substantial importance in project management. By investigating the multifaceted nature of situational awareness and the underlying factors that influence it, this research significantly contributes to the theoretical landscape of the field. The study underscores that situational awareness is not a singular construct but is influenced by various factors, each with its unique role. The theoretical implications are supported by relevant peer-reviewed research, offering a well-rounded perspective on how these findings align with existing knowledge.

One of the most significant theoretical implications is recognizing the vital role of effective stakeholder management in bolstering project manager situational awareness, as supported by Hypothesis 1 (H1). This implication aligns with previous research emphasizing the importance of stakeholders in project management and their impact on project outcomes. It reinforces the idea that stakeholder engagement is a cornerstone of

project management, and understanding its significance contributes to navigating the complex landscape of project dynamics.

Hypothesis 2 (H2) introduces the concept of political savvy as a moderator in the relationship between effective stakeholder management and project management situational awareness. This theoretical implication aligns with research that recognizes the political dimension of project management and how political acumen influences decision-making processes. It highlights the role of political intelligence in effective project leadership, emphasizing the multifaceted nature of project management.

Furthermore, the theoretical implications extend to the concept of effective triple constraint management (TCM), as Hypothesis 3 (H3) supports. This finding underscores the theoretical significance of the triple scope, time, and cost constraints in project management. It emphasizes their interconnectedness with project parameters and situational awareness, aligning with research that underscores the critical role of constraints in project success.

Hypotheses 4 (H4), 5 (H5), and 6 (H6), although not empirically supported, provide valuable theoretical insights. They define the boundaries of factors that influence project manager situational awareness, acknowledging the complexity of the project management field. These non-supported hypotheses align with existing research emphasizing project management's multifaceted and intricate nature, where not all variables directly influence situational awareness.

These theoretical implications offer a nuanced understanding of situational awareness within the context of project management. They emphasize the importance of recognizing the multifaceted nature of the field, where various factors influence a project

manager's ability to comprehend and adapt to the dynamic project environment. These theoretical insights are vital for project management practitioners and researchers seeking to optimize their strategies for project success. They provide a foundation for further exploration and research in the intricate field of project management.

The knowledge gained from this research study significantly enriches the theoretical landscape of project management by shedding light on the intricate dynamics that influence situational awareness. The theoretical implications arising from the findings provide a theoretical framework that integrates stakeholder management, political acumen, and constraint management into the concept of situational awareness. These implications offer valuable insights for project management practitioners and researchers seeking to optimize their strategies for project success.

Furthermore, as a significant contribution of this research study, the creation and validation of project management measurement scales have filled crucial gaps in the existing literature and research. This development has expanded the understanding of key project management constructs, specifically Triple Constraint Management (TCM), Progress Management (PGM), Risk Management (RSK), and Influence Management (INF). The creation and validation of these measurement scales hold importance in enhancing the field's empirical foundations and providing valuable tools for future research endeavors.

Project management literature recognizes the central role of the triple constraints, which include scope, time, and cost management. While numerous studies emphasize the significance of the triple constraints (Kerzner, 2017; Patanakul et al., 2016), an absence of specific measurement scales has limited the empirical exploration of TCM. The

development and validation of a TCM measurement scale in this research contribute significantly to bridging this gap. Previous research highlights the importance of understanding and effectively managing project constraints (Zwikael & Smyrk, 2012). The availability of a validated TCM measurement scale equips researchers with a practical tool to delve deeper into this critical facet of project management.

Progress Management (PGM) is another vital element in project management, integral to tracking and ensuring the timely completion of project tasks. While PGM's importance is well-established (Kerzner, 2017), scholars have overlooked specific measurement scales for project PGM. Creating and validating a PGM measurement scale offers an empirical foundation for further investigations into progress management's nuances. It provides a tool to assess and analyze how effectively progress is managed in different project contexts and its impact on project outcomes.

Risk Management (RSK) is a cornerstone of project management, essential for mitigating potential threats and uncertainties. The significance of RSK is widely acknowledged in the extant project management literature (Patanakul et al., 2016), yet a paucity of measurement scales has limited empirical research in this domain. The development and validation of a risk management measurement scale in this research study serve as a valuable resource for future research endeavors. It enables researchers to quantitatively assess and explore the intricacies of risk management and its consequences in diverse project environments.

Influence Management (INF) plays a critical role in project leadership, as acknowledged by previous studies (Pinto & Kharbanda, 1995). However, the absence of specific measurement scales has hindered in-depth empirical investigations into this

aspect of project management. The creation and validation of an INF measurement scale present an opportunity for researchers to delve deeper into the dynamics of influence management in project contexts, providing empirical support for its significance.

In summation, developing and validating project management measurement scales covering TCM, PGM, RSK, and INF signify a substantial contribution to project management literature. These scales fill existing gaps, providing researchers with empirical tools to explore and assess the multifaceted dynamics of these project management constructs. Leveraging these constructs for future project management research enables a more comprehensive exploration of factors within and beyond the context. By offering a more solid empirical foundation, this research advances theoretical understanding and equips scholars with valuable instruments to delve deeper into these critical facets of project management.

Limitations & Suggestions for Future Research

The Final study ultimately resulted in a substantial sample size of 446 respondents after excluding incomplete submissions. The augmentation of the respondent count could bolster the robustness of our research findings. This strategic decision aligns with established practices in empirical research, where a more extensive and diverse sample size provides increased statistical power and enhanced generalizability of results (Bryman, 2016). A more comprehensive dataset could minimize the potential for errors and increase the likelihood of detecting true effects and associations in the investigated variables (Creswell & Creswell, 2017). Moreover, an expanded respondent count could facilitate a more comprehensive exploration of the complex dynamics surrounding

project manager situational awareness and its multifaceted determinants, contributing to a richer and more nuanced understanding of the research phenomena. An enlarged sample size enhances the study's reliability and the credibility of the empirical conclusions drawn from the collected data (Hox & Boeije, 2005). As a separate test, the researcher combined the cases from the Blind and Final studies. A structured equation model and regression analysis of the combined data showed new significant effects related to non-construction projects and total dollar value.

The Risk Management (RSK) hypothesis was unsupported by the studies. In retrospect, two questions were lengthy and required edits for brevity. One question related to contract risk may be irrelevant for all projects. Discriminate validity was achieved in both studies; however, statistical significance was not achieved. While it is unknown if RSK truly impacts project managers' situational awareness, the prescribed improvements to this measurement scale could potentially strengthen the model.

The Influence Management (INF) and Progress Management (PGM) hypotheses were not supported by the studies. Statistical significance may be attainable with measurement scale refinements. The INF and PGM independent variables only had four survey questions each. Discriminate validity was achieved in both studies; however, expanding the number of questions could strengthen the outcomes. Future research could potentially uncover deeper associations and effects on the conceptual model.

To gain insights into the determinants of project manager situational awareness, participants recollected their experiences as project managers in their most recent projects. It is essential to highlight that the studies excluded project success or failure. Further, probing questions regarding completing the most recent project were excluded.

Obtaining project success or failure details would be an interesting control point that may provide deeper insights into project manager situational awareness. Additionally, knowing when the project completion occurred is a worthy attribute to collect for future research.

To be more inclusive, the survey had expanded control questions for gender identity and sexuality (LGBT). In retrospect, these survey sections were set up incorrectly. Options for male and female were presented to the respondents, as well as nonbinary/trans, other, and prefer not to say. The preferential, optimized coding for gender should have included three options: male, female, and other. Similarly, respondent options for sexual orientation too many options included yes, no, other, and prefer not to say. A better survey setup would have simplified this coding as a binary to allow the respondent to answer yes or no (only).

When analyzing the survey results, the "Other Project Type" selection frequency was used more than anticipated (39 times). This finding could be indicative of a lack of granularity. An enhancement for future research is an expansion of the Project Type selections. In future studies, the researcher would seek to expand the selection choices and clarify their meanings based on extant literature.

Project management often involves different levels of management, including project management, program management, and portfolio management. Projects are the minor units and the building blocks of an organization's work. They are managed individually to achieve specific objectives. Programs oversee and manage related projects contributing to a broader strategic goal or outcome. Programs focus on coordinating projects to maximize their impact. Portfolios represent the entire collection of an

organization's projects, programs, and initiatives to ensure investments align with the organization's strategic objectives and deliver the highest value. Each of these areas has a specific focus and responsibilities. Future research could include controlling variables for project management levels and their associations and effects on situational awareness.

Both surveys contained three questions to understand project complexity. Complexity (CPX) was not an independent variable within the conceptual research model. Future research could explore the literature to find justification for or against adding CPX as a latent variable. The CIFTER measurement scale was used to measure project management complexity. However, only three of the five CIFTER questions were used to control for project complexity. If justification to revise the conceptual model was attained, then using all five questions with slight wording modifications is recommended. The modifications would overcome why two of the questions were excluded initially. For example, not all projects have contractual agreements with vendors or third parties.

This research concluded that years of experience was one determinant of project manager situational awareness (0.002). Further research and analysis around years of experience could delve more deeply into this effect. They specifically uncover experienced project managers' behavioral attributes and how they influence situational awareness. Theoretically speaking, situationally aware project managers more frequently achieve successful project outcomes. If experience is deterministic of situational awareness, then the implicit opportunity to capitalize on these behavioral attributes could help less experienced project managers become more successful.

Project Management Professional (PMP) certification has experience accrual requirements depending on the candidate's level of education. You must have at least

three years of non-overlapping professional project management experience, during which at least 4,500 hours leading and directing project tasks. The experience requirement increases to five years and 7,500 hours (minimum) without a bachelor's degree. PMP certification had a low effect (0.845 combined) on the conceptual research model. This finding is consistent with findings from Catanio et al. (2013) that concluded certified managers are not better at managing project scope than uncertified project managers. Although it was not hypothesized in this study, it is somewhat surprising that PMP certification did not have a more significant effect on project manager situational awareness. Exploring this effect in future research would be a worthwhile endeavor.

While this research study has enriched the theoretical landscape of project management, future research can explore several avenues. One key area is the further examination of the multifaceted nature of project management constructs and their impact on situational awareness. Researchers can delve deeper into stakeholder management, political acumen, and triple constraint management, analyzing their components and interplay in different project contexts. The study by Hobbs and Petit (2017) on stakeholder influence and the work of Pinto and Kharbanda (1995) on the political dimension of project management offer valuable foundations for such investigations.

Future researchers can further explore the factors not empirically supported in this study, such as progress management, risk management, and influence management. Understanding their intricacies in influencing project manager situational awareness and the conditions under which they become relevant can provide valuable insights for

project management scholars and practitioners. This approach aligns with Liu et al. (2011) recognition of project management constructs' complex and multifaceted nature.

Moreover, the creation and validation of project management measurement scales —specifically for Triple Constraint Management (TCM), Progress Management (PGM), Risk Management (RSK), and Influence Management (INF)—open new horizons for future research. Researchers can utilize these scales to conduct empirical investigations in diverse project environments. Exploring the impact of these management constructs on project outcomes and situational awareness offers a rich area for future empirical studies. The works of Kerzner (2017), Zwikael and Smyrk (2012), and Patanakul et al. (2016) provide foundational knowledge for these inquiries.

The empirical evidence validated by this research uncovers fascinating areas of statistical significance and positive interactions between variables that contribute to situational awareness in project management. Future research could seek to validate the relationship of situational awareness to project success. This would entail a new conceptual research model with situational awareness as an independent variable and project success as the dependent variable. The measurement scales created and validated during this study could be easily reused or repurposed. In the spirit of scientific inquiry, this research study successfully pioneered the applied theory of situational awareness in the business context of the firm's management. Future researchers delving into new qualitative studies may become exposed to situational awareness and become inclined to expand it beyond project management into other areas, both inside and outside the firm's management.

The contemporary shift from traditional project management to a transformational leadership role is another opportunity to expand this body of work. In project organizations, project management roles are shifting towards transformational leadership. This evolution emphasizes that modern project managers must not only complete tasks but also drive organizational change and adapt to rapidly evolving environments. The study underscores the need for leadership skills that transcend traditional project management, reflecting the dynamic nature of contemporary business environments (Kissi et al., 2013).

In digital transformation, the ability to lead projects requires project managers to adopt a transformational leadership style to navigate the complexities of technology-driven changes (Kupiek, 2021). One could argue that project managers are evolving into transformational leaders who are instrumental in guiding organizations through change, innovation, and the complex landscape of digital transformation (Kupiek, 2021).

In conclusion, this research study enhances the theoretical foundations of situational awareness in project management and offers prescriptive guidance and newly validated measurement scales for future research endeavors. The multifaceted nature of situational awareness and the underlying factors that influence it provides a rich landscape for further exploration. Researchers can build upon the theoretical implications of this study to deepen their understanding of project management dynamics and contribute to the optimization of project success.

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<p style="text-align: center">APPENDICES</p>

Adult Online Consent to Participate in a Research Study

FIU IRB Approval: 05/08/2023
FIU IRB Expiration: 05/08/2026
FIU IRB Number: IRB-23-0228

ADULT ONLINE CONSENT TO PARTICIPATE IN A RESEARCH STUDY

SITUATIONAL AWARENESS IN PROJECT MANAGEMENT

SUMMARY INFORMATION: Things you should know about this study:

- **Purpose:** This study aims to identify the factors contributing to project management situational awareness.

- **Procedures**: If you choose to participate, you will be asked to answer questions about your prior professional project management experiences using FIU's Qualtrics online survey tool.

- **Duration**: This survey will take approximately twenty-one minutes to complete.

- **Risks**: Aside from the possible slight discomfort associated with answering survey questions, there are no further known physical, psychological, social, legal, or economic risks related to this survey. The likelihood of possible slight discomfort associated with answering survey questions is very low.

- **Benefits**: There are no known personal benefits to the subjects participating in this study. The survey results will inform the broader project management business community.

- **Alternatives**: There are no known alternatives available to you other than not taking part in this study.

- **Participation**: Survey participation is voluntary and subjects may choose to withdraw their consent at any time.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY: This study aims to identify the factors contributing to project management situational awareness.

NUMBER OF STUDY PARTICIPANTS: If you decide to be in this study, you will be one of 300 people in this research study.

DURATION OF THE STUDY: This survey will take approximately twenty-one minutes to complete.

PROCEDURES: If you choose to participate, you will be asked to answer questions about your prior professional project management experiences using FIU's Qualtrics online survey tool.

RISKS AND/OR DISCOMFORTS: Aside from the possible slight discomfort associated with answering survey questions, there are no further known physical, psychological, social, legal, or economic risks related to this survey. The likelihood of possible slight discomfort associated with answering survey questions is very low.

BENEFITS: There are no known personal benefits to the subjects participating in this study. The survey results will inform the project management business community.

ALTERNATIVES: Other than choosing not to participate in this survey, there are no other alternatives.

CONFIDENTIALITY: The privacy of the respondents will be held with the utmost respect, and there is no personally identifiable or specific information collected or associated with the respondents. The researcher will collect all of the survey data provided by respondents anonymously. There is no possible way for anyone (not even the researcher) to identify or trace a subject's identity to their survey responses. The researcher will conduct confidential research. The researcher will store all collected survey data in a locked filing cabinet located (separate from the master key) within a locked office at FIU in Mango RM 373, 11200 SW 8th Street, Miami, FL 33199, and only accessible to those authorized to access the information.

USE OF YOUR INFORMATION: No identifiable or specific information is collected or associated with the respondents. The research data has no personal identifiers. Individual participation is anonymous, meaning that there is no possible way for anyone (not even the researcher) to identify or trace a subject's identity to their survey responses.

COMPENSATION & COSTS: Survey participants will not be compensated for completed surveys.

RIGHT TO DECLINE OR WITHDRAW: Survey participation is voluntary, and subjects may choose to withdraw their consent at any time.

RESEARCHER CONTACT INFORMATION: If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Joseph Archer at FIU MANGO 373, or via telephone at +1 703-623-3382, or via email at jarch040@fiu.edu.

INSTITUTIONAL REVIEW BOARD (IRB) CONTACT INFORMATION: If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at +1 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT: I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I am providing my informed consent by clicking on the "consent to participate" button below.

FIU FLORIDA INTERNATIONAL UNIVERSITY

COVER LETTER AND INSTRUCTIONS FOR INFORMED PILOT

Dear Informed Pilot Participant,

Thank you so much for your willingness to provide your insights into my academic research regarding the factors contributing to situational awareness in project management. In this informed pilot, you are among a panel of expert project managers that were selected to critique a draft of the survey instrument intended to be used for data collection and analysis. I greatly appreciate your interest in sharing your project management expertise.

Each year, corporations across the globe invest billions of dollars into a variety of projects undertaken to effect positive changes. There are many outcomes that projects may strive to achieve and are driven by numerous factors. Examples include improving operational effectiveness, lowering overhead costs, increasing competitive advantages, or complying with regulations. Projects can run the full spectrum of complexity and investment, from simple digital modernization efforts to complex multinational information technology infrastructure renovations. Project managers lead these changes, invariably balancing the triple constraints of scope, time, and cost while addressing emergent issues that jeopardize success. Executive sponsors understandably scrutinize corporate funding when projects can cost millions of dollars.

Given these complexities, project managers must be technically proficient in project management competencies and possess the requisite leadership skills to adapt to constantly evolving situations. Should projects fail, companies suffer sizable financial losses that could impact their ability to innovate products and services beyond their competitors, increase market share, or adhere to regulatory requirements. With so much at stake, it begs the question: ***What are the factors that contribute to situational awareness in project management?***

Please find below an overview of critical elements of this study and specific directions for your tasks.

STUDY OVERVIEW

To better understand the factors that contribute to situational awareness in project management, I have proposed a conceptual research model (Figure 1):

Figure 1: Research Model
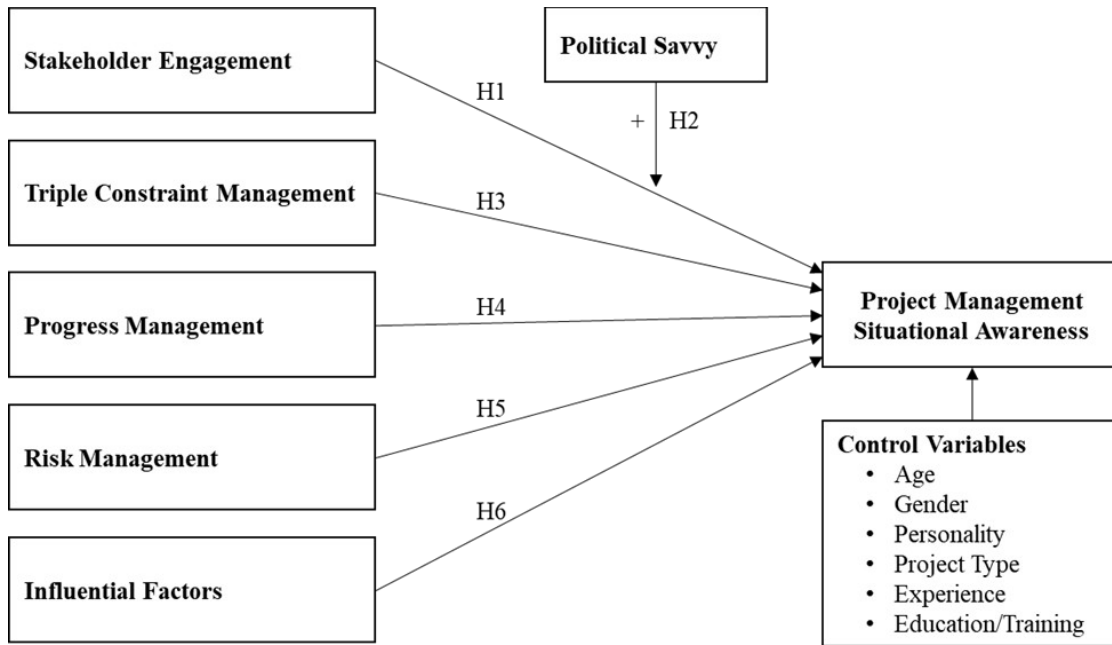
BACKGROUND INFORMATION

Situational awareness (SA) is a well-known concept; however its understanding and usage is mainly limited to the military and aviation environments. For example, "tactical airborne mission effectiveness depends on the aircrew achieving and maintaining high levels of SA throughout the entire mission" (Carmody-Bubb, 1998). Situational awareness in project management is novel in its application and usage. In much the same way a pilot must maintain SA during a flight, a project manager "pilots" the project and maintains SA to achieve desired outcomes effectively. As project managers plan and execute projects, they must grasp and interpret information from their operating environment, comprehend the the situation, project the future state, and make decisions accordingly.

In 1995, Dr. Mica Endsley, engineer and a former Chief Scientist of the United States Air Force, presented a theoretical model of SA based on its role in dynamic human decision-making. Endsley investigates evidence of sensitivity, predictive power, and methodological concerns related to direct, objective measures of SA. Endsley's model of situation awareness in dynamic decision making provides a valuable theoretical framework when discussing SA competence and its relationship to project managers. It is hypothesized that project managers with high SA favorably adapt to evolving situations easier than project managers with low SA.

INSTRUCTIONS

The informed pilot survey consists of three primary respondent categories:
1. Personal attributes
2. Demographic data
3. Thoughts about the following variables

1. Stakeholder engagement
2. Triple constraint management
3. Progress management
4. Risk management
5. Influential factors
6. Political savvy
7. Situational Awareness Review Technique (SART)

I am kindly asking for your assessment of each question and written feedback that will help me improve my comprehensive survey instrument before launching it to a broader audience.

You will find a free-form input field at the end of each section where you are instructed to provide your written feedback related to the group of questions (i.e. Stakeholder Engagement).

Please consider the following potential issues in evaluating each question:
- Is the question clear and understandable?
- Is the question targeted to project management situational awareness?
- Does the question rightly measure the variables of interest?
- Is the question double-barreled? Double-barreled questions cover more than one topic. And" or "or" within a question usually makes it double-barreled
- Is the question leading? A leading question suggests to the respondent that the researcher expects or desires a particular answer.
- Is the question loaded? A loaded question asks the respondent to rely on their emotions more than the facts. Loaded questions contain "emotive" words with a positive or negative connotation.
- Is the question confusing? A confusing question lacks clarity making it difficult for the respondent to comprehend the question in the desired/required manner
- Is the question ambiguous? An ambiguous question is open to more than one interpretation and has a double meaning.
- Is the question easy to understand and answer? Can the respondent can easily understand and answer the question using the provided response choices.

If at any time during your review you have questions, please do not hesitate to contact me. I may be reached at the below-referenced email address or mobile telephone number.

Thank you!

Joseph G. Archer
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VITA

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