

**The Influence of Project Team Members' Competencies on Project
Success: A Study of Malaysian Construction Industry**

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DECLARATION

I hereby declare that the work presented in this dissertation was conducted in full compliance with the regulations of Universiti Malaysia Sarawak (UNIMAS). Except where proper acknowledgment is given, this work is solely the effort of the author. This dissertation has not been accepted for the award of any other degree and is not being **concurrently** submitted for any other academic qualification.

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The Influence of Project Team Members' Competencies on Project Success: A Study of Malaysia Construction Industry

ABSTRACT

Project success in the construction industry is frequently linked to the competencies of the project manager and top management support. Although much has been written about the importance of project managers, less focus has been paid on the skills of project team members and how top management support affects project results. This study investigates how emotional, managerial, and intellectual competencies among project team members, together with top management support, influence project success in the Malaysian construction industry. Using quantitative analysis, the data was analysed using SPSS 29 and SmartPLS, encompassing several stages: descriptive statistics, reliability and validity testing, correlation analysis, Partial Least Squares Structural Equation Modeling (PLS-SEM), moderation analysis, and data screening and assumptions testing. The data demonstrates a strong correlation between intellectual competence and project success, whereas emotional and managerial competencies exhibit weaker connections. It is noteworthy that despite top management support not significantly improving the influence of emotional competence, it is essential to strengthen the impact of intellectual competence on project outcomes. The findings indicate that focusing on intellectual competencies within teams, along with strategic support from the top management is crucial for enhancing project success in Malaysia's construction sector. The research provides significant insights for policymakers focused on improving project management frameworks and optimizing resource allocation to achieve better project outcomes.

Keywords: Construction Industry, Project Success, Top Management Support, PLS-SEM, Project Team Member

Pengaruh Kompetensi Ahli Pasukan Terhadap Kejayaan Projek: Satu Kajian Industri Pembinaan di Malaysia

ABSTRAK

Kejayaan projek dalam industri pembinaan sering dikaitkan dengan kecekapan pengurus projek dan sokongan daripada pihak pengurusan atasan. Walaupun banyak yang telah dikaji mengenai kepentingan pengurus projek, kemahiran ahli pasukan projek dan bagaimana sokongan pihak pengurusan atasan mempengaruhi hasil projek kurang diberikan perhatian. Kajian ini menyelidik bagaimana kecekapan emosi, pengurusan, dan intelektual di kalangan ahli pasukan projek, bersama dengan sokongan pihak pengurusan atasan, mempengaruhi kejayaan projek dalam industri pembinaan Malaysia. Dengan menggunakan analisis kuantitatif, data dianalisis menggunakan SPSS 29 dan SmartPLS, merangkumi statistik deskriptif, ujian kebolehpercayaan dan kesahan, analisis korelasi, Model Persamaan Struktur Partial Least Squares (PLS-SEM), analisis pemoderan, serta penyaringan data dan ujian andaian. Data menunjukkan korelasi yang kuat antara kecekapan intelektual dan kejayaan projek, manakala kecekapan emosi dan pengurusan menunjukkan hubungan yang lebih lemah. Walaupun sokongan pengurusan atasan tidak membantu meningkatkan pengaruh kecekapan emosi secara signifikan, sokongan tersebut masih memainkan peranan penting dalam menguatkan impak kecekapan intelektual terhadap hasil projek. Penemuan ini menunjukkan bahawa kecekapan intelektual ahli pasukan, bersama dengan sokongan strategik daripada pengurusan atasan adalah penting bagi meningkatkan kejayaan projek dalam sektor pembinaan di Malaysia. Penyelidikan ini memberikan pandangan penting untuk pembuat dasar yang menumpukan pada menambah baik rangka kerja pengurusan projek dan mengoptimumkan peruntukan sumber untuk mencapai hasil projek yang lebih baik

Kata Kunci: *Industri pembinaan, Kejayaan Projek, Pengurusan Atasan, PLS-SEM, Ahli Pasukan Projek*

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
AVE	Average Variance Extracted
AVENUE	Autonomous Vehicles to Evolve to a New Urban Experience
BIM	Building Information Modeling
BOQ	Bills of Quantities
CEO	Chief Executive Officer
CMB	Common Method Bias
CPM	Critical Path Method
EC	Emotional Competence
EFA	Exploratory Factor Analysis
EI	Emotional Intelligence
EVM	Earned Value Management
FIDIC	Fédération Internationale des Ingénieurs - Conseils
HSE	Health, Safety, and Environmental
HTMT	Heterotrait-Monotrait Ratio
IC	Intellectual Competence
IPMA	International Project Management Association
KMO	Kaiser-Meyer-Olkin (Measure of Sampling Adequacy)
MC	Managerial Competence
PCA	Principal Component Analysis
PhD	Doctor of Philosophy
PLS-SEM	Partial Least Squares Structural Equation Modeling
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
PMIS	Project Management Information System
PS	Project Success
SD	Standard Deviation
SDT	Self-Determination Theory
SmartPLS	Smart Partial Least Squares
SPSS	Statistical Package for the Social Sciences
TMS	Top Management Support

CHAPTER 1:

INTRODUCTION

1.1 Background of Study

Projects in the construction industry are essential for building infrastructure and driving economic growth in every country worldwide. The construction industry plays a central role in shaping the built environment, from homes to massive commercial development projects (Yusof et al., 2024). Despite the industry's significance, construction projects often encounter numerous challenges, such as budget exceeds, delays, and failure to meet quality standards (Yap et al., 2019). These challenges affect project timelines and budgets and can also cause long-lasting impacts on stakeholders and the reputation of the organizations involved.

Project failure remains a persistent issue despite advancements in technology and management practices. These failures often result from a variety of factors, including ineffective project management, poor planning, and insufficient coordination among stakeholders (Ahamed & Asadi, 2017). A project is considered successful if it is completed on schedule, within budget, and meets the required quality standards (Albtoush et al., 2022). A study by Alsulamy (2022) reveals that several projects in Saudi Arabia failures were primarily driven by time-related conflicts, cost overruns, and complete project abandonment, with delays caused by government officials and contractors' inability to meet delivery deadlines further aggravating the situation. While technical expertise is essential, research indicates that human-related factors, such as the competencies of the project team,

significantly affect project outcomes. Inadequate team competencies, whether emotional, managerial, or intellectual can lead to miscommunication, poor decision-making, and missed opportunities, further contributing to project failure. (Akinshipe et al., 2022) identified that successful construction project completion relies on core competencies such as innovative thinking, problem-solving, emotional maturity, and dependability, which are categorized into personality and managerial traits, emphasizing that both individual and management competencies are essential for overcoming project challenges and ensuring success.

Competencies factors such as emotional, managerial and intellectual abilities of a project team members were believed to influence project outcomes (Fareed et al., 2022). Emotional competence refers to the ability to manage self-emotion and respond to others' emotions, fostering collaboration and positive relationships within the team while managerial competence focuses on the capability to plan, organize, and control project resources effectively (Oh & Choi, 2020). On the other hand, intellectual competence is having the ability to solve problems, think critically, and come up with innovative solutions when faced with challenges (Ogli, 2024). Although there are a few studies regarding competencies in industry, the research often focusses only on the analysis towards project manager. A study by Ahsan and colleagues (2013) revealed that competencies of project managers including their knowledge, skills and abilities are important to meet the right criteria for specific project success.

Despite extensive research on project managers, there is a notable lack of studies on the competencies of project team members (Oh & Choi, 2020). Zdonek et al., (2017) note the absence of a clear framework for measuring project members' competence, with terms such as capability, qualifications, and skills often used interchangeably. This ambiguity complicates the evaluation and development of team members' competencies. Stariņeca and

Voronchuk (2015) argue that selecting project team members based on expertise is a logical strategy. Project team members significantly influence project outcomes, serving as the primary catalysts for project activities. Their expertise and performance can make the difference between project success and failure.

In addition, top management support plays a vital role in moderating the relationship between team competencies and project success. Although team members' skills are important, the guidance and resources provided by top management are crucial to ensuring that these competencies are fully leveraged. Ahmed and Anantatmula (2017) identified the absence of sufficient assistance as a hindrance to project success. Effective top management support can create an environment where the project team is empowered to perform at its best, with access to the resources and decision-making authority needed to address issues as they arise. A study by Ahmed et al., (2022) indicates that 74% of project managers believe that lack of senior management support is a primary cause of project delays and cost overruns. This highlights the critical need for proactive engagement from top management. According to Zwikael (2008), top management support practices such as resource provision, strategic alignment, and effective communication are linked to a 35% improvement in project performance. However, existing literature lacks a comprehensive compilation of top management support practices that effectively contribute to project success (Zwikael, 2008). By recognizing and addressing the importance of top management support, organizations can enhance the effectiveness of their project teams and significantly increase the likelihood of project success.

1.2 Problem Statements

Project failures in Malaysia, especially in construction industry are a significant issue that need to be addressed. Problems such as frequent delays, cost overruns and quality

shortfalls have impact economic substantially, affecting all parties involve not only in Malaysia economy but also infrastructure development (Alameri et. al., 2021). Despite numerous efforts to mitigate these challenges through improved technology, stricter regulations, and enhanced project management methodologies, the problem persists. Although considerable attention has been given to measurable factors like poor planning, resource limitations, and technical inefficiencies, human-related elements such as team competencies which include emotional, managerial and intellectual are still under discovered. This study is underpinned by Self-Determination Theory (Deci & Ryan, 2013), which posits that fulfilling individuals' needs for autonomy, competence, and relatedness enhances motivation and performance. By applying this theory, the study explores how team competencies contribute to project success.

Competence includes skills, knowledge and qualities of team members, which directly contribute to the success of project execution. Despite the increase in the complexity of construction projects, the relationship between team members competence and project outcome remains underexplored. A study by Moon et al., (2018) highlighting the urgent need to assess competencies frameworks focusing on project managers as they play vital roles in navigating the complexity of the projects. Wikarek and Sitek (2023) emphasize the need to enhance team competencies and carefully compose project teams to ensure timely and successful project execution.

The role of top management in supporting competent teams and fostering a conducive project environment is often undervalued. Bolden et al., (2023) highlighted the need to understand the relationship between agency (individual actions) and structure (organizational context) in projects. Effective top management support can serve as a moderating factor, ensuring that team members' expertise is utilized to its full potential and

that challenges are proactively addressed. A study by Blak Bernat et al., (2023) pointed out this need, recommending that future research should delve deeper into potential moderating and mediating factors affecting project success, with a particular emphasis on the role of organizational support, such as top management backing. The lack of research in this area highlights a pressing need to investigate the relationship between team competence, top management support, and project success, particularly in the context of Malaysia's construction industry.

1.3 Research Questions

1. What is the relationship between project team members individual competencies (emotional, managerial and intellectual) toward project success?
2. What is the role of top management support in moderating the relationship between emotional, managerial, and intellectual competencies and project success.

1.4 Research Objectives

In this research, there are two types of objectives which are general objectives and specific objectives. General objectives are discussed in the area of interest while specific objectives are discussed on the elements in the framework.

1.4.1 General objectives

The general objective for the research is to assess the effect of various competencies among team members on project success and what are the effects given by the top management support as a moderator.

1.4.2 Specific objectives

The specific objectives are as follows:

- i. To identify the competencies factors (emotional, managerial, and intellectual) of team members and their influence on the success of a project.
- ii. To examine the moderating effect of top management support on the relationship between project team members competencies and project success.

1.5 Significance of Study

1.5.1 Practical Contribution

This research offers valuable insights into enhancing project management practices through the identification and analysis of emotional, managerial, and intellectual competencies essential for project success. The findings provide valuable insights for HR specialists and project managers to enhance selection and training criteria for project teams. Organizations can leverage these insights to create focused programs that enhance critical competencies, including emotional intelligence, improve team cohesion and resilience, and cultivate a supportive workplace culture. This proactive approach improves productivity by tackling mental health challenges such as burnout and stress (Clarke, 2010; Rezvani & Khosravi, 2019).

Focusing on emotional competencies, including stress management and team-building activities can greatly improve communication and collaboration among team members. Educating project managers to identify indicators of burnout can ensure that teams operate under the best possible conditions to execute their responsibilities. By focusing on

emotional intelligence, organizations can foster more empathetic environments that enhance team morale, resulting in improved overall performance and productivity.

Investigating managerial competencies provides project managers with optimal strategies in decision-making, communication, and conflict resolution. The competencies significantly influence project success through enhanced schedule adherence and increased client satisfaction. Organizations can cultivate a culture of ongoing enhancement through mentorship programs, where seasoned managers share their knowledge, facilitating improved management of project dynamics and more effective resolution of conflicts.

The study highlights the critical role of top management support in ensuring project success. Through the provision of strategic guidance, resources, and the promotion of a collaborative culture, senior management can improve team effectiveness. Comprehending the moderating influence of top management support facilitates more strategic resource allocation, ensuring that projects are aligned with organizational objectives and receive adequate support throughout their lifecycle.

1.5.2 Theoretical Contribution

This research enhances project management theory by broadening traditional competency models by including emotional, managerial, and intellectual competencies, thereby offering a more comprehensive framework for understanding project success. The incorporation of emotional intelligence, including empathy and self-regulation, highlights the significance of interpersonal dynamics in project settings, indicating that effective project managers require a combination of technical, managerial, and emotional competencies. The study also points out the significant influence of top management support, showing how the organizational context via resources, communication, and

strategic alignment boosts the effectiveness of project team competencies, leading to improved project outcomes.

The study provides a solid basis for future research on the connections between competencies and project success in construction industries, establishing a framework for the development of context-specific competency models. This research connects practical and theoretical applications, providing valuable insights for project management professionals on the selection, training, and development of teams through a comprehensive approach to competencies. This study highlights the significance of team member competencies such as emotional, managerial, and intellectual and their influence on project success, while also examining how support from top management in these areas improves project outcomes.

CHAPTER 2:

LITERATURE REVIEWS

2.1 Overview

The construction industry in Malaysia has been a pivotal sector in the country's economic development, contributing significantly to GDP and employment. Since the 1980s, Malaysia has seen rapid development with mega-projects, positioning the construction industry as a key player in the nation's transition towards becoming a developed country (Fateh et al., 2022). The industry contributes significantly to GDP, although it has not yet reached the targeted 6% annual growth (Dehdasht et al., 2021). Apart from that, the construction sector is a major employer, with a significant portion of the workforce being foreign laborers due to a shortage of skilled local workers (Najib et al., 2020).

The construction industry in Malaysia faces significant challenges related to project management failures, which have severe implications for project outcomes, economic stability, and stakeholder satisfaction (Cheong & Mustafa, 2017). Project failure in the Malaysian construction industry is a significant issue, characterized by frequent time and cost overruns (Alameri et al., 2021), quality defects (Pirotti et al., 2020), communications problem (Quan et al., 2022), and contractor and resources management problem (Yap et al., 2020). These failures have substantial economic impacts (Pirotti et al., 2020), environmental impacts (Gomarn &

Pongpeng, 2018), affecting not only the projects themselves but also the broader economy and stakeholders involved.

Therefore, the success of projects is a critical concern in project management due to its direct impact on efficiency, resource allocation, and overall project performance (Gunduz & Yahya, 2015; Mavi & Standing, 2018; Gunduz & Almuajebh, 2020). Successful projects ensure timely completion, cost-effectiveness, and quality, which are essential for maintaining competitiveness and client satisfaction in this complex and fragmented industry (Kabirifar & Mojtahedi, 2019; Mavi et al., 2024). The success of a project is governed by several factors. Among these, the competence of project managers and teams plays a pivotal role in determining success. However, competence alone may not be sufficient, as organizational support, particularly top management support (TMS), can significantly influence project outcomes.

TMS is vital for project success, providing resources, strategic direction, and decision-making authority (Fareed, et al., 2023). Resources include financial investment, personnel, and technology, while strategic direction aligns project goals with the company's long-term objectives. Decision-making authorities help project teams make timely and effective decisions, reducing delays and enhancing performance (Zhu et. al., 2020; Zhao et al., 2024). Support from top management also creates an environment that promotes collaboration and innovation. When senior leaders are engaged and supportive, project teams feel valued and motivated, leading to better performance and commitment. Top management can remove obstacles and provide the necessary backing to navigate challenges, increasing the likelihood of project success (Hermano & Martin-Crus, 2016). Hence, this chapter reviews existing literature on the relationship between competence and project success, with a focus on the moderating role of TMS and project managers.

2.2 Competencies in Project Management

Project management requires a diverse set of competencies to ensure project success. The competence of the project manager is a critical factor that influences the outcome of a project, encompassing a combination of skills, knowledge, and behaviours essential for effective leadership and management (Ghorbani, 2023). Project managers can align projects with organizational goals by using strategic and business management competencies, which involve financial acumen and stakeholder management to make sure projects improve the organization's bottom line (Pacheco et al., 2023). The International Project Management Association (IPMA) Individual Competence Baseline and the Project Management Institute (PMI) are two competency frameworks that offer standardized models for evaluating and developing these competencies. They also provide a comprehensive view of the skills that are needed, classifying them into technical project management, leadership, and strategic and business management. Research has shown that there is a positive relationship between project management competencies and project success (Kukah et al., 2022). The ongoing professional development via certification and training programs in order to preserve and improve these abilities has contributed significantly to achieve successful project outcomes within the construction industry (Greta & Gross, 2020).

Recent studies have continued to support and expand upon these findings. For instance, studies by Daraojimba et al. (2024) and Moloto et al. (2020) indicate that agile methodologies have become a significant factor in project success, requiring project managers to develop adaptability and continuous improvement skills. Digital transformation competencies are increasingly important too, as project managers need to navigate digital tools and technologies effectively (Henderikx & Stoffers, 2022). The growing complexity of projects also necessitates

a broader range of competencies. A study by Fuertes et al. (2020) highlights the importance of strategic management in achieving organizational objectives, which can allow strategic management skills to better align project outcomes with long-term organizational goals. This aligns with the findings of Dalcher (2017), who argues that project managers must also possess a deep understanding of change management principles to lead projects through transformative phases effectively.

In addition to these competencies, the significance of sustainability in project management has gained attention. El Khatib et al. (2020) emphasizes the growing trend of sustainability in project management and its alignment with broader organizational and societal goals. Professional development remains a cornerstone for maintaining and enhancing these competencies. As highlighted by Mcgrath and Kostalova (2020), project managers need to develop new skills and competencies to navigate the complexities of modern projects and meet the evolving expectations of stakeholders in a post-2020 landscape. The competency landscape for project managers is evolving, with an increasing emphasis on agile methodologies, digital transformation, emotional intelligence, strategic management, and sustainability. These competencies are essential for achieving project success in today's dynamic and complex business environment (Alaloul et al., 2021).

Project management competencies are essential skills and abilities that project managers need to successfully manage projects. These competencies are often categorized into "hard" and "soft" skills, with a growing emphasis on the latter in recent years. In project management, both hard and soft skills are crucial for a project manager's success. Hard skills involve technical abilities such as planning, budgeting, and risk management, while soft skills encompass

interpersonal abilities like communication, leadership, and teamwork (Ravindranath, 2016; Jena & Satpathy, 2017; Tahir, 2020).

2.2.1 Hard Skills

Technical competencies, often referred to as hard skills, are foundational for managing the physical, regulatory, and procedural components of construction projects (Nuwan et al., 2020; Amoah & Marimon, 2021; Kissi et al., 2024). It also often refers to technical abilities and knowledge to perform specific tasks (Hassandoust & Andrade, 2020). These skills are largely acquired through formal education, certifications, and hands-on industry experience. Rauzana et al. (2022) emphasized that technical proficiency is a prerequisite for managing project complexity and ensuring quality outcomes in the construction sector. An effective project management relies on a mix of technical skills, including project planning to define goals and tasks, scheduling to create timelines and allocate resources, and risk management to identify and mitigate potential issues (Abdelmasseh et al., 2022; Pieterse et al., 2022; Abdulla et al., 2023). These skills are fundamental to ensure projects are completed efficiently, on time, within budget, and to the required quality standards (Fernandes et al., 2022).

Studies have shown that hard skills significantly impact project success, noting that project managers with strong technical backgrounds are better equipped to understand and address the complex demands of projects, including technical challenges, resource management, and risk mitigation (Nicholas & Steyn, 2020). Ahsan et al. (2013) found that hard skills in areas such as financial management and contract administration are pivotal for ensuring project deliverables are met within budget and on time. Thus, the development and continuous enhancement of hard skills through education and training are vital for project managers to

maintain high standards of performance and achieve successful project outcomes. Traditional project management literature emphasizes the importance of hard skills, such as time management, budgeting, risk management, and technical proficiency.

Key technical competencies include construction planning, scheduling and monitoring, where project managers utilize tools like Gantt Charts, Primavera P6 and Microsoft Project, and apply methods such as the Critical Path Method (CPM) and Work Breakdown Structure (WBS) for accurate timeline forecasting (Pawlowski & Plechawska, 2022; Shah & Chandragade, 2022; Fernandes et al., 2022; Wang et al., 2022). The traditional project management methods used is Project Management Body of Knowledge (PMBOK), which provides structured approaches to project management, focusing on detailed planning and predictable processes (Valadares et al., 2024). The advancements in project management software and tools demand continuous learning and adaptation.

The project management information systems (PMIS) significantly enhance a project manager's ability to plan, execute, and monitor projects efficiently. PMIS technologies are crucial for handling complex engineering projects, enabling better risk management, resource utilization, and scheduling. They facilitate strategic decision-making and performance monitoring, which are essential for delivering projects quicker and cheaper (Besouw, 2020). These systems also provide essential decision-making support, improve project planning, scheduling, monitoring, and control, and contribute to project success by enhancing budget control and meeting deadlines (Indi et al., 2023). In construction and software development, PMIS improve team collaboration, task allocation, and resource management. This leads to more efficient project execution, accurate cost control, and improved product quality and customer satisfaction (Indi et al., 2023; Wang et al., 2023). The usage of PMIS has been

demonstrated in several studies proving that the utilization of advanced project analytics and software tools improve project performance by enabling more accurate forecasting and risk assessment (Xue et al., 2020; Choi & Ha, 2021; Simiyu & Kirinyet, 2024).

Cost estimation and control is equally important, involving preparation of bills of quantities (BOQ), understanding of unit rates, and application of Earned Value Management (EVM) for budget tracking (Fengrong, 2021; Luyue et al., 2022; Zhang & Tang, 2023; Yalçin et al., 2024). Contract and procurement management is another critical area, especially in handling standard forms such as FIDIC, PAM, or JKR contracts, overseeing tender evaluations, and coordinating with subcontractors and suppliers (Construction Industry Development Board, 2021; Hassan & Omwenga, 2023; Mwanaumo et al., 2024). Health, Safety, and Environmental (HSE) compliance also remains a top priority, requiring knowledge of OSHA regulations, safety auditing, and hazard identification to maintain a safe construction environment (Albert et al., 2020; Afroh, 2023; Adeyemo, 2024).

With the rise of digital transformation, technological competencies such as the use of Building Information Modelling (BIM), AutoCAD, drones for site inspections, and construction management software (e.g., Procore, Navisworks) are now indispensable (Chen et al., 2021; De Souza & Debs, 2023; Siddiqui et al., 2023). These competencies are essential for improving efficiency, safety, and sustainability in construction projects. As the industry continues to evolve, the demand for these skills will likely grow, necessitating ongoing education and training for the workforce. Additionally, construction managers must be adept in quality assurance and site documentation, ensuring compliance with regulatory standards and maintaining clear records of project progress.

The significance of hard skills is also evident in the realm of digital transformation. Project managers with expertise in digital tools and platforms are better positioned to lead projects that involve the integration of new technologies. This is particularly relevant in the context of Industry 4.0, where digital proficiency is essential for managing projects that incorporate automation, data analytics, and IoT technologies (Schmidt et al., 2015). Furthermore, the role of hard skills extends to managing virtual teams and remote project execution, which have become increasingly prevalent in the wake of the COVID-19 pandemic. Studies by Wang et al. (2021) indicate that project managers who possess strong technical skills in communication platforms and collaboration tools are more effective in maintaining team cohesion and productivity in a virtual environment.

The continuous training and education enhance project managers' competencies, such as leadership, communication, and emotional intelligence, which are crucial for project success (Bonesso et al., 2020; Pacheco et al., 2023). Project managers who engage in ongoing education and training demonstrate higher levels of competence and are better equipped to handle the dynamic challenges of contemporary project management (Ackermann et al., 2023). The mastery of hard skills is indispensable for project managers striving for excellence in their field. The evolving demands of the profession necessitate a commitment to continuous learning and skill development, ensuring that project managers remain proficient in the essential technical competencies required for successful project outcomes (Marcelino-Sádaba & Pérez-Ezcurdia, 2020; Irfan et al., 2021).

2.2.2 Soft Skills

In addition to technical skills, soft skills are also crucial for project management as they significantly contribute to project success by enhancing emotional intelligence (EI), communication, leadership, and teamwork (Moradi et al., 2020). Soft skills refer to the interpersonal and behavioural abilities that enable effective collaboration and leadership in dynamic environments. These are particularly important in construction, where project teams often comprise multicultural, multidisciplinary professionals and manual labourers working under high-pressure conditions (Subedi, 2021). These skills enable project managers to effectively manage teams, build trust, and navigate the complexities of modern project environments (Kearney et al., 2024). (Zuo et al., 2018) highlight that behavioral competency, including leadership, communication, negotiation, and adaptability, are critical for managing the social and psychological aspects of projects. Project managerial work environments are greatly impacted by contextual performance behaviors, which are frequently the source of these competences. These abilities include teamwork, leadership, flexibility, communication, and handling conflicts.

EI helps project managers understand and manage their own emotions and those of their team members, fostering a positive work environment and teamwork (Mazur et al., 2014; Castro et al., 2022). The study identifies critical EI competencies like strong leadership abilities, effective team building, and conflict resolution, which are associated with improved personal and project performance, inspired leadership, and enhanced communication skills (Kukah et al., 2022). EI is essential for project managers since it helps them to effectively negotiate interpersonal dynamics and promote a cooperative team atmosphere which eventually enabling effective collaboration (Tahir, 2020).

Apart from that, effective communication is consistently highlighted as a critical soft skill for project success. It facilitates clear information exchange among team members and stakeholders, ensuring alignment and understanding throughout the project lifecycle (Paredes, 2020; Kearney et al., 2024). Musheke and Phiri (2021) argue that effective communication is essential for ensuring that all parts of an organization work together harmoniously, leading to better decision-making, increased efficiency, and the achievement of organizational goals. This ability is underpinned by competencies such as empathy, active listening, and effective communication, which enable project managers to understand and address stakeholder concerns, thereby ensuring that project goals are aligned with stakeholder expectations. The alignment of these goals is crucial for securing stakeholder buy-in and support, which in turn facilitates smoother project execution and enhances the likelihood of project success.

Leadership is a critical factor in project success, complementing traditional project management methodologies. It involves a holistic approach that integrates various leadership styles and competencies to adapt to dynamic project environments (Ponomaryov et al., 2022; Kengera, 2023). Leadership skills are essential for guiding teams, making strategic decisions, and fostering a collaborative environment. Strong leadership contributes to higher project success rates by motivating and aligning team efforts with project goals (Pena & Munoz, 2020; Lu & Young, 2022). Different leadership styles, such as empowering, transformational, and humble leadership, along with essential competencies, play a pivotal role in guiding projects to successful outcomes (Zhao et al., 2021; Ahmad et al., 2022; Fareed et al., 2023). Better project outcomes are closely correlated with leadership qualities, such as the capacity to motivate and influence team members. Moreover, the book by (Rahim, 2023) thoroughly discusses the

significance of conflict resolution abilities in organizational settings. It emphasizes how effective conflict management is crucial for handling disagreements and preserving team unity.

Another key soft skill required in project management is teamwork and interpersonal skills. These skills are necessary for effective collaboration and conflict resolution within project teams. They help in building a cohesive team that can work efficiently towards common objectives (Tian, 2020; Paredes et al., 2020; Kearney et al., 2024). According to a study by Langer et al. (2014), project managers who prioritize team cohesion and collaboration can significantly improve project performance. This involves creating an environment where team members feel valued and supported, which can be achieved through regular team-building activities, transparent communication, and recognition of individual and team achievements. Effective conflict resolution is also essential in maintaining team harmony, as it prevents minor disagreements from escalating into major disruptions. This holistic approach to team management not only enhances productivity but also boosts team morale, leading to more innovative and efficient project outcomes. Teamwork and collaboration are crucial as it contributes to the project efficiency and quality (Modupe-Samuel, 2022; Wawak, 2024), enhance leadership and team dynamics (Ali et al., 2021), as well as ensuring stakeholder engagement (Ali, 2024).

Furthermore, the importance of adaptability and flexibility in project management cannot be overstated. In the face of rapidly changing project requirements and unforeseen challenges, project managers who exhibit high levels of adaptability are better equipped to adjust plans and strategies to maintain project momentum (Peterson, 2020). This adaptability often involves quick decision-making and problem-solving, both of which are enhanced by strong analytical and critical thinking skills. Research by Arefazar et al. (2022) mentioned the

importance of adaptability and flexibility in project management, particularly in the context of construction, where unexpected changes and challenges are common. Incorporating a behavioral perspective, which emphasizes soft skills, provides a more comprehensive understanding of project management and enhances the likelihood of project success (Saadi et al., 2020; Castro et al., 2022).

Soft skills play a vital role in project management, influencing everything from stakeholder engagement to team dynamics and adaptability in the face of change. By integrating these skills into their practice, project managers can enhance their effectiveness, ensuring that projects are not only completed on time and within budget but also meet or exceed stakeholder expectations. The continuous development and application of soft skills are therefore essential for the sustained success of projects and the overall growth of the project management profession.

2.3 Project Team Member Competencies

Competencies in project management are defined as a combination of knowledge, skills, attitudes, and behaviours necessary to perform project-related tasks effectively (Arifin, 2021). In the construction industry, known for its complexity, multi-stakeholder engagement, and technical intensity—project management competencies play a decisive role in project success (Pacheco et al., 2023).

Scholars and industry frameworks such as the Project Management Institute (PMI) and the Construction Industry Development Board (CIDB) emphasized the need for project managers and team members to possess a well-rounded set of competencies to manage the

technical, human, and strategic elements of construction projects effectively. These competencies encompass a range of skills and attributes necessary for effective collaboration and project execution such as emotional competency, managerial competency and intellectual competency.

2.3.1 Emotional Competency

Emotional competence, often referred to as emotional intelligence (EI), is a crucial element in the realm of project management. It encompasses the ability to recognize, understand, and manage one's own emotions as well as those of others. This competence is instrumental in fostering effective leadership, enhancing team dynamics, and ultimately contributing to project success. EI is widely recognized for its impact on leadership effectiveness. The concept of EI was first introduced by Goleman in 1998, emphasizing its significance over traditional cognitive intelligence in predicting success. Leaders with high EI are adept at managing interpersonal relationships judiciously and empathetically, which is critical for team cohesion and motivation. Leaders with high EI can foster team cohesion and effectiveness by managing emotions and facilitating positive interactions among team members. This is achieved through emotional contagion, where leaders transmit positive emotions to their teams, enhancing overall team morale and cohesion (Mindeguia et al., 2021; Xiao et al., 2023; Raghvendra, 2024). EI plays a crucial role in other leadership qualities, such as persuading, teamwork and conflict management (Khosravi et al., 2020). A construction project managers need to demonstrate EI, particularly empathy and self-regulation, to manage culturally diverse teams and maintain morale under stressful conditions (Montenegro et al., 2021).

EI also aids in mitigating intra-team conflicts, thus enhancing team effectiveness and cohesion. Leaders possessing elevated EI can manage disagreements more adeptly, mitigating their negative effects on team dynamics (Xiao et al., 2023; Bethari, 2024). Project managers with high emotional competence are better equipped to navigate the complex social dynamics of project teams. Project managers who can effectively manage their emotions and understand the emotional cues of others tend to foster a more collaborative and productive team environment (Montenegro et al., 2021; Sposito et al., 2023). This ability to manage and leverage emotions positively impacts team performance and project outcomes.

Furthermore, emotional competence is linked to stress management and resilience in project environments. Project management often involves high-stress situations and tight deadlines. Project managers with high EI are more resilient and better at coping with stress, leading to more stable project environments (Rezvani & Khosravi, 2019; Montenegro et al., 2021). Their ability to maintain emotional stability helps in making rational decisions even under pressure. Individuals with higher EI are better at appraising stressors as challenges rather than threats, leading to more resilient stress responses (Liu et al., 2021; Liu & Boyatzis, 2021).

In addition to project success, emotional competencies play a pivotal role in several other critical aspects of organizational functioning. One such area is employee well-being and job satisfaction. For instance, project managers with higher levels of EI were associated with higher project performance and success rates (Langowski & De Freitas, 2024). Their research supports the notion that EI is a critical factor in achieving successful project outcomes (Castro et al., 2022). Research has also shown that leaders and managers with high emotional intelligence create a more positive work environment, which significantly enhances the well-being and satisfaction of their team members (Kanuto, 2024). EI in leaders are better at fostering a

supportive and inclusive work culture, leading to higher levels of employee engagement and lower turnover rates (Majee & Jamshed, 2020; Amah, 2023; Milhem et al., 2024). This positive work environment also reduces instances of burnout, as employees feel more understood and valued by their emotionally competent leaders.

Moreover, emotional competence is integral to fostering innovation within organizations. Leaders who exhibit high EI encourage open communication and are more adept at recognizing and managing the diverse emotional responses that come with creative processes (Sivanthinathan et al., 2023). This supportive environment enables team members to feel safe in expressing novel ideas without fear of criticism or rejection (Nguyen et al., 2024). These leaders are better at managing the emotional complexities that accompany the risk-taking necessary for innovation, thereby driving organizational growth and competitiveness (Janitra & Supratikta, 2024).

Another significant impact of emotional competence is observed in the realm of organizational change management by influencing how change is perceived, implemented, and received within an organization. Changing initiatives often evoke a range of emotional responses from employees, including fear, resistance, and uncertainty (Souza & Chimenti, 2024). Leaders with high EI are more effective in managing these emotions, thereby facilitating smoother transitions during organizational change (Fragouli, 2020). The integration of EI into change management practices can enhance engagement, reduce resistance, and foster a supportive environment during transitions (Jelača et al., 2022). By fostering EI and reflexivity, organizations can better manage change processes, reduce resistance, and enhance employee commitment and performance (Fragouli, 2020; Souza & Chimenti, 2024).

Emotional competence, which includes skills like empathy and self-awareness, improves communication by allowing individuals to better understand and respond to the emotions of others (Messaoudi & Sakale 2024; Givargizova, 2024). This competency enables leaders to build trust, resolve conflicts amicably, and foster a collaborative work environment (Ludwig et al., 2022). According to Jordan and Troth (2021), emotional intelligence is a key factor in effective conflict resolution, as it allows leaders to navigate disagreements constructively and maintain positive relationships among team members. This relational aspect of emotional intelligence is crucial for team cohesion and the establishment of a cooperative organizational culture.

Furthermore, emotional competence is linked to ethical decision-making and moral leadership. EI enhances individuals' ability to make ethically sound decisions by improving emotional awareness, regulation, and empathy, which are crucial for navigating moral dilemmas effectively (Gómez-Leal et al., 2021; Nyamori, 2024). Emotional regulation self-efficacy also positively influences moral decision-making by fostering interpersonal trust, which is essential for ethical interactions (Liu et al., 2022). Leaders with high EI are more likely to exhibit ethical behavior and make decisions that align with the values and principles of the organization. This is because they are better at understanding the emotional implications of their decisions on various stakeholders and are more committed to acting in the best interest of their team and organization (Hrechanyk, 2023). Leaders with high EI and ethical competence are better equipped to handle stress, resolve conflicts, and make decisions aligned with professional ethics. This enhances their ability to lead morally and ethically (Gómez-Leal et al., 2021; Przybylska & Nieduziak, 2023).

In the context of learning and development, emotional competence is essential for effective mentorship and coaching. Leaders who possess high levels of emotional intelligence are better mentors as they can understand and respond to the emotional needs of their mentees (Prummer et al., 2024). This understanding fosters a more supportive and developmental mentoring relationship, which enhances the professional growth and competence of employees. Mahmood (2024) suggests that emotionally intelligent mentors are indeed more effective in providing guidance and feedback, which in turn accelerates the learning and development of their protégés.

In summary, while the role of emotional competence in achieving project success is well-documented, its influence extends far beyond this domain. EI is a critical determinant of employee well-being, innovation, change management, interpersonal relationships, ethical leadership, and mentorship. These multifaceted impacts highlight the importance of developing emotional competence within organizational leaders to foster a holistic and thriving work environment.

2.3.2 Managerial Competency

Managerial competencies are essential for project managers to effectively lead their teams and ensure the successful completion of projects. These competencies encompass a range of skills, knowledge, and behaviours that enable project managers to navigate complex project environments, make informed decisions, and achieve project goals.

One of the primary managerial competencies is decision-making. Effective decision-making involves the ability to analyze complex situations, consider various alternatives, and choose the best course of action (Secundo et al., 2021). Decision-making is a crucial competency

that influences the overall success of a project by ensuring timely and informed choices, which are crucial for navigating complex project environments. Project managers' capabilities, including decision-making, directly influence corporate performance and project sustainability (Lee et al., 2024). Project managers must be adept at making timely and well-informed decisions to address issues, allocate resources, and manage risks.

Decision-making competence is linked to cognitive abilities such as general intelligence, numeracy, and executive functions. These abilities contribute to making better decisions and can be enhanced through motivation, emotion regulation, and experience (De Bruin et al., 2020; Skagerlund et al., 2021). Delays in decision-making can negatively impact project performance, particularly in construction projects. Factors such as lack of technical competence, incomplete paperwork, and poor communication can cause delays. Implementing a sustainable decision-making model can help mitigate these issues (Khahro et al., 2023). Moreover, economic decision-making is vital for ensuring projects are financially viable and meet stakeholder interests. This involves deep economic analysis to predict future trends and make informed decisions that ensure financial returns (Galli, 2020; Galli, 2021).

Project managers with strong decision-making and planning skills are better equipped to identify potential risks early, develop mitigation strategies, and respond effectively to unforeseen challenges (Sivasankaran et al., 2023; Tanim, 2025). Effective risk management requires decision-makers to apply a set of principles that guide them through complex and conflicting factors (Krewski et al., 2022). These principles help in balancing precautionary actions with risk-based decision-making, ensuring that decisions are informed by both scientific and extra-scientific factors (Dawood et al., 2023). According to Hillson and Murray-Webster (2017), risk management is a critical competency for project managers, enabling them to

navigate complex project environments and ensure organizational resilience. This competency helps organizations to not only manage individual project risks but also build a culture of proactive risk management, enhancing their ability to withstand and recover from adverse situations.

Conflict resolution is another important managerial competency enhancing a manager's ability to lead effectively and improve team productivity. Projects often involve diverse teams with varying perspectives and interests, which can lead to conflicts. Training in conflict management and resolution strategies can significantly boost team productivity and project effectiveness by improving cooperation and coordination within teams (Zelenko et al., 2023; Bhakuni et al., 2024). Managers who adopt collaborative conflict resolution styles, such as using a 5D CAD model, can help detect and resolve spatial conflicts, thereby optimizing project time and (Rohani et al., 2018). Project managers must be skilled in identifying and resolving conflicts to maintain a harmonious and productive team environment. Conflict resolution can lead to new insights, reduce tension, and improve workplace dynamics, which are essential for achieving project goals and reducing task ambiguity (Adeyemi & Aigbavboa, 2021). Teams led by managers with strong leadership and conflict resolution skills tend to exhibit higher levels of cohesion and collaboration. These managers are adept at building trust among team members, facilitating open communication, and resolving conflicts constructively. A study by Katzenbach and Smith (2015) found that effective leadership significantly enhances team performance by promoting collaboration and leveraging the diverse skills and perspectives of team members.

Furthermore, project managers need strong planning and organizational skills. These competencies involve the ability to develop detailed project plans, set realistic timelines, and manage resources efficiently. Effective planning and organization are critical for ensuring that

projects are completed on time, within budget, and to the desired quality standards (Fanelli et al., 2020; Chowhan et al., 2024; Pahlevi, 2025). These skills also include the ability to anticipate potential obstacles and develop contingency plans. Effective planning skills are essential for strategic planning, which mediates the relationship between managerial skills and organizational performance. Strategic planning allows for better resource utilization and aligns organizational activities with long-term goals, thereby enhancing performance (Ahmad & Ahmad, 2021).

Additionally, project managers skilled in planning and organization can systematically capture project learnings, contributing to the organization's knowledge base and improving future project outcomes. Managers with strong planning and organizing skills are better equipped to manage resources effectively. This includes human resources, financial assets, and operational processes, which are critical for sustaining organizational growth and development (Masoud & Khateeb, 2020; Salazar et al., 2024). A good planning and organizational skills also correlated to time management skills, where time management skills are integral to managerial competence, influencing job performance, decision-making, and the ability to handle complex tasks efficiently (Aeon et al., 2021). Effective time management helps managers make better decisions by allowing them to allocate resources efficiently and avoid role overload (Bachrach et al., 2024). This is crucial in maintaining high performance, especially in roles that require discretionary behaviors like helping and voice (Gorokhova, 2020).

In addition, managerial competencies influence the ethical climate and organizational culture. Ethical behavior and responsibility are crucial for maintaining integrity and trust within an organization (Castaño et al., 2023). Project managers with high ethical standards and strong leadership skills set the tone for ethical behavior within their teams. They model integrity and

transparency, creating an ethical climate that permeates the organization (Meleca & Sevciuc, 2024). A responsible management competence includes skills to handle moral dilemmas and stakeholder value, emphasizing the importance of environmental sustainability and the ability to assimilate and exploit knowledge for organizational learning (Dzhengiz & Niesten, 2020).

One significant area where managerial competencies play a crucial role is employee engagement and satisfaction. Competent project managers, through their effective decision-making, leadership, communication, and conflict resolution skills, create a work environment that promotes higher levels of employee engagement (Rabiul et al., 2022; Karpov & Bazarov, 2024). Engaged employees are more committed to their work, demonstrate higher productivity, and are more likely to stay with the organization (Aftab et al., 2022).

2.3.3 Intellectual Competency

Intellectual competencies are crucial for project managers as they encompass cognitive abilities such as problem-solving, critical thinking, and innovation, which are essential for navigating complex project environments and achieving successful outcomes. These competencies enable project managers to analyze situations, anticipate challenges, and devise effective strategies to meet project objectives.

Problem-solving is a fundamental intellectual competency. It involves identifying issues, understanding their root causes, and developing appropriate solutions. Effective problem-solvers requires a combination of analytical skills and creativity, allowing them to understand complex problems and devise innovative solutions (Choudar et al., 2022; Adeoye & Jimoh, 2023). Project managers must be able to dissect complex problems, evaluate potential solutions, and implement the most effective ones. The integration of educational

technology, along with strategies like scaffolding and peer collaboration, enhances problem-solving skills by creating immersive learning environments and providing practical training (Lu & Xie, 2023). This competency is critical in project management, where unforeseen challenges are common, and the ability to resolve them promptly can significantly impact project success (Rauzana et al., 2022).

Critical thinking is another vital intellectual competency for project managers. It involves the objective analyze, evaluate and synthesis information from an issue to form a judgment (Raj et al., 2022; Verma et al., 2022; Usanova et al., 2024). Critical thinking skills can be developed by problem-based learning as it encourages engagement with real-world problems, promoting deeper understanding and critical analysis (Anggraeni et al., 2023). Facione (2011) emphasizes that critical thinking skills enable project managers to make well-informed decisions by assessing the validity of information, recognizing biases, and considering alternative viewpoints. This competency is essential for effective decision-making and strategic planning, as it allows project managers to navigate uncertainties and make sound judgments (Anantatmula, 2015). Critical thinking is essential for navigating the complexities of modern society, where information and knowledge are key resources. It enhances one's ability to perceive information critically, analyze it independently, and use it effectively (Usanova et al., 2024; Sušić, 2024).

Innovation and creativity are also key in intellectual competencies which refer to the ability to generate new ideas and solutions, adapt to new situations, and apply knowledge in novel ways. Inspiring intuition plays a significant role in managing innovative projects. It allows project managers to foresee new products and processes that cannot be planned purely rationally, thus requiring an intuitive approach. This intuition is supported by creative

competencies, which are categorized into linear, literal, and holistic levels (Bushuyeva et al., 2022a; Bushuyeva et al., 2022b). The concept of creative management involves integrating creativity into the management processes, which has become increasingly popular. This approach emphasizes the importance of intellectual property rights and strategic planning in fostering innovation (Saukh & Vikarchuk, 2021). Moreover, the ability to learn and adapt is an integral part of intellectual competencies. Kolb (2014) introduced the concept of experiential learning, which involves learning through experience and reflection. Project managers who continuously learn from their experiences and adapt their approaches accordingly are more likely to succeed in dynamic project environments. This adaptive capability allows them to respond to changing conditions and emerging challenges effectively.

Intellectual competencies are instrumental in enhancing decision-making quality at both the project and organizational levels. Project managers with advanced critical thinking and analytical skills are adept at evaluating complex information, recognizing patterns, and predicting potential outcomes (Farid et al., 2021). This ability to make informed and strategic decisions is crucial not only for project success but also for broader organizational effectiveness. Research by Hallo and Nguyen (2021) emphasizes that effective leadership requires a balance between intuitive insights and critical, analytical capabilities. suggests that strategic decision-making benefits from the critical and analytical capabilities of leaders, who can navigate uncertainty and make decisions that align with organizational goals. Thus, the intellectual competencies of project managers contribute to a more robust and resilient decision-making framework within the organization (Oh & Choi, 2020). Intellectual competency also acts a mediator in the relationship between big data analytics and project success. It highlights the importance of intellectual resources in leveraging data for successful

project outcomes (Norena-Chavez & Thalassinou, 2023). Intellectual competency is a critical factor in project success, often working synergistically with emotional intelligence and leadership skills. It serves as a predictive indicator of success, especially in complex and data-driven projects, and enhances team dynamics and planning effectiveness (Irfan et al., 2021). These insights highlight the multifaceted role of intellectual competency in achieving successful project outcomes.

In addition to their impact on project success, intellectual competencies of project managers significantly influence various other organizational outcomes and processes (Fareed et al., 2022). One key area where intellectual competencies play a crucial role is in fostering a culture of continuous improvement and organizational learning (Fareed et al., 2021). In the construction industry, project manager competencies play a moderating role in enhancing project success by effectively managing organizational culture, communication, and project scope clarity (Muneer et al., 2022).

Intellectual competencies also have a profound impact on risk management and resilience. It influences the ability of construction managers to anticipate, respond to, and recover from disruptions effectively. Intellectual competence in project managers is vital for aligning strategies and fostering a homogenous culture, which are essential for effective risk management and reducing rework in construction projects (Tabassi et al., 2016; Love & Matthews, 2020). Project managers with strong analytical and critical thinking skills are better at identifying potential risks, assessing their impact, and developing effective mitigation strategies. This proactive approach to risk management enhances the organization's ability to anticipate and respond to challenges, thereby increasing overall resilience.

Moreover, intellectual competencies are crucial for fostering a culture of ethical decision-making and integrity. Project managers with advanced critical thinking skills are more likely to evaluate the ethical implications of their decisions and actions. They can assess the broader impact of their choices on stakeholders and the organization, ensuring that their decisions align with ethical standards and organizational values. According to Trevino and Nelson (2021), ethical decision-making in organizations is heavily influenced by the cognitive abilities of leaders, who can critically evaluate situations and make decisions that uphold ethical principles. Therefore, intellectual competencies not only enhance decision-making quality but also promote a culture of ethics and integrity within the organization.

2.4 Top Management Support

Top management support (TMS) plays a pivotal role in influencing the outcomes of project success, particularly in environments characterized by complexity and uncertainty, such as the construction industry (Mohd Zureehan & Lee, 2022). Previous studies have consistently highlighted that the active involvement of top management can significantly enhance the effectiveness of project implementation by providing direction, resources, and authority (Nyesemane et al., 2023). As a moderating variable, top management support strengthens the relationship between individual competence and project success by creating an enabling environment in which project teams can operate effectively (Rahah & Kadir, 2022).

2.4.1 Resource Provision

Resource provision refers to the extent to which top management allocates and ensures the availability of financial, human, technological, and material resources necessary for project

execution (Enyinna et al., 2025; Oluwabunmi Ayoade, 2025; Seyisoglu et al., 2025). According to (Aliyev, 2025), the lack of adequate resources is a common barrier to project success, and this gap can often be attributed to insufficient top-level commitment. When top management is actively engaged, they not only allocate resources but also prioritize projects within the organizational structure, reducing delays and operational bottlenecks (Trunk & Gačnik, 2025).

In construction projects, the allocation of resources indicates strong organizational support, which increases employee engagement and emphasizes the importance of the project (Dayoub & Fakhratov, 2021). Enough resources allow skilled construction workers to fully utilize their knowledge, which has a direct impact on the timeliness, safety, and quality of their projects. Even the most talented teams may find it difficult to fulfill important deadlines without the right inputs, highlighting the critical role that top management plays in enabling the flow of resources (Parmar, 2024; Othman et al., 2014).

Financial resources are used in construction to pay for necessary expenses including raw materials, labor wages, subcontractor fees, and equipment rents. Efficiency is increased by technological resources such as construction equipment, project management software, and Building Information Modeling (BIM) (Gu, 2021). However, human resources such as professional workers, engineers, and seasoned site managers remain essential to successful execution (Mesároš et al., 2022).

Research has indicated a robust correlation between project performance and the sufficiency of available resources (Abishek et al., 2023; Zeng & Gao, 2024). Construction projects with adequate resources experienced fewer delays, produced better results, and maintained stronger team morale (Nikoukar & Tavakolan, 2025). However, there are difficulties

in providing resources for building. Underestimating can result in expensive delays and rework, while overestimating can waste people and equipment (Lock & Wagner, 2016). Availability is further strained by budgetary restrictions, a shortage of experienced workers, and conflicting project schedules, particularly when several projects vie for the same resources (Zhang et al., 2024).

Clarifying resource requirements and obtaining required commitments are facilitated by early communication with key stakeholders, including suppliers, contractors, and customers (Unegbu et al., 2024). Constant communication guarantees that problems are resolved quickly and results in high-rate project success (Mojidra et al., 2024). By putting into practice, a resource management strategy specifically designed for the construction industry, procurement, scheduling, and allocation may be streamlined while maintaining alignment with project goals and milestones.

2.4.2 Strategic Guidance

Strategic guidance includes establishing precise project objectives, prioritizing initiatives, aligning them with the overall organizational goals, and consistently assessing progress (Osendi et al., 2024). (Bryson & George, 2024) outlines a framework for decision-making and resource allocation that ensures projects align with the organization's mission and vision. A well-defined strategic direction enables teams to comprehend their responsibilities, synchronize their efforts with organizational objectives, and concentrate on generating value. Osendi et al. (2024) highlighted that projects characterized by a clear strategic direction tend to achieve greater success, as they garner the necessary support and resources aligned with

organizational goals. This alignment minimizes the risk of failure and fosters sustained success and competitiveness (Ong'ondi & Uche, 2019).

Nonetheless, delivering effective strategic direction may involve challenges. Organizations function within dynamic environments where changing internal and external factors can lead to a misalignment of projects with evolving objectives (Soroka et al., 2022). Furthermore, poor communication of strategic decisions throughout the organization may result in confusion and diminished project performance.

Clear communication is crucial for ensuring alignment. Effective communication of goals, consistent progress reports, and established feedback channels ensure that stakeholders remain informed and actively involved (Byiringiro & Irechukwu, 2024). Engaging senior management in both planning and execution enhances strategic alignment, facilitates prompt resolution of deviations, and elevates team motivation by underscoring the significance of the project.

2.4.3 Decision-Making Authority

For projects to be managed efficiently and on schedule, decision-making authority is essential. According to Turner and Müller (2005), effective delegation enables project managers and teams to address challenges promptly, thereby sustaining momentum and achieving objectives within the established time, cost, and quality parameters. This approach also improves accountability, as individuals granted the authority to make decisions are held responsible for the results. The findings of Patanakul et al. (2010) indicate that clearly established decision-making authority contributes to enhanced project success, improved

coordination, reduced delays, and more effective conflict resolution. Teams that are empowered can take proactive measures, thereby reducing the likelihood of overruns and failures.

However, obstacles persist. Achieving a balance between centralized and decentralized decision-making presents challenges—centralization can hinder responsiveness, whereas decentralization may lead to misalignment with overarching objectives (Ahern et al., 2014). It is essential that decision-makers receive adequate training and information, as ineffective decisions can jeopardize the success of a project. Organizations should establish clear decision-making frameworks, offer targeted training, and cultivate a culture of trust and accountability to effectively address this issue. Frameworks delineate decision-making authority, fostering consistency and alignment. Training provides team members with crucial competencies such as risk management and stakeholder engagement. Establishing trust between leadership and project teams is essential for effective delegation and decision-making.

2.5 Project Success

The concept of project success has undergone significant transformation, extending beyond the traditional parameters of time, cost, and scope to include broader and more nuanced criteria. Modern evaluation of project success incorporates qualitative aspects such as stakeholder satisfaction, long-term benefits, and overall impact. Beshah et al. (2024) highlights that evaluating construction project success now involves distinguishing between success criteria, which measure outcomes, and success factors, which identify the conditions necessary for achieving those outcomes. This comprehensive approach underscores the importance of factors like stakeholder engagement, team capabilities, and adaptable management practices in determining project success.

Leadership is a critical determinant of project success. Jenkins (2024) delves into the influence of digital leadership and professional certification on project success, particularly in business intelligence systems. His findings indicate that project managers who possess strong digital leadership skills and relevant certifications tend to achieve higher success rates. Similarly, Reeder (2024) explores the decision-making processes of IT leaders who employ a hybrid approach to project management, emphasizing the roles of servant and situational leadership in guiding projects to successful completions. These studies underscore that effective leadership, characterized by adaptability and a focus on team empowerment, is crucial for navigating the complexities of modern projects.

Methodological innovations also play a significant role in enhancing project outcomes. The integration of design thinking with lean start-up methodologies provides a structured approach to innovation, emphasizing iterative processes and continuous stakeholder feedback, which are pivotal for successful project execution (Sreenivasan & Suresh, 2024). This aligns with the findings of Rosita et al. (2024), who integrate project-based learning and service-learning in tourism education to improve critical thinking and problem-solving skills. These educational methodologies not only enhance students' skills but also foster a more engaged and proactive approach to learning, which can be directly linked to the success of educational projects.

The integration of advanced technologies is another key factor contributing to project success. Al-Saudi (2024) discusses the potential of blockchain technology in reviving Waqf, an Islamic endowment, highlighting how technological adoption can streamline operations and enhance transparency. Similarly, Quiroga et al. (2024) present case studies from various Department of Transportation projects, demonstrating how innovative technologies can

minimize utility issues during construction and improve overall project delivery processes. These examples illustrate that leveraging technology can lead to more efficient and effective project outcomes.

Projects often face various challenges that can impede success, including organizational, technical, and environmental obstacles. Bonsall (2024) identifies a knowledge gap in the application of soil science within archaeological projects, suggesting that interdisciplinary collaboration can mitigate these challenges. Addressing such gaps by incorporating diverse expertise can enhance project success by ensuring that all relevant factors are considered.

Practical case studies offer valuable insights into the factors that contribute to project success. Van den Boom et al. (2024) describes the AVENUE project, which tested automated vehicles in real-world settings. The project identified key success factors such as technological reliability, stakeholder engagement, and regulatory support. These case studies highlight that successful projects often require a combination of robust planning, adaptive management, and effective communication strategies. They demonstrate that a holistic approach, which considers both technical and human factors, is essential for achieving project success.

In summary, the literature on project success indicates a shift towards a more comprehensive evaluation framework that includes both traditional metrics and broader qualitative criteria. Effective leadership, methodological innovation, technological integration, and proactive problem-solving are recurrent themes that emerge from recent studies. These factors collectively contribute to the successful completion of projects across various domains.

2.6 Underpinning Theories – Self Determination Theories

Self-Determination Theory (SDT), developed by Deci and Ryan (2013), is a widely recognized framework for understanding human motivation, focusing on the intrinsic and extrinsic factors that influence individuals' behaviors and performance. SDT identifies three basic psychological needs—autonomy, competence, and relatedness—that are essential for fostering intrinsic motivation and well-being (Arokiyaswamy et al., 2024). In the context of project management, SDT provides valuable insights into how competencies and top management support contribute to project success.

Table 2.1:
Key Components of Self-Determination of Theory

Key Components	Meaning
Autonomy	This involves giving employees the freedom to take initiative and make decisions, which enhances their intrinsic motivation and engagement in projects
Competence	Refers to the skills, abilities, and knowledge that employees bring to their roles. When employees feel competent, they are more likely to perform effectively and contribute positively to project outcomes
Relatedness	This is about building strong relationships within the workplace. A sense of belonging and connection with colleagues can enhance motivation and job satisfaction

Source: Shaw (2024)

Emotional competence, which includes self-awareness, empathy, and emotional regulation, aligns with the need for relatedness. When team members feel emotionally

connected and understood, their intrinsic motivation is enhanced (Reilly, 2022). This increased motivation leads to better collaboration, higher engagement, and improved project outcomes (Coronado-Maldonado & Benítez-Márquez, 2023). Emotional competence helps in creating a supportive team environment where members feel valued and connected, thereby boosting their performance and the overall success of the project. Managerial competence encompasses leadership, strategic thinking, and resource management. These skills support the needs for autonomy and competence. Engaging in perspective-taking increases empathy among team members, leading to higher satisfaction and motivation. This approach helps team members feel understood and emotionally connected, which is crucial for maintaining motivation (Lee et al., 2023). Effective managers create an environment that encourages self-initiation and skill development among team members (Castellano et al., 2021). By fostering autonomy and competence, managerial competence enhances intrinsic motivation, leading to higher levels of performance, creativity, and project success. Managers who provide clear direction, support, and opportunities for growth enable their teams to thrive and achieve project goals. Intellectual competence involves problem-solving, innovation, and technical expertise. This competence satisfies the need for competence, as team members feel more capable and confident in their abilities when they can effectively apply their skills and knowledge (Byrne & Eddy, 2022). High intellectual competence contributes to successful project outcomes by promoting innovative solutions and ensuring high-quality deliverables. When team members perceive their work as challenging yet achievable, their intrinsic motivation increases, positively impacting project success.

Top management support is a critical factor that can enhance the intrinsic motivation derived from competencies. By providing necessary resources, recognition, and a supportive

environment, top management can satisfy the psychological needs of autonomy, competence, and relatedness (Kubiak, 2020). This support can amplify the positive effects of emotional, managerial, and intellectual competencies on project success. For instance, top management can facilitate training programs, provide strategic guidance, and foster a culture of continuous improvement, thereby boosting the intrinsic motivation and performance of project teams (Dextras-Gauthier et al., 2023). In the context of investigating the relationship between competence and project success, the moderating role of top management support becomes evident.

Research indicates that top management support not only directly influences project outcomes but also moderates the impact of team competencies on project success (Wong & Laschinger, 2015). By fostering an environment that meets the psychological needs of team members, top management can significantly enhance the intrinsic motivation and effectiveness of project teams, leading to successful project outcomes. Further studies have supported this view, emphasizing the role of psychological empowerment facilitated by top management. Psychological empowerment, which encompasses a sense of meaning, competence, self-determination, and impact, has been linked to higher levels of employee engagement and performance (Amor et al., 2021; Wen et al., 2023; Husna et al., 2024). Top management's role in fostering an environment where employees feel empowered and competent can significantly drive project success.

Moreover, the interplay between competence and top management support has been highlighted in various studies. For instance, research by O'Donoghue and Werff (2021) found that empowering leadership from top management enhances employees' intrinsic motivation by satisfying their need for competence. This empowerment leads to greater creativity and

innovation, essential components for successful project outcomes (Kim et al., 2023). Additionally, recent findings suggest that the alignment of organizational support with individual competencies leads to better project performance (Azevedo et al., 2022). Integrating SDT into project management research also underscores the importance of a supportive organizational culture. A culture that promotes learning, development, and recognition of competencies helps in fulfilling the psychological needs of employees (Chong et al., 2020; Boom & Meulenaere, 2024). According to a study by Deci et al. (2017), organizations that prioritize the development of their employees' competencies through continuous learning opportunities and constructive feedback from top management see improved intrinsic motivation and project outcomes.

The critical role of top management in moderating the relationship between competencies and project success can also be seen through the lens of resource availability. Top management's provision of adequate resources and their role in removing obstacles enables teams to leverage their competencies effectively (Fareed & Su, 2022; Fareed et al., 2023). This support enhances their sense of autonomy and competence, leading to better performance and successful project completion (Ahmed & Philbin, 2022). Recent research by Stander et al. (2015) has shown that transformational leadership, a style often adopted by top management, significantly predicts work engagement and job performance through the satisfaction of basic psychological needs. This finding supports the notion that leadership behavior can effectively moderate the relationship between team competencies and project success. Another study by Decuypere and Schaufeli (2020) highlights that leadership styles that promote autonomy and competence, such as empowering leadership, contribute significantly to the psychological well-being of employees and, consequently, to project success. This study further emphasizes the

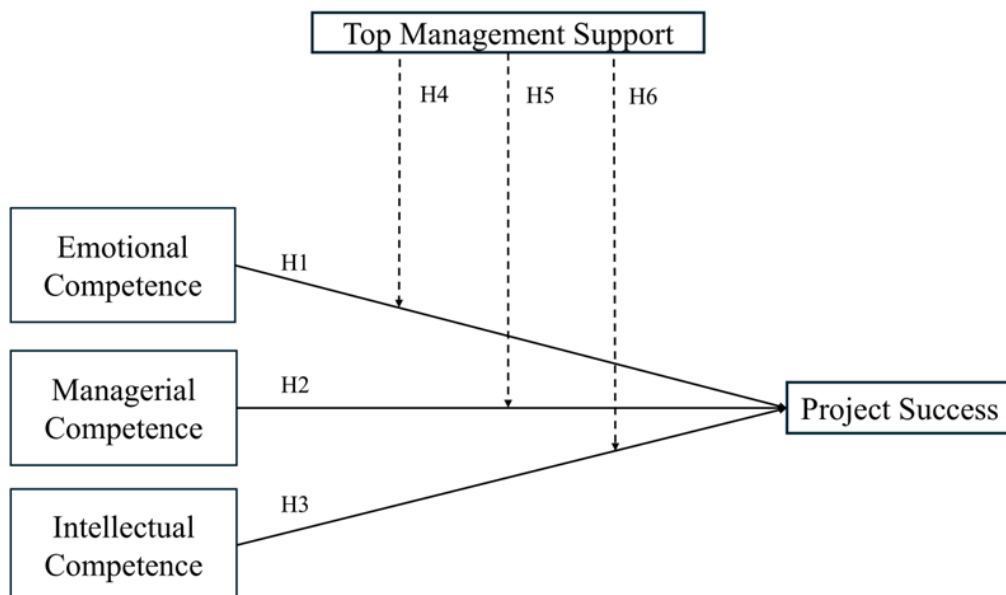
importance of leadership in moderating the relationship between competence and project outcomes.

In summary, SDT offers valuable insights into how competencies and top management support contribute to project success. By addressing the psychological needs of autonomy, competence, and relatedness, project managers and top management can create an environment that fosters intrinsic motivation and enhances project outcomes. The integration of SDT into project management research provides a robust framework for understanding the complex motivational dynamics that drive project success, highlighting the critical role of competencies and top management support.

2.7 Hypotheses Development

In this research, the conceptual framework can be seen in Figure 2.1 below.

**Figure 2.1:
Conceptual Framework**



2.7.1 Emotional Competence

Higher emotional competence in team members leads to greater project success. Emotional competence encompasses self-awareness, empathy, and emotional regulation, which are essential for creating a supportive and cohesive team environment. Team members with high emotional competence are better able to understand and manage their own emotions, as well as those of their colleagues (Mazidi et al., 2024). This understanding fosters empathy and cooperation, leading to improved teamwork and communication. Additionally, emotionally competent team members are more adept at resolving conflicts, maintaining a positive team dynamic, and reducing stress and burnout, all of which contribute to better project outcomes (Prati et al., 2009; Cao et al., 2020).

Research has shown that emotional competence is positively correlated with job performance and satisfaction. A study by Shuffler et al. (2011) demonstrated that teams with higher emotional intelligence exhibit better coordination, communication, and overall performance. Furthermore, emotional competence enhances the ability to navigate complex interpersonal dynamics and adapt to changing project requirements. This adaptability is crucial for maintaining project momentum and achieving goals despite challenges and setbacks. The positive impact of emotional competence on project success is also supported by the ability of emotionally competent individuals to foster a collaborative and innovative team culture, which is essential for project success in dynamic and competitive environments (Oh & Choi, 2020).

H1: There is a positive relationship between emotional competence and project success.

2.7.2 Managerial Competence

Managerial competencies are critical for project managers to effectively lead their teams and achieve project success. These competencies include decision-making, leadership, communication, conflict resolution, and planning (Magano et al., 2020). Effective decision-making enables project managers to analyze situations and choose the best course of action, while strong leadership inspires and motivates teams (Shamim, 2022). Communication skills facilitate clear dialogue among stakeholders, and conflict resolution maintains a productive team environment. Planning and organizational skills ensure projects are completed on time, within budget, and to the desired quality standards. Empirical studies support the significance of these competencies, highlighting their positive impact on project performance across various industries.

Higher managerial competence in team members leads to greater project success. Managerial competence encompasses a broad set of skills necessary for the effective management of projects and teams. These skills enable team members to navigate complex project landscapes, coordinate tasks efficiently, and respond adaptively to emerging challenges (Abagheri Mahabadi et al., 2024). For example, decision-making competence allows managers to weigh various factors and select the optimal course of action, which is crucial in dynamic project environments where conditions can change rapidly (Aga et al., 2016).

H2: There is a positive relationship between managerial competence and project success.

2.7.3 Intellectual Competence

Intellectual competencies are essential for project managers as they encompass cognitive abilities such as problem-solving, critical thinking, and innovation. These skills are crucial for

navigating complex project environments and achieving successful outcomes (Fareed et al., 2021). Problem-solving enables project managers to identify issues, understand root causes, and develop effective solutions. Critical thinking allows for objective analysis and well-informed decision-making, while innovation fosters novel solutions and improved project performance. Martinsuo and Ahola (2022) highlight the importance of these competencies in handling project complexities, managing risks, and aligning strategies effectively. The ability to learn and adapt further enhances project managers' effectiveness in dynamic environments.

Higher intellectual competence in team members leads to greater project success. Intellectual competence involves the capacity to process information, make sound judgments, and generate creative solutions (Karami et al., 2020). Team members with high intellectual competence can effectively tackle challenges that arise during project execution, ensuring that problems are addressed promptly and efficiently (Bushuyey et al., 2022). For instance, problem-solving skills enable team members to diagnose issues accurately and develop practical solutions that mitigate risks and keep the project on track (Morris et al., 2012).

H3: There is a positive relationship between intellectual competence and project success.

2.7.4 Top Management Support

TMS is crucial for project success, encompassing the dedication, participation, and endorsement of senior executives. Top management support ensures resource availability, strategy alignment, visibility, communication, and decision-making support. Effective resource allocation and strategy alignment guarantee that projects meet company goals and have the necessary resources (Shojaeian & Abbaspour, 2024). Senior leaders' visibility and communication convey the project's importance to stakeholders, while their support in decision-

making addresses issues promptly. Studies confirm that top management support directly impacts project performance, enhancing the likelihood of achieving objectives, staying on schedule, and remaining within budget (Nguyen & Mohamed, 2021). However, obtaining top management support can be challenging due to conflicting priorities, internal politics, and resistance to change. Strategies to enhance TMS include educating senior leaders on project management, providing regular updates, and involving them in key project milestones.

Higher top management support leads to greater project success. When senior executives are actively involved in projects, they provide essential resources and align the project with the organization's strategic objectives (Ahmed & Philbin, 2022). This alignment ensures that the project has the necessary support to overcome obstacles and achieve its goals. Research by Martinsuo and Geraldi (2020) demonstrates that projects with strong top management support are more likely to be completed on time and within budget, as top management support facilitates the resolution of issues and enhances overall project performance.

2.7.4.1 Hypothesis 4: Top management Support Moderating Emotional Competence and Project Success

Emotional competence encompasses the ability to recognize, understand, and manage one's own emotions as well as those of others. In project management, this skill is vital for fostering effective interpersonal relationships, enhancing teamwork, and cultivating a cohesive work environment. High levels of emotional intelligence among team members contribute to project success by reducing conflicts and promoting collaboration (Supramaniam & Singaravelloo, 2021). Moreover, when top management actively supports projects, it fosters an environment that values emotional intelligence and psychological safety. Such a supportive atmosphere empowers team members to express ideas and concerns openly, thereby maximizing

their effectiveness (Zhang & Xu, 2024). Leadership that prioritizes emotional intelligence and psychological safety has been shown to enhance team performance and decision-making (Alzoubi & Aziz, 2021). Additionally, training programs aimed at developing emotional competencies have proven effective across various professional settings, underscoring the importance of integrating emotional intelligence into leadership development initiatives (Rahul, 2024).

H4: The positive relationship between emotional competence and project success is moderated by top management support.

2.7.4.2 Hypothesis 5: Top management Support Moderating Managerial Competence and Project Success

Managerial competence encompasses a project manager's proficiency in decision-making, leadership, communication, and conflict resolution, skills that are pivotal for guiding projects to successful completion. These competencies enable project managers to effectively lead teams, make informed decisions, and resolve conflicts, thereby enhancing project performance. Mazidi et al. (2024) highlights that such competencies are critical for project success, as they directly influence team dynamics and project outcomes.

Top management support further amplifies the effectiveness of project managers by providing the necessary authority, resources, and strategic alignment. When senior executives actively endorse and support project managers, it empowers them to lead teams more effectively and navigate challenges efficiently. This support also offers a broader organizational perspective, enabling project managers to align project objectives with the company's strategic goals. Research indicates that top management support is a significant predictor of project

success, as it fosters an environment conducive to effective project execution (Carreno, 2024; Lee & Baker, 2023).

H5: The positive relationship between managerial competence and project success is moderated by top management support.

2.7.4.3 Hypothesis 6: Top management Support Moderating Intellectual Competence and Project Success

Intellectual competence refers to cognitive abilities such as problem-solving, critical thinking, and innovation, which are essential for adapting to dynamic project requirements and developing creative solutions to complex challenges (Oh & Choi, 2020). Teams with high intellectual competence are better equipped to drive innovation and enhance project outcomes through effective decision-making and novel approaches. The presence of critical thinking and analytical skills among project members enables faster response to unforeseen obstacles, fostering resilience and long-term project success (Ada et al., 2021).

Top management support plays a pivotal role in maximizing the benefits of intellectual competence within project teams. By promoting a culture of continuous learning and providing access to training, resources, and strategic direction, senior leadership empowers teams to fully leverage their intellectual capabilities (Balconi et al., 2024). Furthermore, top management involvement ensures that innovative solutions are not only encouraged but also strategically aligned with organizational goals, thereby translating intellectual contributions into measurable project performance improvements.

H6: The positive relationship between intellectual competence and project success is moderated by top management support.

2.8 Literature Gap

There are numerous studies and literature conducted based on project managers, there is still lack of study on the competency of project team members (Oh & Choi, 2020). Zdonek et al. (2017) mentioned that there is various literature discussed on the project manager competence, however, the competencies of individual project team members are hardly. Zdonek et al. (2017) highlighted that although project manager competencies have been widely studied, the competencies of project team members are largely overlooked. Furthermore, there is no established framework to systematically assess these competencies, with terms such as capability, qualifications, and skills often being used interchangeably without clear conceptual boundaries. Additionally, although the selection of project team members based on technical expertise is widely practiced and considered logical (Starineca & Voronchuk, 2015), empirical studies investigating how these competencies influence project success are scarce. Most existing research on project-based competencies has maintained a manager-centric focus, neglecting the critical role of team members who directly contribute to project execution and delivery.

Adding to this gap, there is a lack of empirical studies examining top management support as moderators with project team members' competency and project success factors. The past study conducted by Chatterjee et al., (2021) investigated the pros and cons of remote labor via digital platforms and concluded that implementation of a remote work system has been studied, including its motivations and repercussions. It demonstrated flexibility in the workplace, work time, and infrastructure can help preserve operations in remote work systems during challenging times. The remote approach of work is thought to have increased employee satisfaction and productivity, leading to better organizational performance. Their study remained broader in organizational scope rather than focusing specifically on project execution

contexts. Moreover, although remote work systems have been linked to improved operational continuity, their direct impact on project-based team competencies has not been deeply explored.

Similarly, while previous studies such as Santos-Vijande et al. (2015) analyzed the moderating role of top management support in service innovation projects within the hotel industry, the focus was primarily on customer co-creation and service outcomes, not internal team competencies. Ali et al. (2020) examined how humble leadership influences project success and found that team building mediates the relationship between leadership style and project outcomes. However, while top management support was considered as a moderator in their framework, the study did not directly measure competencies of project team members in relation to project success. Therefore, the existing literature suggests that top management support, while recognized as an important contextual factor, has not yet been sufficiently studied as a moderator specifically in the relationship between project team members' competencies and project outcomes. This study seeks to address this critical gap by examining the competencies of project team members and the moderating role of top management support in influencing project success within project-based environments.

2.9 Chapter Summary

This chapter dives into what really matters for getting a project done right, focusing on the skills that project managers, team members, and top management need to bring to the table. While we know a lot about what makes project managers effective, things like planning, scheduling, risk management, and softer skills like emotional intelligence, communication, and leadership—there is a bit of a gap when it comes to understanding the specific skills that team members need. This chapter aims to fill that gap by looking closely at the emotional, managerial, and intellectual skills that team members bring to the table and how those skills can directly impact whether a project succeeds or not.

Emotional skills, like being self-aware and empathetic, are highlighted as crucial for strong leadership and teamwork. On the other hand, managerial skills such as decision-making, leading a team, clear communication, and handling conflicts are essential for navigating the often-tricky terrain of project management. Intellectual skills, which include problem-solving, critical thinking, and coming up with innovative solutions, are also critical for tackling the challenges that come up during projects.

The chapter also shines a light on the importance of support from top management. While it's well-known that having backed from senior leadership is key for providing resources and aligning with the company's strategy, what's not as clear is how exactly this support can boost the effectiveness of team members. This chapter digs into that question, offering insights on how top management's involvement can make a big difference in helping team members do their best work and in ensuring project success. By focusing on the skills of project team members and how top management can support them, this chapter not only fills in some important gaps in our understanding but also offers practical advice on how to select, develop,

and support teams more effectively. It wraps up by discussing some of the common hurdles in getting top management on board and offers strategies to overcome these challenges, like keeping senior leaders informed about the value of project management and involving them at key stages of the project. This way, both individual skills and organizational support can come together to maximize the chances of project success.

Table 2.2:
Systematic Literature Review

Theme	Key Aspects Discussed	References	Gaps Identified
Competencies in Project Management	Includes both hard (technical) and soft (emotional, interpersonal) skills. Emphasizes agile, digital, and strategic skills across various frameworks like PMI and IPMA.	Ghorbani (2023); Kukah et al. (2022); Mcgrath and Kostalova (2020); Henderikx and Stoffers (2022)	Lack of consensus on core competencies; overemphasis on project manager role, less on team-wide skills
Project Team Member Competencies	Focus on emotional (EI), managerial (leadership, decision-making), and intellectual (problem-solving, innovation) competencies; often overlooked in contrast to project manager skills.	Zdonek et al. (2017); Oh and Choi (2020); Montenegro et al. (2021); Xiao et al. (2023)	Limited empirical studies linking team member competence directly to project success
Top Management Support	TMS provides resources, strategic direction, and decision-making authority. Acts as moderator enhancing team performance through visibility and support.	Santos-Vijande et al. (2015); Ali et al. (2020); Zwikael (2008); Ahmed & Philbin (2022)	TMS is underexplored as a moderator in project team settings specifically
Project Success	Defined by timely delivery, cost effectiveness, stakeholder satisfaction, and quality. Affected by team competence and organizational support.	Gunduz & Almuajebh (2020); Kabirifar & Mojtahedi (2019); Mavi et al. (2024)	Many studies focus on output KPIs only, missing qualitative insights on team dynamics
Underpinning Theories	Self-Determination Theory (Deci & Ryan, 2013) is used to	Deci & Ryan (2013);	Application of SDT in project team

explain how autonomy, competence, and relatedness influence motivation and success. Supports the impact of competencies and TMS on outcomes.	Arokiyaswamy et al. (2024); Reilly (2022); Castellano et al. (2021)	settings is still emerging; mostly used in leadership and HR contexts
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RESEARCH METHODOLOGY

3.1 Overview

This chapter aims to outline the research design, process and methodology employed in this study. This study investigated the hypothesized relationship between team project member competencies and project success, focusing on the effect of top management support. To examine this connection, a quantitative approach was adopted, utilizing a survey to assess whether a significant relationship exists. The study was utilizing a cross-sectional survey design, data collection from project team members at a single point in time to explore the relationships between emotional, managerial, and intellectual competence on project success, with top management support as a moderating variable. Data collection utilized a qualifying questionnaire for participant relevance and validated scales to comprehensively and reliably measure the main variables.

3.2 Research Approach

This study took a quantitative approach to explore the skills of project team members and how these skills influenced project success in Malaysia. The quantitative method was chosen because it allowed for the collection of objectives, numerical data that could be analyzed to identify trends, uncover relationships, and draw broadly applicable conclusions (Rana et al., 2021). Quantitative approach provides a precise way to measure important aspects of project

team competencies, including emotional, managerial, and intellectual skills, along with project success and top management support. Turning these variables into measurable data enables it to be applied for statistical analyses to uncover significant correlations and casual relationships (Oh & Choi, 2020).

Furthermore, the quantitative method helped in identifying specific competencies were most predictive of project success, thus enabling targeted interventions for project team development. The use of quantitative methods helped in elucidating the complex relationships between various competencies and project outcomes, ultimately contributing to the advancement of knowledge in project management. For instance, these methods reveal how different competencies interact and contribute to the overall success of a project, offering a clear understanding of the dynamics within project teams (Creswell & Creswell, 2017). By using structured surveys and standardized tools, consistent information was gathered from a large group of project team members, ensuring that the findings were robust and reliable.

The survey includes a range of questions to assess the various competencies of team members, their experiences, and the outcomes of the projects they were working on. The quantitative method was applied to measure and analyze the variables in detail, using tools like correlation and regression analyses to determine how different competencies relate to project success (Bryman, 2016). This approach not only enhances the rigor of the research but also provides actionable insights that can be applied in practice to foster more effective project management strategies.

3.3 Research Design

The study employed a cross-sectional survey design to investigate the relationships between emotional competence, managerial competence, and intellectual competence (independent variables) on project success (dependent variable), and to examine the moderating effect of top management support. A cross-sectional survey design involved collecting data from participants at a single point in time, which allowed for the analysis of the current state of variables and their relationships. This design was particularly useful for understanding how different competencies contributed to project success and how top management support may influence these relationships.

The cross-sectional survey method offers several advantages for this research, such as enabling the collection of large samples of project team member data. This advantage was believed to enhance the generalizability of the findings. Standardized information on team members' competencies, their experiences, and project outcomes was gathered using structured questionnaires, ensuring consistency and reliability in the data collected (Maier et al., 2023). This method was considered efficient and cost-effective, as it allowed for the rapid collection of a substantial amount of data within a limited timeframe.

Moreover, the cross-sectional design was considered well-suited for identifying patterns and correlations between the variables. For example, statistical techniques such as correlation analysis and multiple regression were used to determine the strength and direction of the relationships between emotional, managerial, and intellectual competencies and project success (Sampaio et al., 2022). These analyses were conducted to reveal which competencies were most critical for achieving successful project outcomes and how top management support was found

to moderate these effects. By examining these relationships at a single point in time, a snapshot of the current dynamics within project teams was provided by the study.

Additionally, this design was found to facilitate the exploration of moderating effects, such as the role of top management support. Insights into how top management support interacted with different competencies to affect project success were offered through this approach (Fareed et al., 2023). For instance, it was uncovered that while intellectual competence significantly contributed to project success, its impact was amplified or diminished depending on the level of support from top management. This knowledge was expected to assist organizations in tailoring their management approaches to better leverage the competencies of their project teams.

The cross-sectional survey design was recognized as an effective and practical approach for investigating the complex relationships between competencies and project success. A comprehensive analysis of the current state of these variables was enabled, and a foundation was provided for developing targeted strategies to enhance project outcomes.

3.4 Research Sampling

In this study, the research targeted project team members ranging from entry-level professionals to industry owners and CEOs. The sampling process was guided by a power analysis that was conducted using G*Power (Kang, 2021), as shown in Figure 3.1, a widely used statistical software for determining sample sizes. The goal was to ensure that the study had sufficient statistical power to detect meaningful effects in the data. Specifically, the analysis was based on an F-test for linear multiple regression, using a fixed model where the R^2 deviation from zero was assessed.

The parameters for the power analysis were set as follows:

- Effect size (f^2): 0.15, which corresponds to a medium effect size as per the guidelines by (Memon et al. (2020). This value indicates a moderate level of association between the predictor variables and the outcome variable.
- Alpha error probability (α): 0.05, representing a 5% risk of committing a Type I error, where a true null hypothesis is incorrectly rejected.
- Power ($1-\beta$): 0.90, indicating a 90% probability of correctly rejecting a false null hypothesis, thereby minimizing the risk of a Type II error.
- Number of predictors: 6, reflecting the key independent variables included in the regression model.

Based on these parameters, a minimum sample size of 123 participants was recommended by the power analysis. This ensured that the study had adequate power to detect

statistically significant effects and draw valid conclusions about the relationship between project team member competencies and project success.

To achieve this sample size, a random sampling strategy was employed. Project team members from various organizations across Malaysia were randomly selected to participate in the study. Random sampling was chosen to ensure that every individual within the population had an equal chance of being selected, thus enhancing the representativeness of the sample and minimizing selection bias (Chudasama, 2023). The recruitment process involved reaching out to organizations through professional networks, industry associations, and online platforms. Detailed information about the study's objectives, the nature of participation, and the confidentiality of responses was provided to potential participants. A list of potential organizations was compiled, and a random number generator was used to select the participants from each organization. This method ensured that the sample was diverse and representative of the broader population of project team members in Malaysia.

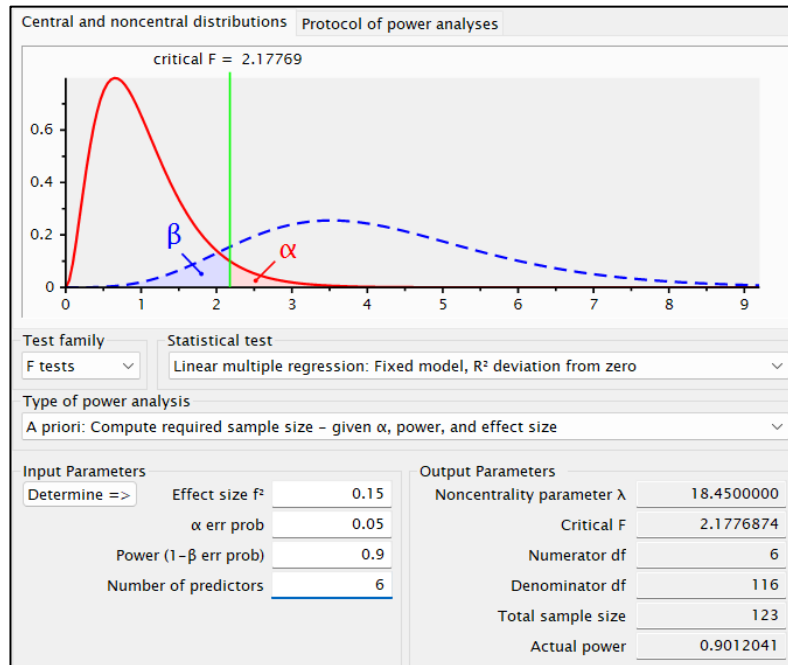
Participants were selected to ensure a diverse representation of different job designations, project durations, and job experiences. This approach was used to help capture a comprehensive view of the competencies that contributed to project success in different contexts. Additionally, project duration was included as a key variable, as it serves as a measurable indicator of project success specifically reflecting whether projects were completed within their scheduled timelines (Beshah et al., 2024). This allowed for quantitative analysis of how team competencies and top management support interact to influence timely project delivery. To further ensure diversity and representation, stratified random sampling was considered where the population was divided into strata based on certain characteristics (e.g.,

industry type, project size), and random samples were drawn from each stratum (Siegel & Wagner, 2022).

The recruitment process involved multiple stages to maximize response rates and ensure a high-quality dataset following method by Stevens et al. (2024). Initially, organizations were contacted through emails and follow-up calls to explain the purpose of the study and request their cooperation in facilitating access to their project teams. Once organizational consent was obtained, an invitation email containing a link to the online survey was sent to the randomly selected participants. Follow-up reminders were sent to encourage participation and address any queries or concerns. Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality and anonymity were strictly maintained, with data being aggregated for analysis to protect individual identities. By following this rigorous sampling and recruitment process, the study aimed to gather high-quality data that could provide valuable insights into the competencies of project team members and their impact on project success in Malaysia.

By employing random sampling, the validity and reliability of the study's findings were enhanced, ensuring that the conclusions drawn were generalizable to the broader population of project teams in Malaysia. This method also facilitated a more robust and unbiased analysis of the relationships between the competencies of project team members and project success, providing valuable contributions to the field of project management (Fung, 2018).

Figure 3.1:
G Power Statistical Tool



3.5 Research Instrument

To accurately evaluate the competencies of project team members and the influence of top management support on project success, well-designed research was deemed essential. These instruments ensured the collection of relevant and reliable data.

A critical component of these instruments was a qualifying question, which served as a screening mechanism to confirm that participants had relevant experience in team projects, thereby enhancing the study's validity. This qualifying question helped determine whether potential respondents had current or past involvement in team projects, tasks, or assignments (Wafudu et al., 2022). This was considered vital as the study focused on understanding the competencies and experiences of individuals who have actively participated in project

environments. Respondents who do not meet this criterion were excluded from the study to maintain data relevance and integrity.

The qualifying question included at the beginning of the survey was: " Are you currently/in the past involved in a team project/task/assignment? If no, disqualified." This question was deemed crucial for several reasons. First, it ensured that only individuals with practical experience in team projects participated, which was necessary for obtaining meaningful insights into the competencies under study. Second, excluding respondents without relevant experience helped avoid irrelevant data, leading to more precise and valid findings. Including this qualifying question, it ensured that the data collected was pertinent to the research objectives, providing a robust foundation for exploring the relationships between emotional competence, managerial competence, intellectual competence, top management support, and project success.

Subsequently, respondents who qualified were asked demographic questions to collect background information such as age, gender, education level, and years of experience in project work. This demographic data was deemed essential for understanding the context and background of the respondents, which could provide additional insights into the study's findings and help control potential confounding variables (Ziegenfuss et al., 2021). Following the demographic section, respondents were presented with questions related to the study's main variables. These included validated scales to measure emotional competence, managerial competence, intellectual competence, top management support, and project success. Each variable was assessed through multiple items designed to capture the various dimensions of the constructs, ensuring comprehensive and reliable measurement. This structured approach to data collection enabled a thorough analysis of how these competencies and top management support

contributed to project success, while also accounting for the influence of respondents' demographic characteristics.

**Table 3.1:
Demographic**

Items	Characteristics	Items	Characteristics
Gender	Male	Team Size	9 people or less
	Female		10 to 19 people
			20 people or more
Age	18-25 years old	Project Duration	1 year or less
	26-33 years old		2 to 4 years
	34-41 years old		5 years or more
	42-49 years old		
	50 years and above		
Qualification	SPM	Job Experience	Less than 3 years
	Diploma		3 to 5 years
	Bachelor's degree		5 to 10 years
	Master's degree		10 to 15 years
	PhD/Doctorate		More than 15 years
Job- Designation	Fresh/Entry-level		
	Assistant		
	Junior		
	Senior		
	Manager		
	Director		
	CEO / Chairman		
	Owner		

Table 3.2:
Variables Measurement Item

Variable	Construct measurement	Scale	Adopted from
Independent Variable	<u>Emotional Competence</u> The team members were aware of their own feelings and managed and controlled themselves.	Likert-scale (1-5) Strongly disagree – strongly agree	(Oh & Choi, 2020)
	The team members consistently maintained their concentration and performed tasks in a variety of situations, under pressure.		
	The team members motivated and influenced each other to achieve clear results.		
	<u>Managerial Competence</u> The team members organized and coordinated the project resources according to clear objectives and converted long-term goals into action plans.		
	The team members actively support tasks and communicate among the team members.		
	The team members create ideas and solve problems with responsibility.		
	<u>Intellectual Competence</u> The team members demonstrated their ability to collect, analyze, and judge information from a wide range of sources.		
	The team members demonstrated the ability to present the future direction and vision of the organization.		
	The team members demonstrated the ability to think strategically.		
Dependent Variable	<u>Project Success</u> The project was delivered on schedule.	Likert-scale (1-5)	(Ahmed et al., 2022)

Moderating Variable	The project deliverables were of high quality.	Strongly disagree – strongly agree Likert-scale (1-5) Strongly disagree – strongly agree (Ahmed et al., 2022)
	The project deliverables met user requirements.	
	<u>Top Management Support</u>	
	Top management provided sufficient resources to complete the project successfully.	
	Top management established effective communication strategies to enhance project and organizational efficiency.	
	Top management ensured effective system implementation to institute organizational change.	

3.6 Data Collection

Data collection for this study was conducted through a structured questionnaire distributed *via* email to human resource staff and project team members within the construction industry. The target respondents were specifically selected from individuals actively involved in construction projects, including residential, commercial, and infrastructure sectors, to ensure relevance to the study's focus. Initially, questionnaires were distributed through professional contacts within the construction industry to establish a foundational sample. This approach was chosen to leverage existing networks and ensure access to qualified participants with direct experience in project execution.

To further expand the reach and ensure a diverse and representative sample, a snowball sampling method was employed (Ting et al., 2025). Respondents were encouraged to share the questionnaire with other project team members and managers within their professional networks. This method was particularly useful for accessing hard-to-reach participants and increasing the sample size, which is critical for achieving statistically significant results.

To maximize the response rate, follow-up emails were sent two weeks after the initial distribution, with periodic reminders thereafter. These reminders were strategically timed to encourage participation without overwhelming respondents. Additionally, several measures were implemented to address potential issues of common method bias (Podsakoff et al., 2024). Respondents were explicitly informed that there were no right or wrong answers to the questions, reducing evaluation apprehension and encouraging honest responses. They were also assured of the confidentiality and anonymity of their responses, which helped build trust and ensured that individual data would not be disclosed. Detailed instructions were provided to guide respondents in completing the questionnaire accurately, minimizing errors and incomplete submissions.

To ensure that enough questionnaires are returned, a substantial number were distributed initially, accounting for potential non-responses and incomplete submissions. The anticipated response rate was closely monitored throughout the data collection period. If the response rate fell below expectations, additional efforts were made, such as reaching out to more contacts or sectors within the construction industry. This proactive approach ensured that the study achieved a robust and representative dataset.

Upon receiving the complete questionnaires, the data was meticulously checked for completeness and accuracy. Any inconsistencies or missing data were addressed promptly to ensure the reliability and validity of the dataset. By following these rigorous procedures, the study aimed to collect comprehensive and high-quality data from a diverse pool of respondents. This approach provided robust insights into the competencies of project team members and their impact on project success, aligning with the study's objectives and ensuring the credibility of the findings.

3.7 Data Analysis

This study was conducted using a rigorous data analysis process to examine the relationships between emotional, managerial, and intellectual competencies of project team members and project success, as well as the moderating role of top management support. The analysis was performed using SPSS 29 and SmartPLS, encompassing several stages: descriptive statistics, reliability and validity testing, correlation analysis, Partial Least Squares Structural Equation Modeling (PLS-SEM), moderation analysis, and data screening and assumptions testing.

Table 3.3:
SmartPLS Analyses Conducted

Type of Analysis	Purpose	Description
Measurement Model Assessment	To assess reliability and validity of constructs	Evaluated internal consistency (Cronbach's alpha, composite reliability), convergent validity (Average Variance Extracted, AVE), and discriminant validity (HTMT ratio).
Structural Model Assessment	To test hypothesized direct relationships	Analyzed path coefficients, R^2 values, effect sizes (f^2), and predictive relevance (Q^2); checked model fit using SRMR
Bootstrapping Analysis	To evaluate significance of paths and hypotheses	Conducted bootstrapping with 5,000 resamples to obtain t-values, p-values, and confidence intervals for hypothesis testing.
Moderation Analysis	To test moderating effect of Top Management Support	Created interaction terms between competencies and top management support; analyzed moderation effects through interaction terms and simple slope analysis.
Multicollinearity Assessment	To ensure no serious multicollinearity issues	Checked out VIF values for indicator collinearity; ensured all VIF values were acceptable (below 5).

3.7.1 Descriptive Statistics

The data analysis began with descriptive statistics to summarize the sample characteristics and key variables. This step was essential to provide a foundational understanding of the data, identify patterns, and detect anomalies such as outliers. Measures of central tendency (mean and median) and variability (standard deviation and range) were calculated for each variable. The mean offered an average value, while the median provided a robust measure unaffected by outliers. The standard deviation and range helped assess data dispersion, ensuring a clear picture of variability. Additionally, frequency distributions were created for categorical and continuous variables, using histograms and frequency polygons to visualize data distribution, skewness, and outliers. These steps were crucial for understanding the dataset's structure and ensuring data quality before advanced analysis (Ali et al., 2024).

The analysis was conducted using SPSS 29, chosen for its efficiency, accuracy, and user-friendly interface (Saleh, 2023). SPSS facilitated the calculation of descriptive statistics and the creation of visualizations, ensuring a thorough and precise exploration of the data. This software enabled the identification of potential issues, such as outliers or non-normal distributions, which were addressed before proceeding. By leveraging SPSS, the study ensured that the initial data exploration was both comprehensive and reliable, laying a solid foundation for subsequent analyses.

The use of descriptive statistics served multiple purposes: it provided a clear summary of the dataset, identified potential data quality issues, and ensured that advanced analyses were built on a well-understood foundation (Özsoy & Kılıç, 2024). This approach not only enhanced the reliability of the findings but also ensured that the study's conclusions were based on accurate and validated data. By starting with descriptive statistics, the study

established a robust framework for exploring the relationships between project team member competencies and project success.

3.7.2 Reliability and Validity Testing

Before conducting the main analyses, the study assessed the reliability and validity of the measurement instruments to ensure they accurately and consistently measured the intended constructs. This step was critical for establishing the credibility and accuracy of the research findings. Reliability was evaluated using Cronbach's alpha, a widely accepted statistic for measuring internal consistency. A Cronbach's alpha value above 0.70 was considered acceptable, indicating that the items within each scale were sufficiently correlated and reliably measured the same underlying construct (Tavakol & Dennick, 2011). This threshold was chosen to ensure the scales were consistent and stable, providing confidence in the data's reliability.

To assess construct validity, Exploratory Factor Analysis (EFA) was performed using SmartPLS, a robust software tool for analyzing complex models. EFA was chosen because it identifies the underlying relationships between measured variables and determines whether the items on a scale accurately capture the intended constructs (Mia et al., 2022). By examining factor loadings and the structure of the factors, the study ensured that the scales for emotional, managerial, and intellectual competencies, project success, and top management support were valid. SmartPLS was particularly useful for identifying problematic items with low factor loadings, which could be revised or removed to improve the scale's validity. This step was essential to confirm that the instruments measured what they were designed to measure, aligning with the study's theoretical framework.

The assessment of reliability and validity was a critical prerequisite for the main analyses. Reliable instruments ensured consistent and precise measurement of constructs,

while valid instruments confirmed that the constructs were accurately captured. Together, these steps provided confidence that the data collected was meaningful and interpretable, laying a solid foundation for robust and credible research findings. By using Cronbach's alpha and EFA, the study ensured that its measurement instruments were both reliable and valid, enhancing the overall quality and trustworthiness of the results.

3.7.3 Correlation Analysis

Correlation analysis was conducted to examine the relationships between the independent variables (emotional, managerial, and intellectual competencies) and the dependent variable (project success). This analysis was a fundamental step in understanding how these competencies influenced project success and provided a basis for more detailed investigations. Pearson's correlation coefficient was used to measure the strength and direction of the linear relationships between variables. Pearson's coefficient (r) ranges from -1 to +1, where +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship, and 0 indicates no relationship (Schober et al., 2018). This method was chosen because it is widely recognized for assessing linear associations and providing clear insights into the nature and strength of relationships.

The analysis was conducted using SPSS 29, a powerful statistical software package that facilitated the calculation of Pearson's correlation coefficients and generated a comprehensive output, including a correlation matrix, significance levels (p-values), and scatter plots. SPSS was selected for its accuracy, efficiency, and ability to handle large datasets. The analysis focused on calculating correlation coefficients for each pair of variables: emotional competencies and project success, managerial competencies and project success, and intellectual competencies and project success. For example, a positive correlation between managerial competencies and project success suggested that higher

levels of managerial competence were associated with greater project success. Significance levels (p-values) were examined to determine whether the observed correlations were statistically significant, with a p-value < 0.05 indicating that the relationship was unlikely to have occurred by chance.

This correlation analysis served as a critical preliminary step before applying more complex modelling techniques, such as multiple regression or structural equation modelling. It helped identify significant predictors of project success and detect potential multicollinearity issues, where independent variables were highly correlated with each other. By understanding these relationships, the study was able to develop more sophisticated models that controlled for confounding variables and provided deeper insights into the factors influencing project success. In summary, correlation analysis using Pearson's coefficient in SPSS 29 provided valuable initial insights, laying the groundwork for further analysis and contributing to a comprehensive understanding of the relationships between competencies and project success.

3.7.4 Partial Least Squares Structural Equation Modeling (PLS-SEM)

To test the hypotheses and examine the impact of emotional, managerial, and intellectual competencies on project success, Partial Least Squares Structural Equation Modeling (PLS-SEM) was performed using SmartPLS. PLS-SEM was chosen because it is well-suited for analyzing complex relationships among multiple variables and is robust against violations of normality, making it ideal for real-world data that may not meet strict statistical assumptions (Doan et al., 2020). This method allowed for a detailed examination of how each competency uniquely contributed to project success while controlling for the influence of other variables, providing a clear understanding of their distinct impacts.

The analysis proceeded in two stages: measurement model assessment and structural model evaluation. In the measurement model, reliability and validity were assessed to ensure the constructions were accurately measured. Reliability was evaluated using composite reliability and Cronbach's alpha, while validity was examined through convergent validity (using Average Variance Extracted, AVE) and discriminator validity (ensuring constructs were distinct). Once the measurement model was validated, the structural model was evaluated to test the hypotheses. Path coefficients were examined to determine the strength and direction of relationships between competencies and project success, with bootstrapping used to assess statistical significance. This approach ensured the model was both reliable and valid, providing a solid foundation for hypothesis testing.

PLS-SEM also enabled the examination of direct and indirect effects, offering insights into both the immediate impact of competencies on project success and potential mediating relationships. Additionally, the model's explanatory power was assessed using R-squared values, which indicated the proportion of variance in project success explained by the competencies. Model fit indices, such as the Standardized Root Mean Square Residual (SRMR), were also examined to ensure the model adequately fit the data. By leveraging PLS-SEM, the study provided a robust and comprehensive analysis of the factors driving project success, contributing valuable insights to the field of project management.

3.7.5 Moderation Analysis

The moderating effect of top management support on the relationship between competencies and project success was rigorously tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. This approach involved the creation of interaction terms by multiplying each type of competence (emotional, managerial, and intellectual) with top management support. These interaction terms were

then integrated into the structural model to determine whether top management support significantly moderates the relationship between these competencies and project success.

In PLS-SEM, the creation of interaction terms was considered a crucial step for testing moderation effects (Iqbal et al., 2015). Each interaction term represented the combined effect of a particular competence and top management support. By including these interaction terms in the model, it was possible to assess whether the presence of strong top management support enhanced or diminished the impact of each type of competence on project success.

To interpret the significance of these interaction effects, simple slope analysis was conducted. Simple slope analysis is used to break down and interpret significant interactions (Hair et al., 2022) by examining the relationship between the independent variables (competencies) and the dependent variable (project success) at different levels of the moderator (top management support). This analysis provided detailed insights into how the strength of the relationship between competencies and project success changed across varying levels of top management support.

For example, if the interaction term between managerial competence and top management support was significant, the simple slope analysis illustrated how the impact of managerial competence on project success varied when top management support was high compared to when it was low. This revealed whether top management support amplified the positive effects of managerial competence on project success or mitigated potential negative effects.

Conducting this moderation analysis using SmartPLS offered several advantages. SmartPLS was equipped to handle complex models with multiple interaction terms and provided robust tools for bootstrapping, which helped in assessing the statistical significance

of the moderation effects. Bootstrapping generated confidence intervals and p-values for the interaction terms, allowing for a rigorous evaluation of whether top management support significantly moderates the relationships in question.

This comprehensive analysis not only confirmed whether top management support acted as a significant moderator but also provided deeper insights into the dynamics between managerial support and the effectiveness of various competencies in achieving project success. Understanding these interactions was crucial for organizations aiming to leverage top management support to maximize the positive impacts of their competencies.

By using PLS-SEM in SmartPLS to test the moderating effect of top management support, the study provided a nuanced understanding of how top management support influenced the relationship between competencies and project success. The creation and analysis of interaction terms, coupled with simple slope analysis, elucidated the conditions under which top management support enhanced or diminished the effectiveness of emotional, managerial, and intellectual competencies in driving project success. This detailed examination offered valuable insights for both researchers and practitioners

RESULTS AND DISCUSSIONS

4.1 Overview

This chapter presents the results of the data analysis conducted to investigate the relationships between emotional, managerial, and intellectual competencies and project success, with top management support as a moderator. Initially, descriptive statistics provide a summary of the sample characteristics and key variables. Following this, reliability and validity testing ensures the robustness of the measurement instruments. Correlation analysis explores the associations between independent variables and project success. The core of the chapter is the Partial Least Squares Structural Equation Modeling (PLS-SEM) results, which assess the direct effects of competencies on project success. Additionally, moderation analysis examines the impact of top management support on these relationships. The chapter concludes with a discussion of the key findings, highlighting significant relationships and the moderating role of top management support, setting the stage for a detailed discussion and implications in the subsequent chapter.

4.2 Preliminary Data Screening

A total of 250 questionnaires were distributed using a random sampling method, and 166 were returned, resulting in a response rate of 66.4%. Among these, 147 were fully completed, while 19 respondents did not finish the survey. The initial qualifying question asked whether respondents had relevant experience in team projects; 10 respondents were

disqualified for answering "No." Consequently, 137 samples were deemed suitable for the research, meeting the requirement of 130 samples as determined by the G*Power calculation.

The first stage of data analysis involved a meticulous filtering process to ensure the relevance and accuracy of the collected survey responses. This filtering was crucial to maintaining the integrity of the research (Ali et al., 2024). Establishing a consistent baseline was critical for deriving meaningful insights aligned with the study's objectives. Respondents lacking relevant experience in team projects were removed, resulting in the exclusion of 10 individuals. Incomplete surveys were discarded, accounting for 19 respondents. Surveys with consistent answers for all variables were checked, but none were found, and thus none were removed. Outliers were assessed using standardized residuals. Cases with standardized residuals beyond ± 3 , typically considered outliers, were identified and removed if found. However, it was determined that no respondents had outlier data (see Appendix 1 for detailed value on the standardized residuals). This thorough data cleaning process ensured that the dataset was robust and reliable for subsequent analysis.

4.3 Demographic Profile

4.3.1 Gender

The survey sample comprises a total of 137 respondents, with a distinct gender distribution. Males constitute 81 of the respondents, accounting for approximately 59.1% of the total sample. On the other hand, females make up 56 of the respondents, representing about 40.9% of the sample. This gender disparity indicates a higher participation rate among males compared to females within the context of this study. Such a distribution can be reflective of the industry or sector being surveyed, suggesting a male-dominated workforce

in the industry (Mavi & Standing, 2018). This demographic information is critical as it can provide valuable context for interpreting the results of the study.

Given that the research focuses on the impact of emotional, managerial, and intellectual competence on project success, with top management support as a moderating factor, it is essential to consider how gender distribution might influence these variables. For instance, the predominance of male respondents could affect the findings related to managerial and intellectual competencies, as well as perceptions of top management support (Hammoud, 2022).

Table 4.1:
Gender Distribution of Survey Respondents

Gender	N	%
Male	81	59.1
Female	56	40.9

4.3.2 Age

The age distribution of the survey respondents reveals that the majority fall within the 34-41 years old category, accounting for 52.6% of the total sample. This suggests that middle-aged individuals predominantly participated in the survey. The next largest group is the 26-33 years old category, making up 33.6% of respondents. Younger participants (18-25 years old) represent 8.0%, while older age groups (42-49 years old and 50 years and above) are less represented, constituting 3.6% and 2.2%, respectively.

This age distribution can provide insights into the experience levels and perspectives of the respondents, potentially influencing their views on emotional, managerial, and intellectual competencies in project success (Pacheco et al., 2023). The significant

representation of middle-aged respondents might reflect a demographic that is actively engaged in managerial and leadership roles within the industry.

Table 4.2:
Age Distribution of Survey Respondents

Age	N	%
18-25 years old	11	8
26-33 years old	46	33.6
34-41 years old	72	52.6
42-49 years old	5	3.6
50 years and above	3	2.2

4.3.3 Educational Qualifications

The qualifications of the survey respondents reveal a predominant representation of individuals with a bachelor's degree, accounting for 50.4% of the total sample. This is followed by respondents with a Diploma, making up 27.7% of the participants. Those with a master's degree constitute 11.7%, while respondents with an SPM qualification represent 8.8%. The smallest group is those with a PhD/Doctorate, at 1.5%.

This distribution suggests that most of the respondents possess higher qualifications, which may influence their perspectives on emotional, managerial, and intellectual competencies in project success. The significant number of respondents with bachelor's and master's degrees indicate a highly educated sample, potentially impacting their views on the importance of top management support as a moderating factor in project success (Semerádová, 2015).

Table 4.3:
Educational Qualifications of Survey Respondents

Educational Qualifications	N	%
SPM	12	8.8
Diploma	38	27.7
Bachelor's Degree	69	50.4
Master's Degree	16	11.7
PhD/Doctorate	2	1.5

4.3.4 Job Designation

The job designation distribution of the survey respondents indicates a significant representation of Owners, accounting for 46.7% of the total sample. This were followed by respondents holding the position of CEO/Chairman, comprising 20.4% of the participants. Assistants make up 14.6% of the respondents, while Junior positions represent 8.0%. Fresh/Entry-level respondents account for 5.1%, Directors for 3.6%, and Seniors for 1.5%. There were no respondents with the job designation of Manager.

This distribution suggests that the majority of the respondents were in high-level positions such as Owners and CEOs/Chairmen, which could have a substantial impact on the findings related to emotional, managerial, and intellectual competencies in project success. The predominance of individuals in top leadership roles might provide insights into the strategic perspectives and decision-making processes within their organizations, particularly in relation to the moderating effect of top management support (Fareed et al., 2023b).

Table 4.4:
Job Designation Distribution of Survey Respondents

Job Designation	N	%
Fresh / Entry-level	7	5.1
Assistant	20	14.6
Junior	11	8
Senior	2	1.5
Manager	0	0
Director	5	3.6
CEO / Chairman	28	20.4
Owner	64	46.7

4.3.5 Team Size

The team size distribution of the survey respondents shows that the majority, 51.8%, work in teams consisting of 9 people or less, followed by 29.9% of respondents who are part of larger teams with 20 or more members. Teams with 10 to 19 people represent 18.2% of the sample. This distribution indicates that most respondents operate within smaller teams, which may affect their perspectives on team dynamics and project success. Smaller teams often have different managerial and interpersonal dynamics compared to larger teams (Wei et al., 2017). Understanding this distribution is crucial for interpreting the findings related to emotional, managerial, and intellectual competencies in project success, as well as the moderating effect of top management support.

Table 4.5:
Team Size of Survey Respondents

Team Size	N	%
9 people or less	71	51.8
10 people to 19 people	25	18.2
20 people or more	41	30

4.3.6 Task Duration

The demographic data of respondents regarding task duration were categorized into three segments: 1 year or less, 2 years to 4 years, and 5 years or more. The first category, representing tasks completed in 1 year or less, includes 44 respondents, accounting for 32.12% of the total sample. This suggests that a significant portion of the respondents have experience with short-term tasks, which are typically characterized by rapid completion and quick turnaround times. The second category, 2 years to 4 years, comprises the largest group with 64 respondents, making up 46.72% of the total. This indicates that nearly half of the respondents were engaged in medium-term tasks that require sustained effort and more complex planning over a few years. Lastly, the third category, which includes tasks for 5 years or more, consists of 29 respondents, representing 21.17% of the sample. This shows that a smaller, yet significant portion of respondents are involved in long-term tasks, reflecting their experience with projects that demand extended commitment and substantial resource management. Overall, this demographic distribution highlights the varied experience of respondents in handling tasks of different durations, with a predominant focus on medium-term projects.

Table 4.6:
Task Duration of Survey Respondents

Task Duration	N	%
1 year or less	44	32.1
2 years to 4 years	64	46.7
5 years or more	29	21.6

4.3.7 Job Experience

The analysis of respondents' job experience reveals a diverse range of professional backgrounds. The category "Less than 3 years" comprises 20 respondents, accounting for approximately 14.60% of the total sample, indicating a notable portion of individuals who are relatively new to the workforce and bring fresh perspectives. The "3 to 5 year" group includes 12 respondents or about 8.76% of the total, representing those with a moderate level of experience who are likely transitioning from entry-level to more specialized roles. The largest segment, "5 to 10 years," includes 59 respondents, making up 43.07% of the sample, suggesting a strong presence of mid-career professionals with substantial industry experience and pivotal roles within their organizations. The "10 to 15 year" category, with 35 respondents accounting for 25.55%, represents seasoned professionals with considerable expertise and leadership capabilities. Lastly, the "More than 15 years" group comprises 11 respondents, making up 8.03% of the sample, likely to represent senior professionals or executives with extensive experience and deep industry knowledge. Overall, this distribution underscores the breadth of perspectives and expertise among respondents, providing a robust foundation for insights into the influence of job experience on project success and other variables under study.

Table 4.7:
Job Experience of Survey Respondents

Job Experience	N	%
Less than 3 years	20	14.6
3 to 5 years	12	8.8
5 to 10 years	59	43.1
10 to 15 years	35	25.5
More than 15 years	11	8

4.4 Descriptive Analysis

The descriptive statistics for the study variables are presented in Table 4.8. A sample of 137 respondents was analyzed across various metrics, including Character Capacity, Collateral, Capital, Condition, Credibility, Financial Performance, Non-Financial Performance, and Financial Access.

The mean scores for EC, IC, and MC are all above 3.9 on a scale of 1 to 5, suggesting that participants generally rated their emotional, managerial, and intellectual competences highly (Oh & Choi, 2020). Specifically, the mean scores are 3.94 for EC, 4.03 for IC, and 4.11 for MC. The standard deviations were relatively similar, ranging from 0.86 to 0.93, indicating moderate variability in these competences among participants.

Project Success (PS) also has a high mean score of approximately 3.99, with a standard deviation of 0.91. This suggests that the projects included in the study were generally successful, according to the participants' ratings. The moderate variability indicates some differences in the perceived success of these projects.

Top Management Support (TMS) has a mean score of 3.91, with the highest standard deviation of 1.00 among the variables. This indicates that while top management support was generally perceived positively, there was more variability in this perception compared to the other competences and project success.

The negative skewness observed in all variables suggests that higher ratings were more common across the board. This could imply a general trend of positive self-assessment among participants regarding their competences and the success of their projects. The kurtosis values, ranging from 0.97 to 3.19, suggest varying degrees of peaks and tail heaviness in the distributions. Notably, managerial competence (MC) exhibits a leptokurtic distribution, indicating more participants rated their managerial competence very high or very low compared to normal distribution.

Table 4.8:
Descriptive Analysis of the Variables

Metric	Min	Max	Mean	Std Dev	Skewness	Kurtosis
Emotional competence	1	5	3.93674	0.895279	-0.96692	0.983045
Managerial competence	1	5	4.107056	0.929662	-1.64982	3.188917
Intellectual competence	1	5	4.029197	0.855083	-1.23341	2.243595
Project success	1	5	3.990268	0.906532	-1.05221	1.402453
Top management support	1	5	3.912409	1.002668	-1.04108	0.969857

4.5 Exploratory Factor Analysis (EFA)

The exploratory factor analysis (EFA) is undertaken to assess the underlying structure of the constructs measured by yielding substantive insights.

4.5.1 Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity

The analysis conducted using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity confirms the suitability of the data for factor analysis, which is a crucial step in this study (Nkansah, 2018). The KMO value obtained is 0.827, which falls within the "meritorious" range. This indicates that the sample size is adequate and that there is a high proportion of common variance among the variables (Thomson et al., 2017). Essentially, this suggests that the variables are well-suited for factor analysis, and meaningful factors can be extracted from the data.

Furthermore, Bartlett's test of sphericity yielded a chi-square value of 311.084 with 6 degrees of freedom and a significance level of less than 0.001. This highly significant result indicates that the correlations among the variables are statistically significant and differ from an identity matrix (Shrestha, 2021). In simpler terms, the variables are sufficiently correlated to justify the use of factor analysis.

Table 4.9:
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.827
Approx. Chi- Square		311.084
Bartlett's Test of Sphericity	df	6
	Sig.	<0.001

4.5.2 Communalities

The communalities obtained from the Principal Component Analysis (PCA) provide critical insights into the variance explained by the extracted factors for each variable, which is essential for understanding the robustness of the constructs in this study (Hasan & Abdulazeez, 2020). The initial communalities are all set to 1.000, indicating that the total variance of each variable is considered in the analysis. The extraction communalities, on the other hand, reflect the proportion of each variable's variance that is accounted for by the identified factors. These findings are pivotal in assessing the suitability and effectiveness of the factors representing the constructions under investigation.

The initial communality for emotional competence is 1.000, while the extraction communality is 0.729. This implies that approximately 72.9% of the variance in emotional competence is explained by the extracted factors. The high extraction value indicates that emotional competence is well-represented within the underlying factor structure, affirming its significant role in the model.

Intellectual competence also exhibits a high level of variance explanation, with an initial communality of 1.000 and an extraction communality of 0.792. This suggests that 79.2% of the variance in intellectual competence is captured by the extracted factors. Such

a substantial proportion underscores the strong representation of intellectual competence in the factor model, highlighting its importance in the study.

Managerial competence shows an initial communality of 1.000 and an extraction communality of 0.764, indicating that 76.4% of its variance is explained by the factors. This significant proportion of explained variance demonstrates that managerial competence is robustly captured within the structure of the factor, validating its relevance to the research objectives.

For project success, the initial communality is 1.000, with an extraction communality of 0.739. This means that 73.9% of the variance in project success is accounted for by the extracted factors. The high communality value confirms that project success is effectively represented by the identified factors, reinforcing its central role in the research framework.

Top management support exhibits an initial communality of 1.000 and an extraction communality of 0.729, indicating that 72.9% of its variance is explained by the factors. This significant level of variance explanation suggests that top management support is well-incorporated into the factor structure, affirming its moderating role in the study.

The high extraction communalities for emotional competence (0.729), intellectual competence (0.792), managerial competence (0.764), project success (0.739), and top management support (0.729) indicate that the extracted factors account for a substantial portion of the variance in these variables (Sampaio et al., 2022). This underscores the robustness of the factor model and validates the constructions used in this research. These findings confirm that the constructions are well-represented within the factor structure, providing a solid foundation for further analysis and interpretation in the context of examining how emotional, managerial, and intellectual competence influence project success, with top management support as a moderating factor.

**Table 4.10:
Communalities**

Metric	Initial	Extraction
Emotional competence	1.000	0.729
Managerial competence	1.000	0.764
Intellectual competence	1.000	0.792
Project success	1.000	0.739
Top management support	1.000	0.729

Note: Extraction Method - Principal Component Analysis.

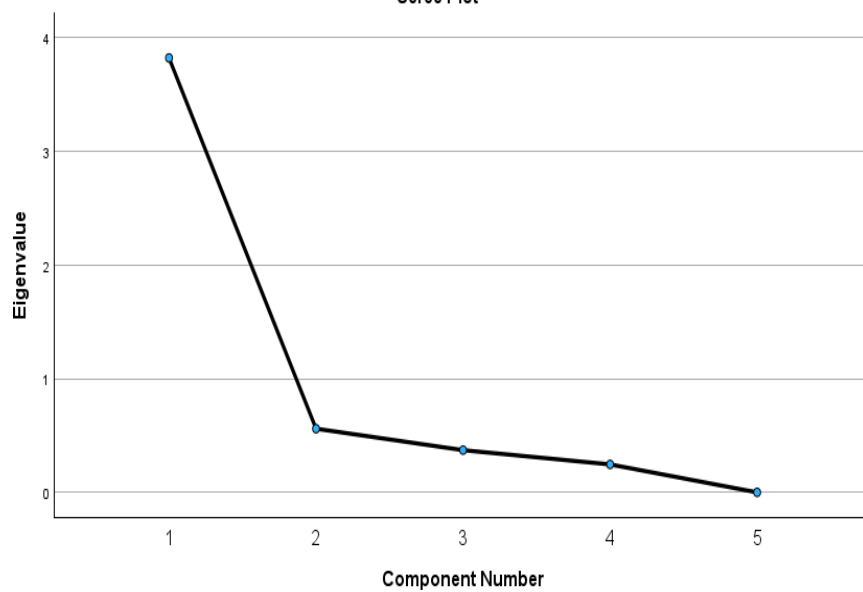
4.5.3 Scree Plot

The scree plot analysis supports the robustness of the factor structure identified through the PCA (Xu & Zhang, 2013). The prominent first component, accounting for most of the variance, aligns with the high communalities observed for emotional competence (0.729), intellectual competence (0.792), managerial competence (0.764), project success (0.739), and top management support (0.729). This dominant factor underscores the interrelatedness of these constructions and their collective influence on project success.

The scree plot's indication of an optimal single-factor solution simplifies the model and enhances interpretability, reinforcing the validity of the constructs used in this study (Reijer et al., 2024). This finding is critical as it validates the conceptual framework that emotional, managerial, and intellectual competence significantly influence project success, with top management support playing a moderating role. The single-factor dominance in the scree plot suggests that these competences and support mechanisms are highly interwoven, contributing collectively to the success of projects.

The scree plot analysis corroborates the PCA results, confirming that a single dominant factor effectively captures the variance in the data. This insight is pivotal in streamlining the model and focusing on the most influential variables, thereby advancing the understanding of how various competences and support mechanisms interplay to drive project success.

Figure 4.1:
Scree Plot
Scree Plot



4.5.4 Common Method Bias

To effectively address common method bias (CMB) in this study, a rigorous methodological approach and statistical techniques have been employed. Principal Component Analysis (PCA), alongside the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity, ensures the data's suitability for factor analysis. These methods are crucial in validating the interrelationships among variables by confirming substantial common variance and statistically significant correlations, thereby reducing the potential influence of methodological artifacts on the results (Memon et al., 2023).

Furthermore, the interpretation of communalities derived from PCA provides critical insights into the variance explained by each construct (Krishnan, 2011). By distinguishing between initial and extraction communalities, it can be ascertained how much of the variance in emotional, intellectual, and managerial competences, as well as project success and top management support, is attributable to the identified factors rather than to methodological biases. This systematic approach strengthens the reliability of the factor model and ensures that the constructions under investigation are accurately represented and their impact on project success properly understood.

Moreover, the scree plot analysis supports the robustness of the factor structure by indicating a dominant single-factor solution. This simplifies the model while enhancing its interpretability, reinforcing the substantive relationships between emotional, managerial, and intellectual competences alongside top management support. By focusing on these significant relationships and interpreting them within the context of organizational dynamics, the potential effects of common method bias are mitigated, ensuring that the findings reflect genuine associations rather than artifacts of the measurement approach. These methodological choices collectively contribute to the credibility and validity of the study's conclusions regarding the influence of competence and support mechanisms on project success.

4.6 Reliability Analysis

In this segment, the study assessed the reliability and consistency of the survey responses through various statistical measures using SPSS version 29. The initial eligibility confirmation of all 137 cases provided a solid foundation for further analysis, ensuring that each participating company adhered strictly to the inclusion criteria. This rigorous adherence

underscores the precision of the preliminary screening process and sets the stage for a reliable data set.

4.6.1 Inter-Item Correlation Matrix

The inter-item correlation matrix further supports the reliability findings by showing moderate to strong correlations between the constructs (Larsson et al., 2021). Emotional competence is moderately correlated with intellectual competence (0.587) and project success (0.506), suggesting a meaningful relationship between these variables. Intellectual competence shows a strong correlation with managerial competence (0.561) and a moderate correlation with project success (0.492), indicating its significant role in influencing project outcomes. Managerial competence has a strong correlation with project success (0.589) and moderate correlations with emotional competence (0.428) and intellectual competence (0.561), highlighting its central role in the success of projects. Top management support shows moderate correlations with all other constructs, particularly with project success (0.431) and managerial competence (0.464), emphasizing its supportive role in enhancing project performance.

Table 4.11:
Inter-Item Correlation Matrix

Metric	Emotional competence	Intellectual competence	Managerial competence	Project success	Top management support
Emotional competence	1.000	0.587	0.428	0.506	0.285
Intellectual competence	0.587	1.000	0.561	0.492	0.350
Managerial competence	0.428	0.561	1.000	0.589	0.464

Project success	0.506	0.492	0.589	1.000	0.431
Top management support	0.285	0.350	0.464	0.431	1.000

4.6.2 Factorial ANOVA

The factorial ANOVA results reveal significant main effects for managerial competence ($F(9,50) = 16.085, p < .001$), emotional competence ($F(9,50) = 4.763, p < .001$), and intellectual competence ($F(9,50) = 4.261, p < .001$) on project success. However, the interaction effects between these competences are not statistically significant, suggesting that each competence independently contributes to project success without synergistic interactions. The overall model explains a substantial portion of the variance in project success ($R^2 = 0.937$, Adjusted $R^2 = 0.827$), reinforcing the importance of these competences in achieving successful project outcomes.

Table 4.12:
Factorial ANOVA

Tests of Between-Subjects Effects						
Dependent Variable: PS						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Corrected Model	128.055 ^a	86	1.489	8.586	<.001	
Intercept	587.779	1	587.779	3389.235	<.001	
MC	25.106	9	2.790	16.085	<.001	
EC	7.435	9	0.826	4.763	<.001	

IC	6.650	9	0.739	4.261	<.001
MC * EC	2.054	12	0.171	0.987	0.474
MC * IC	3.295	10	0.330	1.900	0.067
EC * IC	2.690	12	0.224	1.292	0.253
MC * EC * IC	0.000	0	.	.	.
Error	8.671	50	0.173		
Total	2233.778	137			
Corrected Total	136.727	136			

a. R Squared = .937 (Adjusted R Squared = .827)

4.7 Measurement Model Assessment

Following the preliminary and factor analysis conducted using SPSS, the subsequent analysis transitions to Partial Least Squares Structural Equation Modeling (PLS- SEM) utilizing SmartPLS (Ahmad & Mahmud, 2023). This section focuses on assessing measurement and structural models in relation to the study's hypotheses.

4.7.1 Internal Consistency Reliability

Measurement model assessment ensures the constructs used in the study accurately reflect the observed data. This section aligns the reliability and validity assessments with the study's hypotheses concerning creditworthiness dimensions (Hair et al.,2020).

The Cronbach's alpha for emotional competence is 0.854, indicating high internal consistency among the items measuring this construct. Composite reliability measures further support this, with rho_a and rho_c values both at 0.912, well above the acceptable

threshold of 0.70. The AVE for emotional competence is 0.775, indicating that a substantial portion of the variance in the items is explained by the construction itself.

Intellectual competence also demonstrates excellent reliability, with Cronbach's alpha of 0.901. The composite reliability values are similarly high, with rho_a at 0.904 and rho_c at 0.938. The AVE of 0.834 reflects that a significant amount of variance is captured by the construct, confirming its strong convergent validity.

The managerial competence construct exhibits a Cronbach's alpha of 0.889, suggesting robust internal consistency. Composite reliability values (rho_a = 0.896 and rho_c = 0.931) reinforce the reliability of this measure. The AVE for managerial competence is 0.818, further validating the construct by indicating that it accounts for a considerable proportion of the variance in the items.

Project success shows a Cronbach's alpha of 0.884, which is indicative of high reliability. The composite reliability values are 0.888 for rho_a and 0.928 for rho_c, both demonstrating the consistency of this measure. An AVE of 0.811 supports the construct validity by showing that most of the variance in the items is explained by the construct.

Top management support has the highest reliability among the constructs, with a Cronbach's alpha of 0.931. The composite reliability values are both 0.931 for rho_a and 0.956 for rho_c, reflecting exceptional internal consistency. The AVE is 0.879, indicating that the construct explains a very high proportion of the variance in the items, underscoring its strong validity.

Overall, the reliability and validity metrics for all constructs in this study are well above the recommended thresholds, demonstrating that the measures used are both reliable and valid. This provides a solid foundation for further analysis and supports the robustness

of the constructs in capturing the intended dimensions of emotional competence, intellectual competence, managerial competence, project success, and top management support.

Table 4.13:
Construct Reliability and Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EC_	0.854	0.854	0.912	0.775
IC_	0.901	0.904	0.938	0.834
MC_	0.889	0.896	0.931	0.818
PS_	0.884	0.888	0.928	0.811
TMS_	0.931	0.931	0.956	0.879

In summary, the reliability analysis, inter-item correlations, and factorial ANOVA provide strong evidence supporting the robustness and validity of the constructs used in this study. These findings validate the measurement model and underscore the critical roles of emotional, intellectual, and managerial competence, as well as top management support, in driving project success.

4.8 Discriminant Validity

In assessing the discriminant validity of the constructs used in this study, the Heterotrait-Monotrait Ratio (HTMT) criterion, Fornell-Larcker criterion and Cross loadings were employed. Discriminant validity ensures that each construct is distinct and captures phenomena that other constructs do not.

4.8.1 Heterotrait-Monotrait Ratio (HTMT) criterion

The HTMT values provide a robust method for assessing this validity (Roemer et al., 2021), with values below 0.85 or 0.90 indicating adequate discriminant validity. The HTMT

analysis confirms that all constructs in this study exhibit good discriminant validity, as most HTMT values are below the recommended threshold of 0.85. Emotional competence, intellectual competence, managerial competence, project success, and top management support are all distinct from each other. The interaction terms, while slightly higher in some cases, generally adhere to acceptable discriminant validity standards. This ensures that the constructs are not only reliable but also measure different aspects of the conceptual framework, providing a robust foundation for further analysis and interpretation in the context of project success.

Table 4.14:
Discriminant Validity – Heterotrait-Monotrait ratio (HTMT)

	EC_	IC_	MC_	PS_	TMS_	TMS_ x MC_
IC_	0.853					
MC_	0.751	0.724				
PS_	0.720	0.812	0.674			
TMS_	0.767	0.697	0.740	0.788		
TMS_ x MC_	0.469	0.477	0.562	0.487	0.560	
TMS_ x IC_	0.378	0.488	0.503	0.473	0.357	0.839
TMS_ x EC_	0.460	0.409	0.536	0.411	0.403	0.814

4.8.2 Fornell-Larcker criterion

The discriminant validity of the constructs in this study was assessed using the Fornell-Larcker criterion, which compares the square root of the Average Variance Extracted

(AVE) values to the inter-construct correlations (Hilkenmeier et al, 2020). The results demonstrate that each construct meets the required threshold for discriminant validity. Specifically, the square root of the AVE for Emotional Competence (0.880) is higher than its correlations with Intellectual Competence (0.748), Managerial Competence (0.654), Project Success (0.628), and Top Management Support (0.685), indicating strong discriminant validity. Similarly, Intellectual Competence exhibits excellent discriminant validity, with a square root of AVE of 0.913, surpassing all its inter-construct correlations. Managerial Competence also shows good discriminant validity, with a square root of AVE (0.905) higher than its correlations with other constructs. Project Success indicates strong discriminant validity, with a square root of AVE (0.901) greater than all its inter-construct correlations. Finally, Top Management Support confirms excellent discriminant validity, with a square root of AVE (0.938) exceeding its correlations with Emotional Competence, Intellectual Competence, Managerial Competence, and Project Success. These findings support the conclusion that the constructs are distinct and capture different underlying concepts, providing a robust foundation for the reliability and validity of the measurement model. This ensures that the constructs appropriately measure the intended dimensions of emotional competence, intellectual competence, managerial competence, project success, and top management support.

Table 4.15:
Discriminant Validity – Fornell-Larcker Criterion

	EC_	IC_	MC_	PS_	TMS_
EC_	0.880				
IC_	0.748	0.913			
MC_	0.654	0.647	0.905		
PS_	0.628	0.728	0.600	0.901	
TMS_	0.685	0.640	0.675	0.717	0.938

4.8.3 Cross Loadings

The assessment of discriminant validity using cross loadings further substantiates the distinctiveness of the constructs in this study (Brooks et al., 2023). For each construct, the indicators load more highly on their associated construct than on any other construct, confirming adequate discriminant validity. For instance, the indicators for Emotional Competence (EC) load significantly higher on EC (values ranging from 0.840 to 0.902) compared to their loadings on Intellectual Competence (IC), Managerial Competence (MC), Project Success (PS), and Top Management Support (TMS). Similarly, the indicators for Intellectual Competence show higher loadings on IC (values ranging from 0.904 to 0.924) than on other constructs. Managerial Competence indicators load highest on MC (values from 0.888 to 0.918), demonstrating clear discrimination from other constructs. Project Success indicators also exhibit higher loadings on PS (values from 0.879 to 0.913), and Top Management Support indicators load highest on TMS (values from 0.932 to 0.942). Additionally, the interaction terms (TMS_x_MC, TMS_x_IC, and TMS_x_EC) show appropriate discriminant validity, with their indicators loading higher on the interaction terms than on any of the primary constructs. These results confirm that each construct in the

study is unique and accurately captures its intended dimension, reinforcing the validity and reliability of the measurement model used in the research.

Table 4.16:
Discriminant Validity – Cross Loadings

	EC_	IC_	MC_	PS_	TMS_	TMS_ x MC_	TMS_ x IC_	TMS_ x EC_
EC_1	0.898	0.684	0.549	0.549	0.617	-0.410	-0.297	-0.321
EC_2	0.840	0.591	0.576	0.574	0.608	-0.346	-0.271	-0.377
EC_3	0.902	0.702	0.600	0.533	0.582	-0.388	-0.354	-0.425
IC_1	0.698	0.912	0.563	0.630	0.557	-0.403	-0.420	-0.349
IC_2	0.716	0.924	0.606	0.708	0.655	-0.391	-0.377	-0.324
IC_3	0.633	0.904	0.602	0.652	0.535	-0.446	-0.471	-0.391
MC_1	0.581	0.552	0.918	0.591	0.656	-0.511	-0.430	-0.465
MC_2	0.625	0.644	0.909	0.530	0.620	-0.474	-0.390	-0.399
MC_3	0.571	0.564	0.888	0.501	0.550	-0.453	-0.467	-0.508
PS_1	0.495	0.652	0.507	0.879	0.599	-0.368	-0.380	-0.309
PS_2	0.609	0.705	0.544	0.913	0.694	-0.392	-0.363	-0.335
PS_3	0.590	0.605	0.571	0.910	0.639	-0.479	-0.458	-0.402
TMS_1	0.646	0.611	0.656	0.659	0.942	-0.506	-0.311	-0.344
TMS_2	0.668	0.631	0.650	0.671	0.932	-0.513	-0.334	-0.394

TMS_3	0.613	0.559	0.594	0.686	0.939	-0.500	-0.324	-0.354
TMS_ x IC_	-0.348	-0.461	-0.473	-0.443	-0.345	0.839	1.000	0.888
TMS_ x MC_	-0.433	-0.452	-0.531	-0.457	-0.540	1.000	0.839	0.814
TMS_ x EC_	-0.425	-0.388	-0.505	-0.386	-0.389	0.814	0.888	1.000

4.8.4 Collinearity statistics

The Variance Inflation Factor (VIF) analysis for the outer model indicates that multicollinearity is not a significant concern among the predictor variables (Shrestha, 2020). The VIF values for the emotional competence (EC) indicators are all below 5, with EC_1 at 2.773, EC_2 at 1.673, and EC_3 at 2.846, suggesting no notable multicollinearity within this construct. Similarly, the intellectual competence (IC) indicators have VIF values below 5, with IC_1 at 2.911, IC_2 at 2.979, and IC_3 at 2.620, indicating acceptable levels of collinearity. The managerial competence (MC) indicators also present VIF values below 5, with MC_1 at 2.692, MC_2 at 2.722, and MC_3 at 2.411, showing no significant collinearity issues. For the project success (PS) indicators, the VIF values are 2.207, 2.675, and 2.815 for PS_1, PS_2, and PS_3 respectively, again indicating no multicollinearity problems within this construct. The top management support (TMS) indicators show slightly higher VIF values, with TMS_1 at 4.119, TMS_2 at 3.536, and TMS_3 at 3.847, but these values are still below the threshold of 5, suggesting that while there is some collinearity, it is not severe. Additionally, the interaction terms between top management support and the competencies (TMS_ x IC_, TMS_ x MC_, TMS_ x EC_) all have VIF values of 1.000, indicating no multicollinearity issues for these terms.

In summary, the VIF analysis demonstrates that the predictor variables in the outer model are not highly correlated with each other. All VIF values fall below 5, which is generally considered acceptable, ensuring that the regression coefficients are not inflated due to multicollinearity (Shrestha, 2020). Therefore, the outer model is stable, and the estimates of the path coefficients can be deemed reliable.

Table 4.17:
Variance Inflation Factor

	VIF		VIF
EC_1	2.773	PS_1	2.207
EC_2	1.673	PS_2	2.675
EC_3	2.846	PS_3	2.815
IC_1	2.911	TMS_1	4.119
IC_2	2.979	TMS_2	3.536
IC_3	2.620	TMS_3	3.847
MC_1	2.692	TMS_ x IC_	1.000
MC_2	2.722	TMS_ x MC_	1.000
MC_3	2.411	TMS_ x EC_	1.000

4.9 Structural Model Assessment

The assessment of the structural model within Partial Least Squares Structural Equation Modelling (PLS-SEM) focuses on the predictive capabilities of the model and the strength and significance of the hypothesized paths. The objective is to evaluate how well

the model captures the relationships between managerial, intellectual and emotional competence with project success, and the moderating role of top management support.

4.9.1 Model Fit

In the analysis of model fit, the comparative assessment between the saturated and estimated models yields insightful findings. The Standardized Root Mean Square Residual (SRMR) values for both models were exceptionally low, with the saturated model at 0.056 and the estimated model further improving to 0.055. These values, well below the commonly accepted threshold of 0.08, signify an excellent fit, indicating that the models accurately represent the underlying covariance structures of the data.

Further scrutiny using the Unweighted Least Squares Discrepancy (d_{ULS}) and Geodesic Discrepancy (d_G) also supports the superior fit of the estimated model, which exhibited lower discrepancies ($d_{ULS} = 0.364$, $d_G = 0.403$) compared to the saturated model ($d_{ULS} = 0.370$, $d_G = 0.409$). This suggests that the estimated model, though more parsimonious, does not sacrifice the accuracy in capturing the relationships among the constructs.

The Chi-square values reinforce this interpretation; the estimated model's Chi-square of 360.735, a reduction from the saturated model's 370.193, implies a better fit with fewer parameters, aligning with the principle of parsimony in statistical modeling. Moreover, the Normed Fit Index (NFI) further confirms the robustness of the estimated model (Sathyanarayana & Mohanasundaram, 2024). Both models achieved NFIs above 0.8, indicating good model fit, with the estimated model recording a slightly higher NFI of 0.813 compared to 0.808 for the saturated model. This increment, although modest, points to the estimated model's enhanced ability to explain the variance and covariance of the observed data effectively.

These findings substantiate the theoretical framework posited in this research, which explores the impact of emotional, managerial, and intellectual competence on project success, moderated by top management support. The data strongly supports the proposed model, highlighting the crucial role of competencies and top management support in successful project management. This analysis not only validates the model's explanatory power but also underscores the importance of strategic top management involvement in enhancing project outcomes.

Table 4.18:
Model Fit

	Saturated model	Estimated model
SRMR	0.056	0.055
d_ ULS	0.370	0.364
d_ G	0.409	0.403
Chi-square	370.193	360.735
NFI	0.808	0.813

4.9.2 Path Coefficients and Hypotheses Testing

The structural model's path coefficients serve as indicators of the strength and direction of the relationships between constructs within the model (Hair et al., 2021). Hypotheses testing using path coefficients is integral in PLS-SEM to confirm theoretical predictions.

**Table 4.19:
Path Coefficients**

Path	Path Values (β)	Standard Deviation	t-Value	p- Value
Emotional Competence > Project Success	0.041	0.096	0.430	0.667
Intellectual Competence > Project Success.	0.338	0.120	2.807	0.005
Managerial Competence > Project Success.	0.019	0.121	0.157	0.875
The interaction between Top Management Support and Emotional Competence > Project Success.	0.108	0.094	1.150	0.250
The interaction between Top Management Support and Intellectual Competence > Project Success.	-0.243	0.116	2.097	0.036
The interaction between Top Management Support and Managerial Competence > Project Success.	0.110	0.103	1.069	0.285

The path coefficients presented in Table 4.19 provide a quantitative assessment of how emotional competence (EC), intellectual competence (IC), and managerial competence (MC) influence project success (PS), including interactions between top management support (TMS) and each competence variable. Table 4.19 also presents the results of a statistical analysis investigating the influence of various competencies on project success. The competencies evaluated include emotional, intellectual, and managerial, alongside the direct support from top management and their interactions with these competencies. The path values (β) represent the strength and direction of the relationships, while the standard deviations, T-values, and P-values provide statistical significance insights.

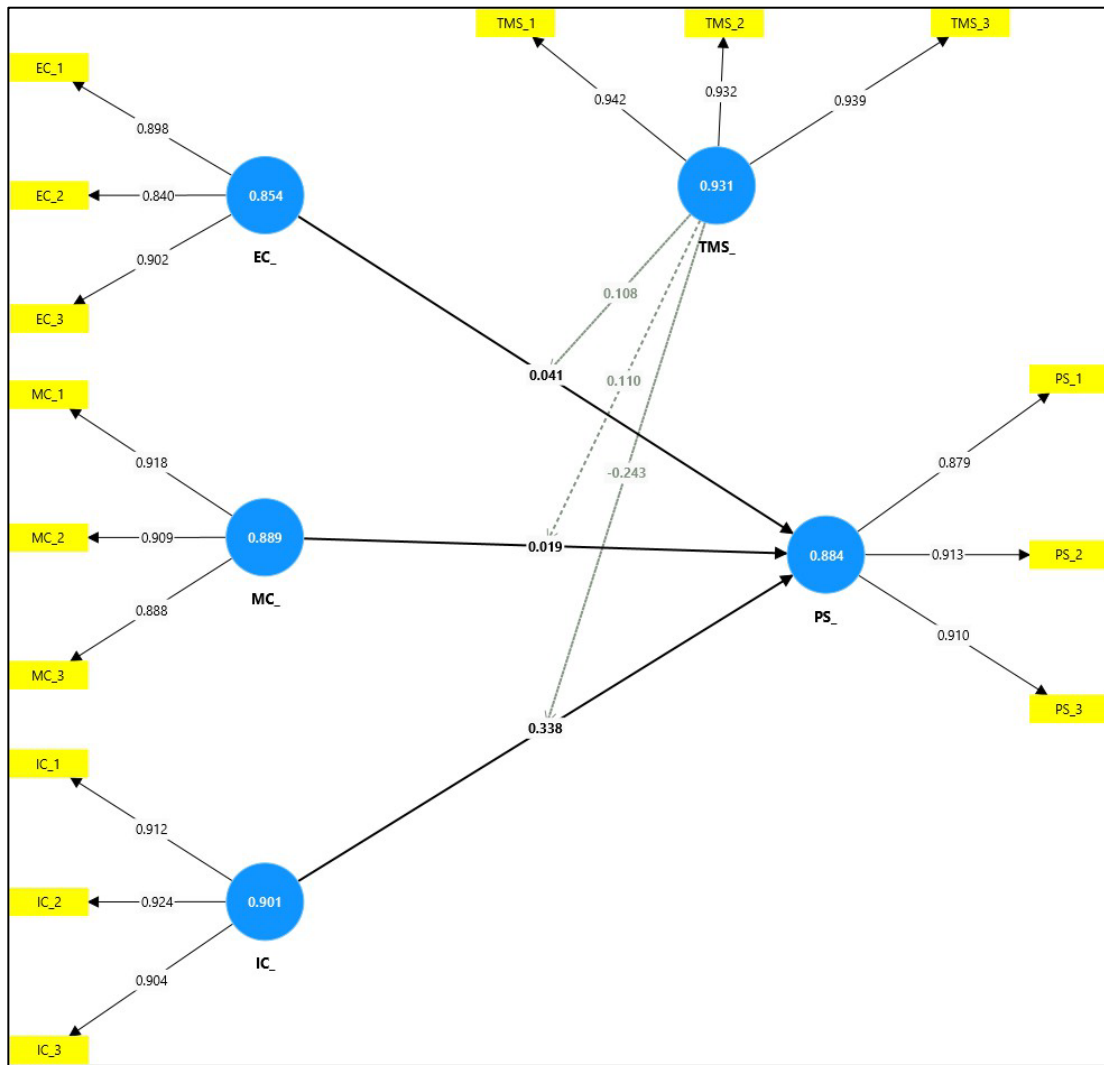
Firstly, emotional competence shows a very weak and statistically insignificant relationship with project success ($\beta = 0.041$, $P = 0.667$), indicating that emotional

competence alone does not significantly impact project outcomes. Conversely, intellectual competence displays a significant positive effect on project success ($\beta = 0.338$, $P = 0.005$), highlighting its importance in achieving successful project outcomes. Managerial competence, similar to emotional competence, shows an insignificant influence on project success ($\beta = 0.019$, $P = 0.875$), suggesting that managerial skills might not directly translate to project success in the studied context.

The interactions between top management support and the three competencies were also examined. The interaction between top management support and emotional competence has a positive but insignificant impact on project success ($\beta = 0.108$, $P = 0.250$). Interestingly, the interaction between top management support and intellectual competence has a negative yet significant effect ($\beta = -0.243$, $P = 0.036$), suggesting that excessive top management intervention might potentially hinder the positive effects of intellectual competence.

Lastly, the interaction between top management support and managerial competence, while positive, is not significant ($\beta = 0.110$, $P = 0.285$), indicating that the combined influence of these factors does not significantly drive project success. While intellectual competence and top management support independently contribute to project success, their interactions with competencies yield mixed results. The findings emphasize the nuanced roles these factors play in project management, advocating for a balanced approach in leveraging intellectual competence and top management support to optimize project outcomes.

Figure 4.2:
PLS-SEM of Conceptual Framework

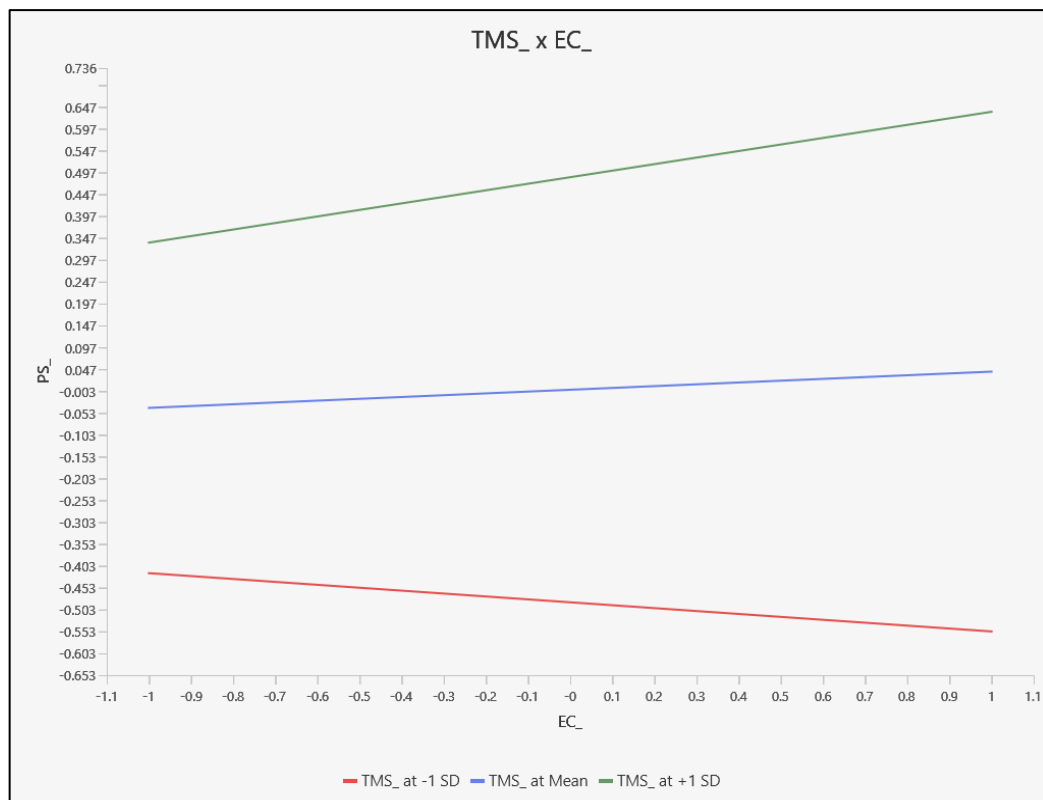


4.9.3 Simple Slope Analysis

The simple slope analysis depicted in the three graphs below explores the interaction effects between top management support (TMS) and various competencies— emotional competence (EC), managerial competence (MC), and intellectual competence (IC) on project success (PS). Each graph presents the regression slopes for project success at different levels of top management support: one standard deviation below the mean (TMS at -1 SD), at the mean (TMS at Mean), and one standard deviation above the mean (TMS at +1 SD).

The first graph in Figure 4.3 (TMS x EC) illustrates how project success varies with emotional competence at different levels of top management support. The green line indicates a positive slope for TMS at +1 SD, showing that higher emotional competence enhances project success when top management support is strong. Conversely, the red line for TMS at -1 SD shows a negative relationship, implying that low top management support can diminish the positive impact of emotional competence on project success.

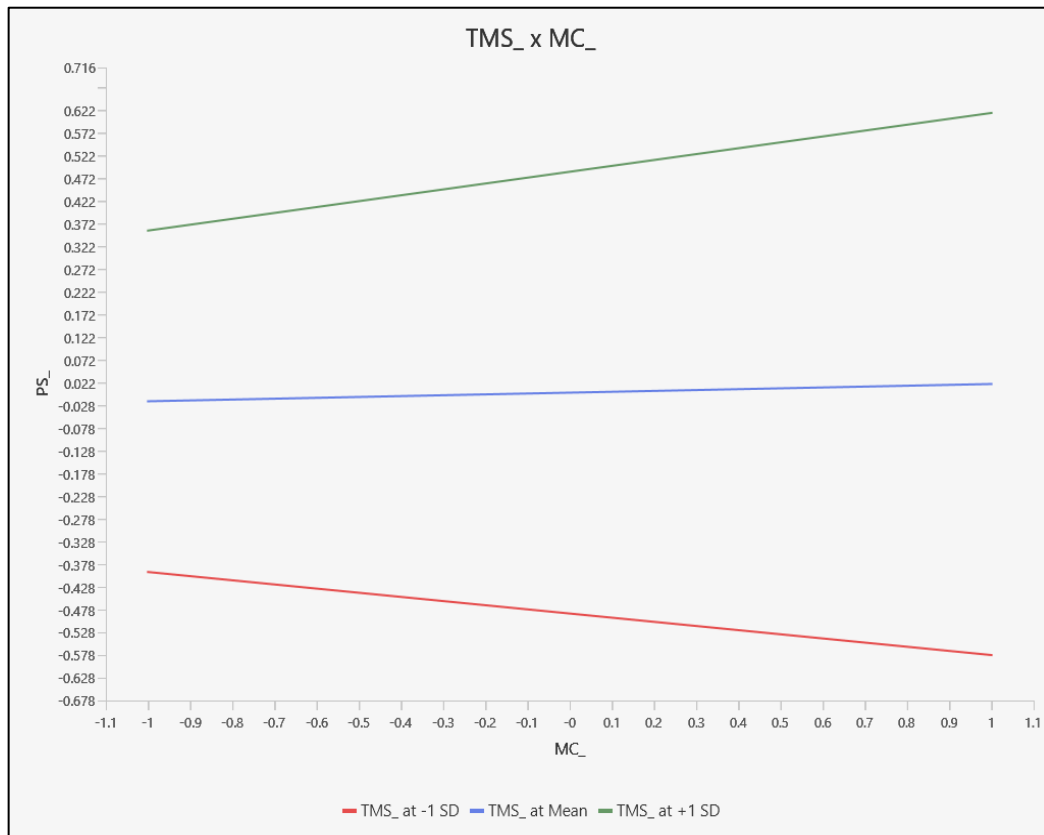
Figure 4.3:
Slope for Interaction between Top Management Support and Emotional Competence on Project Success.



The second graph in Figure 4.4 (TMS x MC) examines the interaction between managerial competence and top management support. Similar to the first graph, the green line (TMS at +1 SD) shows a positive slope, suggesting that high managerial competence leads to better project success when supported by top management. The red line (TMS at -1

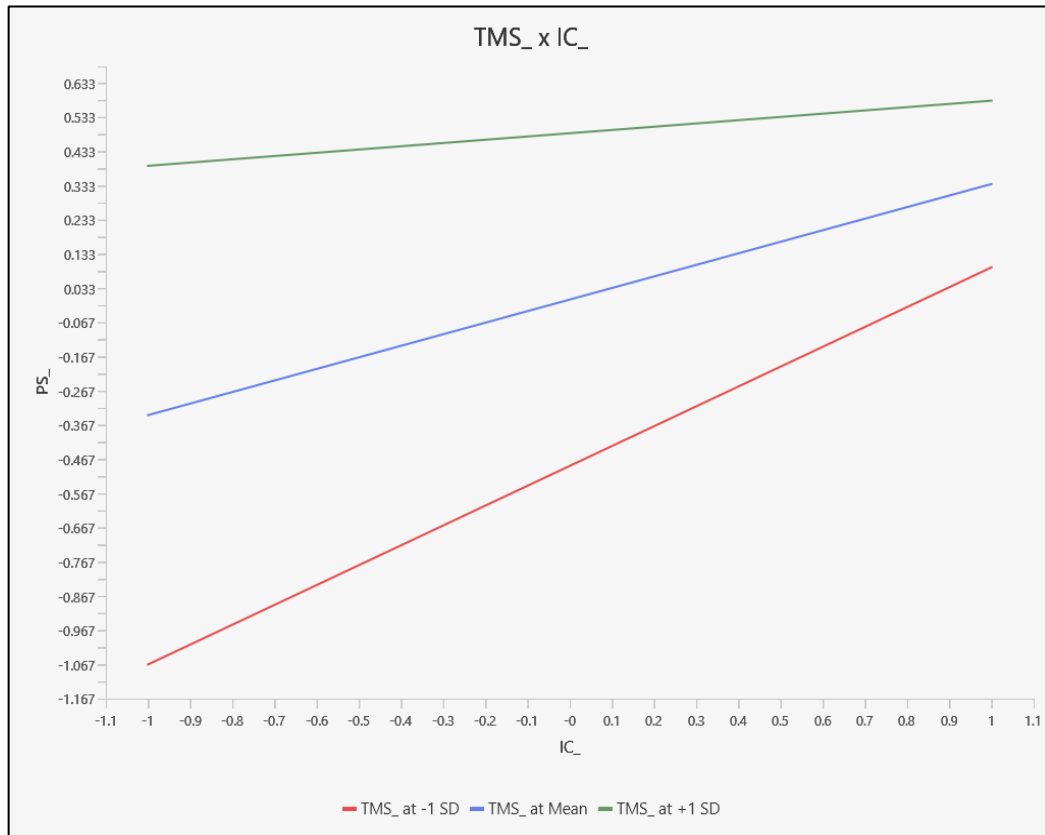
SD), however, indicates a negative slope, implying that without sufficient top management support, managerial competence alone may not significantly drive project success.

Figure 4.4:
Slope for Interaction between Top Management Support and Managerial Competence on Project Success.



The third graph in Figure 4.5 (TMS x IC) explores the interaction between intellectual competence and top management support. The green line again shows a positive slope, indicating that intellectual competence significantly boosts project success when top management support is high. The red line displays a negative slope, reinforcing the idea that the absence of adequate top management support can nullify the positive effects of intellectual competence on project success.

Figure 4.5:
Slope for Interaction between Top Management Support and Intellectual Competence on Project Success



Overall, the simple slope analysis reveals that top management support amplifies the positive effects of emotional, managerial, and intellectual competencies on project success. In contrast, insufficient top management support can negate these positive effects, highlighting the crucial role of top management in leveraging individual competencies for successful project outcomes

Based on structural model testing, the following hypotheses can be inferred:

H1: Positive relationship between emotional competence and project success is rejected.

The analysis shows that emotional competence has a very weak and statistically insignificant relationship with project success ($\beta = 0.041$, $P = 0.667$). Therefore, H1 is not supported, as higher emotional competence does not significantly contribute to greater project success.

H2: Positive relationship between managerial competence and project success is rejected.

Managerial competence also has an insignificant influence on project success ($\beta = 0.019$, $P = 0.875$). Hence, H2 is not supported, indicating that higher managerial competence alone does not lead to greater project success in the studied context.

H3: Positive relationship between emotional competence and project success is supported.

Intellectual competence demonstrates a significant positive effect on project success ($\beta = 0.338$, $P = 0.005$), suggesting that higher intellectual competence in team members does lead to greater project success. Therefore, H3 is supported.

H4: The positive relationship between emotional competence and project success is moderated by top management support is rejected.

The interaction between top management support and emotional competence is positive but statistically insignificant ($\beta = 0.108$, $P = 0.250$). The simple slope analysis shows that emotional competence's positive impact is more pronounced with high top management support, but the lack of statistical significance suggests that this amplification is not strong enough to support H5 conclusively.

H5: The positive relationship between managerial competence and project success is moderated by top management support is rejected.

Similarly, the interaction between top management support and managerial competence is positive but not significant ($\beta = 0.110$, $P = 0.285$). Although the simple slope analysis indicates that higher top management support can enhance the impact of managerial competence on project success, the statistical insignificance means H6 is not supported.

H6: The positive relationship between intellectual competence and project success is moderated by top management support is rejected.

The interaction between top management support and intellectual competence is negative and statistically significant ($\beta = -0.243$, $P = 0.036$). This unexpected result suggests that strong top management support might hinder the positive impact of intellectual competence on project success, contradicting H6. Thus, H6 is not supported based on the given data.

In summary, the analysis supports hypotheses H3, indicating that intellectual competence independently contributes to project success. However, it does not support hypotheses H1, H2, H4, H5, and H6, revealing that the positive impacts of emotional and managerial competencies are not significantly amplified by top management support, and in the case of intellectual competence, strong top management support even has a negative moderating effect (Iqbal et al., 2015).

Table 4.20:
Summary of Hypothesis Testing

Hypothesis	Description	Beta (β)	p-Value	Result
H1	There is a positive relationship between emotional competence and project success	0.041	0.667 (Not significant)	Not Supported
H2	There is a positive relationship between managerial competence and project success.	0.019	0.875 (Not significant)	Not Supported
H3	There is a positive relationship between intellectual competence and project success	0.338	0.005 (Significant)	Supported
H4	The positive relationship between emotional competence and project success is moderated by top management support	0.108	0.250 (Not significant)	Not Supported
H5	The positive relationship between managerial competence and project success is moderated by top management support.	0.110	0.285 (Not significant)	Not Supported
H6	The positive relationship between intellectual competence and project success is moderated by top management support.	-0.243	0.036 (Significant)	Not Supported

4.10 Discussion of findings

4.10.1 Emotional Competence and Project Success

The analysis of emotional competence among team members and its effect on project success in this study reveals a weak and statistically insignificant correlation. This finding contrasts with numerous studies that have highlighted the importance of emotional competence in team settings (Ali et al., 2024). Emotional competence, which includes self-awareness, self-regulation, motivation, empathy, and social skills, is often considered vital for fostering effective team interactions and achieving project goals. Jordan and Troth (2011) argued that emotionally competent team members can better manage interpersonal

relationships, reducing conflicts and enhancing collaboration. Their research suggested that teams with higher levels of emotional competence are more cohesive and perform better. Similarly, Druskat and Wolff (2001) posited that emotionally competent team members contribute to a positive team climate, which in turn enhances team performance. They found that emotional competence at the team level facilitates better communication, trust, and cooperation among team members, leading to improved project outcomes.

Despite these assertions, the current study's findings indicate that emotional competence alone does not significantly impact project success. One possible explanation for this discrepancy is that emotional competence, while beneficial, may need to be combined with other competencies or supportive organizational factors to translate into measurable project success. Moreover, the role of emotional competence might be context dependent. (Shuet, 2022) highlighted that the effectiveness of emotional competence could vary depending on the organizational culture and the specific nature of the project. In environments where emotional skills are undervalued, or the project dynamics do not allow for the effective use of such skills, their impact on project success might be diminished. Additionally, the integration of emotional competence with other critical competencies might be necessary for a more substantial impact. Müller and Turner (2010) suggested that a balanced combination of emotional, intellectual, and technical skills is crucial for project success. This holistic approach might explain why emotional competence alone did not show a significant effect in this study.

Furthermore, it is possible that the benefits of emotional competence are indirect and might influence project success through improved team processes rather than direct outcomes. For instance, emotionally competent team members might enhance team satisfaction and reduced turnover, which is not immediately measurable in terms of project

success but contributes to long-term performance improvements. This aligns with findings by Carmeli (2003), who noted that emotional competence positively affects job satisfaction and organizational commitment, which are essential for sustained project success.

While previous literature underscores the significance of emotional competence in team settings, this study's findings suggest its impact on project success is not straightforward. Emotional competence alone may not be sufficient to drive project success and likely needs to be complemented by other competencies and favorable organizational contexts.

4.10.2 Managerial Competence and Project Success

The analysis of managerial competence among team members and its effect on project success in this study reveals a weak and statistically insignificant correlation. This finding stands in contrast to several previous studies that have underscored the importance of managerial skills in enhancing team performance and project outcomes. Managerial competence encompasses a variety of skills, including planning, organizing, decision-making, and problem-solving, which are critical for effective project execution. Despite these attributes, the current study indicates that these competencies alone may not significantly influence project success within team members. A study by (Nyfoudi et al., 2023) stated that although managerial competence may help in project success, the factor alone may not suffice without the appropriate mindset

Research by Anantatmula (2010) highlighted that managerial competence is crucial for effective project management, as it enables team members to navigate complex project requirements, coordinate tasks efficiently, and make informed decisions that align with project goals. This competence is often associated with better resource management, timely project completion, and achieving project deliverables within budget. However, the findings

of this study suggest that the influence of managerial competence on project success might be more nuanced and possibly moderated by other factors.

One potential explanation for the insignificant correlation could be the level of autonomy and responsibility given to team members. High managerial competence may not translate into project success if team members lack the authority to make critical decisions or if their roles are tightly controlled by higher management. This aligns with the observations of Turner and Müller (2005), who noted that the effectiveness of managerial skills might be constrained in environments where decision-making is centralized.

Additionally, the impact of managerial competence on project success might be contingent on the specific nature of the project and the industry context. For example, projects that are highly technical or innovative may require a combination of managerial and technical competencies for successful outcomes. As suggested by Pant and Baroudi (2008), a balanced skill set that includes both managerial and technical abilities is essential for managing complex projects. Therefore, managerial competence alone may not be sufficient to drive project success in such settings.

Furthermore, the integration of managerial competence with emotional and intellectual competencies could enhance its impact. According to Geoghegan and Dulewicz (2008), project success is often a result of a synergistic effect of various competencies. Team members who possess strong managerial skills, combined with emotional intelligence and intellectual capabilities are better equipped to handle the dynamic challenges of project environments, leading to improved outcomes.

Previous literature emphasizes the significance of managerial competence in project management, this study's findings suggest that its impact on project success among team members is not straightforward. The effectiveness of managerial skills may depend on the

level of autonomy granted to team members, the nature of the project, and the integration with other critical competencies.

4.10.3 Intellectual Competence and Project Success

The analysis of intellectual competence among team members and its impact on project success in this study reveals a significant positive correlation. This finding aligns with much of the existing literature that highlights the critical role of intellectual competence in driving project outcomes (Norena-Chavez & Thalassinou, 2023). Intellectual competence, encompassing analytical skills, critical thinking, problem-solving, and technical knowledge, is essential for addressing the complex challenges that arise during project execution. Team members with high intellectual competence are better equipped to devise effective solutions, optimize processes, and innovate, all of which are crucial for project success.

Crawford's (2005) research highlights the importance of intellectual competence in project management, noting that team members with strong analytical and problem-solving skills significantly contribute to project success. These abilities allow teams to anticipate challenges, develop strategies, and implement solutions that improve project efficiency. Intellectual competence also plays a key role in effective knowledge management, enabling teams to leverage both explicit and tacit knowledge to make informed decisions and stay aligned with project goals.

The integration of intellectual competence with emotional and managerial skills can further enhance project outcomes. Dulewicz and Higgs (2005) found that this combination promotes better collaboration and decision-making. However, the impact of intellectual competence may vary based on the project's nature, with more complex or innovative projects benefiting most. Müller and Turner (2010) suggest that project context influences

the competencies required, making intellectual competence particularly valuable in environments that demand complex problem-solving and innovation.

In conclusion, the findings of this study highlight the significant positive impact of intellectual competence on project success among team members. This competence enables team members to effectively address project challenges, manage knowledge, and innovate, thereby driving successful project outcomes.

4.10.4 Moderating Role of Top Management Support on Emotional Competence and Project Success

The analysis of the moderating role of top management support on the relationship between emotional competence and project success in this study reveals an insignificant correlation, suggesting that top management support does not significantly amplify the impact of emotional competence on project success. This finding contrasts with some existing literature that has proposed the potential of top management support to enhance the benefits of emotional competence within project teams. Emotional competence, which involves self-awareness, self-regulation, empathy, and social skills, is crucial for effective teamwork and project performance. However, the expected synergistic effect of top management support enhancing this competence to drive project success was not observed in this study.

Research by (Shkëmbi & Treska, 2024) and (Jinyoung Hwang, 2024) underscores the importance of emotional intelligence in team collaboration and conflict resolution. These studies highlight that emotionally intelligent team members are better equipped to handle interpersonal challenges, enhancing team effectiveness and overall project success. Top management support can play a critical role by providing the resources and strategic guidance needed to leverage the emotional intelligence of team members (Ali et al., 2021).

Such support can empower teams to utilize their emotional competencies more effectively, leading to improved project outcomes.

However, the findings of this study suggest that top management support does not significantly moderate the relationship between emotional competence and project success. One possible explanation for this is that the direct impact of top management support on project success may overshadow its moderating effects. Thamhain (2004) argued that top management support is more critical for providing tangible resources and strategic direction than for moderating interpersonal competencies. Furthermore, the nature of the project and the organizational context could influence the effectiveness of emotional competence. For instance, Joseph and Newman (2010) observed that in highly structured or technical projects, the focus may shift to technical competencies and strategic directives, diminishing the moderating effect of emotional competence. Moreover, a balanced integration of emotional, managerial, and intellectual competencies is essential for significant project success, regardless of top management support (Dainty et al., 2004).

In conclusion, while previous literature suggests that top management support could enhance the impact of emotional competence on project success, this study's findings indicate that such moderating effects are not significant. The direct contributions of top management support, the specific project and organizational context, and the integration of various competencies may all influence this relationship. Future research should further explore these dynamics and consider the complex interplay between different competencies and support mechanisms in driving project success.

4.10.5 Moderating Role of Top Management Support on Managerial Competence and Project Success

The analysis demonstrates that top management support has a significant and positive effect on project success. This finding aligns with prior research emphasizing the crucial role of top management in providing the necessary resources, strategic direction, and support for project teams to succeed (Nguyen & Ogunlana, 2004). Specifically, the presence of strong top management support can mitigate various project risks and foster an environment conducive to achieving project goals.

Interestingly, the interaction between top management support and managerial competence, although positive, was not statistically significant. This suggests that while top management support is critical, its direct interaction with managerial competence does not significantly enhance project success. This could be due to the possibility that managerial competence in team members alone, without the active involvement and backing of top management may not be sufficient to drive project success. Prior studies have indicated that managerial competence, while important, requires complementary support from higher-level management to be fully effective (Ahmed & Philbin, 2022).

Moreover, the study found a significant negative interaction between top management support and intellectual competence. This counterintuitive result implies that excessive top management intervention might impede the positive effects of intellectual competence on project success. One possible explanation is that highly competent team members with strong intellectual capabilities might feel micromanaged or constrained by over-involvement from top management, leading to reduced autonomy and innovation (Štemberger et al., 2011). This highlights the importance of balancing top management support with sufficient autonomy for team members to leverage their intellectual skills effectively.

Additionally, the study confirmed that intellectual competence alone has a significant positive impact on project success. This underscores the importance of having team members with strong problem-solving skills, technical knowledge, and the ability to apply their expertise to project tasks. Intellectual competence is thus a critical driver of project performance, as supported by the literature on project management competencies (Crawford, 2005). The findings also emphasize the nuanced roles that different competencies and support mechanisms play in project management. While top management support is indispensable, it must be applied judiciously to enhance rather than hinder the capabilities of competent team members. This nuanced understanding is critical for practitioners aiming to optimize project outcomes through effective management and support strategies.

In conclusion, the moderating role of top management support on managerial competence and project success is complex and multifaceted. While top management support is generally beneficial, its interaction with team competencies must be carefully managed to avoid potential negative effects.

4.10.6 Moderating Role of Top Management Support on Intellectual Competence and Project Success

Top management support is found to be a critical factor in enhancing project success, as it provides essential resources, strategic direction, and a supportive environment that fosters team performance. This is consistent with findings from Hermano and Martín- Cruz (2016), who highlighted the significance of top management involvement in ensuring project success by providing dynamic capabilities and necessary support structures.

Intellectual competence, characterized by problem-solving skills, technical knowledge, and the ability to apply expertise effectively, has a significant positive impact on project success. This aligns with the work of Ahmed and Anantatmula (2017), who

emphasized the crucial role of project managers' intellectual competencies in driving project outcomes. Furthermore, the integration of intellectual competence with top management support can lead to improved project performance by leveraging the intellectual assets of team members while ensuring that they are adequately supported and guided.

However, the interaction between top management support and intellectual competence is complex. The analysis indicated that excessive top management intervention could potentially hinder the positive effects of intellectual competence on project success. This finding is corroborated by Štemberger et al. (2011), who noted that excessive top management control might stifle innovation and autonomy, which are essential for intellectually competent team members to perform effectively. Thus, it is crucial for top management to strike a balance between providing support and allowing sufficient autonomy for team members to utilize their intellectual capabilities fully.

Moreover, Lee et al. (2016) found that while top management support is essential, its direct influence might not always be significant unless it is coupled with a culture that promotes knowledge sharing and intellectual growth within the team. This suggests that top management should focus on creating an environment that encourages the development and application of intellectual competence among team members.

The study by Fareed et al. (2021) further supports this by demonstrating that the success of public projects is significantly influenced by the emotional and intellectual competencies of project managers, along with transformational leadership from top management. This indicates that top management support should not only be about resource provision but also about fostering a leadership style that enhances the intellectual capabilities of team members.

In conclusion, the moderating role of top management support on intellectual competence and project success is multifaceted. While top management support is crucial for project success, its effectiveness is maximized when it complements the intellectual competence of team members without stifling their autonomy.

4.11 Theoretical Implications

The theoretical implications of the research findings on the moderating role of top management support on intellectual competence and project success are multifaceted and contribute significantly to the existing body of knowledge in project management and organizational behavior.

The findings of this study highlight the essential importance of intellectual competence in achieving project success. The impact of intellectual competence, encompassing problem-solving skills, technical knowledge, and the effective application of expertise, is significant on project outcomes (Barczak et al., 2010). This aligns with the resource-based view (RBV), highlighting the significance of distinctive resources such as intellectual competence in attaining competitive advantage and success in projects.

The research indicates a complex role of top management support as a moderating factor. While support from top management typically improves project success, excessive intervention may impede the beneficial impacts of intellectual competence. This challenges the assumption that increased management support is always advantageous, indicating that a suitable balance between oversight and autonomy is essential (Too & Weaver, 2014). This insight is consistent with contingency theory, which suggests that management practices need to be customized to fit particular contexts and variables (Donaldson, 2001).

Additionally, the study promotes a management strategy that cultivates an environment conducive to the flourishing of intellectual competence. By aligning

management support with team competencies, organizations can prevent micromanagement and foster a strategic environment that utilizes intellectual capital while preserving team autonomy. The findings provide significant insights for both scholars and industry professionals in refining project management practices and improving organizational performance.

4.12 Practical Implications

The practical implications of the research findings on the moderating role of top management support on intellectual competence and project success provide several actionable insights for organizations and project managers. The findings highlight the essential importance of intellectual competence in achieving project success. Organizations should focus on developing this competence through specialized training, continuous development opportunities, and promoting a culture of knowledge sharing. Investing in the intellectual development of employees enhances individual performance and significantly contributes to improved project outcomes (Shao et al., 2012; Ng & Feldman, 2009).

The study also reveals the nuanced influence of top management support, particularly in its interaction with intellectual competence. While support is important, excessive involvement can diminish the advantages of intellectual independence. Consequently, leaders should offer proactive guidance and essential resources while refraining from micromanagement, thereby enabling project teams to utilize their skills efficiently (Dovey & Fenech, 2007). This well-rounded strategy fosters innovation and enables teams, resulting in enhanced project performance. Furthermore, the study emphasizes the importance of synchronizing managerial support with the intellectual requirements of a project. It is essential for top management to cultivate a culture that prioritizes learning by promoting

critical thinking, facilitating open communication, and acknowledging intellectual contributions (Yukl, 2006). Providing tailored support such as advanced tools or access to experts addresses the particular needs of each project, ensuring that intellectual competence is maximized and aligning individual capabilities with the primary objectives of the organization (Turner & Lloyd-Walker, 2008).

In summary, the practical implications of this research emphasize importance of intellectual competence and the need for balanced top management support in achieving project success. Organizations should focus on developing intellectual capabilities, fostering a supportive culture, and aligning managerial support with the intellectual needs of their projects. These strategies can enhance project performance and contribute to the overall success of the organization.

CHAPTER 5:

CONCLUSIONS

5.1 Conclusion

This study sets out to explore the relationships between team members' emotional, managerial, and intellectual competencies and project success, with top management support (TMS) serving as a moderating factor. The structural model revealed that only intellectual competence had a significant positive effect on project success, while emotional and managerial competencies were found to be statistically insignificant in this context. In addition, top management support did not significantly moderate the relationship between competencies and project success. This is in exception for an unexpected negative moderation effect in the case of intellectual competence. These findings provide a nuanced understanding of how different types of competencies and organizational support mechanisms interact to influence project outcomes.

The significant role of intellectual competence (H3 supported) affirms the crucial contribution of technical knowledge, analytical thinking, and problem-solving abilities in driving successful project outcomes. This aligns with findings from Norena-Chavez and Thalassinou (2023), who emphasized that intellectually competent team members can more effectively address complex project challenges and innovate within time and budget

constraints. Similarly, Crawford (2005) noted that intellectual competence is indispensable in enhancing project efficiency through informed decision-making and knowledge application.

Conversely, emotional competence (H1) was found to be statistically insignificant in predicting project success. While earlier studies (Jordan & Troth, 2011; Druskat & Wolff, 2001) suggested that emotional intelligence promotes team cohesion and communication, this study's findings imply that emotional skills may play a more indirect or context-dependent role. In line with Carmeli (2003) and Shuet (2022), emotional competence may foster job satisfaction and commitment but may not directly influence measurable project outcomes especially in technically driven environments.

The rejection of H2 (managerial competence) also warrants careful reflection. Though managerial competence has been widely recognized for its role in project success (Anantatmula, 2010; Nyfoudi et al., 2023), the findings suggest that these skills alone may not suffice. Turner and Müller (2005) proposed that without adequate autonomy or decision-making authority, team members with strong managerial skills may be restricted in applying their competence, limiting their effectiveness.

Top management support was expected to enhance the effects of the three competencies on project success (H4 to H6). However, the findings rejected all three moderation hypotheses, with H6 showing a statistically significant but negative interaction effect. This counterintuitive outcome suggests that excessive oversight from top management can hinder the expression of intellectual competence among team members. Supporting this, Štemberger et al. (2011) argued that micromanagement restricts autonomy and stifles innovation. The contingency theory (Donaldson, 2001) further asserts that the effectiveness of leadership and support mechanisms must be tailored to specific organizational contexts, underscoring the need for balance between oversight and empowerment.

These findings offer practical guidance for managers. Intellectual competence should be nurtured through training programs, critical thinking exercises, and knowledge-sharing initiatives (Shao et al., 2012; Ng & Feldman, 2009). Furthermore, top management should adopt a balanced approach, offer strategic direction and essential resources while refrain from micromanaging (Dovey & Fenech, 2007). Such an environment allows intellectually competent team members to operate independently, promoting agility and innovation across projects.

The results also stress the strategic need for aligning leadership support with team member strengths. Yukl (2006) and Turner and Lloyd-Walker (2008) recommend that managerial support be tailored to project demands and competence levels. For instance, providing domain-specific tools, access to expert consultation, and opportunities for knowledge exploration ensures that competencies are appropriately activated and aligned with strategic objectives.

While the original research model anticipated a synergistic effect between competencies and support mechanisms, the evidence suggests that competencies must be understood in their own right. Emotional and managerial competencies may require specific enabling conditions or complementary roles, as noted by Müller and Turner (2010), to contribute to outcomes effectively. Future projects should consider integrated team development frameworks where competencies are not treated in isolation but as part of a coherent capability system.

In conclusion, this study confirms that not all competencies contribute equally or directly to project success. Intellectual competence stands out as a critical success factor, particularly when supported with appropriate autonomy and aligned leadership. Emotional and managerial competencies, though traditionally emphasized, may have more indirect or

context-specific impacts. These insights call for a recalibration of team development strategies, competency-based hiring, and support system design in project-based organizations. By focusing on developing and leveraging intellectual competence and moderating top management involvement, organizations can significantly enhance their ability to deliver successful projects in increasingly complex and dynamic environments.

5.2 Recommendations

Based on the findings, several key recommendations can be made to enhance project success through the effective integration of intellectual competence and top management support. Organizations should prioritize the continuous development of intellectual competence among team members by investing in regular training programs, workshops, and seminars. These initiatives should focus on enhancing problem-solving skills, technical knowledge, and innovative thinking, thereby improving the intellectual capabilities of the workforce and contributing to better project outcomes.

Top management should adopt a balanced approach in their involvement with projects. While it is crucial to provide necessary resources and strategic direction, excessive intervention should be avoided as it can stifle the intellectual autonomy of team members. Instead, a balance that allows team members to apply their skills effectively will lead to improved project performance. Additionally, fostering a supportive organizational culture is essential. This involves encouraging continuous learning and knowledge sharing among team members, recognizing and rewarding intellectual contributions, and creating an environment where intellectual competence is valued and promoted.

To maximize the impact of intellectual competence on project success, top management support should be strategically aligned with the skills needed for the project. This

means understanding the specific requirements of each project and providing tailored support, such as advanced analytical tools for data-intensive projects or access to expert consultations for complex technical challenges. Empowering team members by giving them the autonomy to make decisions and solve problems independently is another crucial recommendation. Such empowerment enhances intrinsic motivation and engagement, leading to better project outcomes. Creating an environment where team members feel trusted and valued for their intellectual contributions is key.

Implementing regular monitoring and feedback mechanisms to assess the effectiveness of top management support is also recommended. Continuous feedback will help in making necessary adjustments to management practices and support mechanisms, optimizing project outcomes. Recognizing that different projects and team members may require different levels of support, it is important to tailor top management support based on the competency levels of team members and the specific needs of the project. This customized approach ensures that support is both effective and efficient.

Promoting cross-functional collaboration within the organization can leverage diverse intellectual competencies, leading to innovative solutions and a broader application of intellectual skills. This collaborative effort contributes to the overall success of projects. Finally, regularly assessing the impact of top management practices on project outcomes and being willing to adapt these practices based on feedback and changing project needs is essential. Flexibility in management approaches helps maintain a supportive environment that enhances intellectual competence and project success.

By implementing these recommendations, organizations can effectively leverage the intellectual competence of their team members while ensuring that top management support contributes positively to project success.

5.3 Limitations

The following limitations can be identified for the research thesis on the moderating role of top management support on intellectual competence and project success: Firstly, the sample size of 137 respondents, while meeting the requirement determined by the G*Power calculation, may still limit the generalizability of the findings. The relatively small sample size might not fully capture the diverse range of experiences and perspectives across different industries and organizational contexts.

Secondly, the demographic distribution of the respondents indicates a higher participation rate among males (59.1%) compared to females (40.9%). This gender disparity could influence the results, as the perceptions of competencies and top management support might differ between males and females. Similarly, the age distribution, with a majority of respondents falling within the 34-41 years old category, may not reflect the views of younger or older professionals adequately.

The educational qualifications and job designations of the respondents also present potential limitations. The significant representation of individuals with higher education qualifications (bachelor's and master's degrees) and those in high-level positions (Owners and CEOs/Chairmen) might skew the findings. The prospects of respondents with different educational backgrounds and job roles might differ, impacting on the generalizability of the results. Another limitation is related to the scope of the competencies examined. While the study focuses on emotional, managerial, and intellectual competencies, other relevant competencies such as technical skills, interpersonal skills, and leadership abilities are not included. This narrow focus might overlook other critical factors that contribute to project success.

The study's reliance on self-reported data through questionnaires also introduces potential biases, such as social desirability bias and response bias. Respondents might overstate their competencies or the level of top management support they receive, leading to inflated relationships between the variables studied. Furthermore, the cross-sectional nature of the study limits the ability to infer causality between the variables. The relationships observed between top management support, intellectual competence, and project success are correlational and do not establish a definitive cause-and-effect relationship. Finally, the study's findings are context-specific and might not be applicable to all organizational settings. The influence of industry-specific factors, organizational culture, and external environment on the relationships between competencies, top management support, and project success are not accounted for, limiting the broader applicability of the results.

By acknowledging these limitations, future research can address these gaps by employing larger and more diverse samples, incorporating longitudinal designs to establish causality, and exploring additional competencies and contextual factors that influence project success.

5.4 Future Research Directions

Several directions for future research can be recommended to further explore the complex interplay between top management support, intellectual competence, and project success. Firstly, future research should consider expanding the sample size and including diverse industry contexts to enhance the generalizability of the findings (Bryman, 2016). The current study's relatively small sample size and specific demographic limitations suggest that broader sampling could provide a more comprehensive understanding of how top management support influences intellectual competence and project success across different sectors (Yin, 2018). Additionally, future studies should explore other competencies that may impact project

success, such as technical skills, interpersonal skills, and leadership abilities. The current research focuses on emotional, managerial, and intellectual competencies, but integrating a wider range of competencies could provide a more holistic view of the factors contributing to project success (Boyatzis, 2008).

Longitudinal studies are also recommended to establish causal relationships between top management support, intellectual competence, and project success. The cross-sectional nature of the current study limits the ability to infer causality, and longitudinal research could provide deeper insights into how these relationships evolve over time (Ployhart & Vandenberg, 2010). Future research should also investigate the contextual factors that might influence the effectiveness of top management support. These factors could include organizational culture, project complexity, and external environmental variables. Understanding these contextual influences could help tailor top management support strategies to different organizational settings and project types. Moreover, qualitative studies involving interviews or case studies could provide richer, in-depth insights into the mechanisms through which top management support impacts intellectual competence and project success. These qualitative approaches could complement quantitative findings and offer detailed narratives (Patton, 2002) and practical examples of successful management practices.

Finally, future research should examine the potential negative effects of excessive top management intervention on project success. The current study highlights that too much top management support can hinder the positive effects of intellectual competence. Exploring the thresholds and conditions under which top management support becomes counterproductive would provide valuable guidelines for optimizing managerial practices. By addressing these areas, future research can build on the current findings and contribute to a more nuanced and

comprehensive understanding of the role of top management support in leveraging intellectual competence for project success.

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APPENDICES

**Appendix 1:
Standardized Residuals**

	EC_1	EC_2	EC_3	IC_1	IC_2	IC_3	MC_1	MC_2	MC_3	PS_1	PS_2	PS_3	TMS_1	TMS_2	TMS_3
1	-1.325	2.486	-1.317	-1.304	-1.392	2.773	1.29	-2.597	1.225	1.441	-2.448	1.292	1.273	-2.543	1.264
2	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
3	-0.218	0.461	-0.273	0.745	-0.236	-0.463	0.053	0.015	-0.078	0.447	-0.544	0.159	0.345	-0.67	0.324
4	-0.945	1.771	-0.937	0.165	0.097	-0.265	0.067	0.088	-0.172	0.2	0.18	-0.404	0.049	-0.062	0.013
5	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
6	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005

7	0.068	0.105	-0.184	0.302	0.454	-0.785	0.039	-0.058	0.015	-2.514	1.277	1.101	0.01	-0.015	0.005
8	-1.886	1.041	0.821	-0.393	0.779	-0.467	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
9	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.783	-0.194	-0.571	0.029	-0.038	0.009
10	0.434	0.149	-0.608	-0.645	0.415	0.173	-0.882	0.063	0.974	-0.168	-0.203	0.396	0.039	-0.05	0.011
11	-0.476	-0.702	1.247	-0.702	0.411	0.233	-0.253	0.686	-0.428	-0.536	-0.585	1.196	-0.267	0.57	-0.301
12	-0.249	0.581	-0.37	-0.375	-0.287	0.674	0.359	-0.656	0.271	0.104	0.08	-0.195	0.02	-0.026	0.007
13	-0.249	0.581	-0.37	-0.065	0.081	-0.026	-0.581	0.302	0.366	0.409	0.396	-0.855	-0.296	0.606	-0.308
14	-0.249	0.581	-0.37	0.05	0.089	-0.145	0.053	0.015	-0.078	-0.847	0.072	0.772	0.029	-0.038	0.009
15	0.13	-0.135	0.011	0.05	0.089	-0.145	0.674	-0.345	-0.43	0.168	0.147	-0.334	0.029	-0.038	0.009
16	-0.552	0.297	0.248	-0.317	-0.283	0.614	0.046	-0.021	-0.032	0.168	0.147	-0.334	1.283	-0.644	-0.602
17	0.465	0.029	-0.51	-1.012	0.042	0.932	-0.253	0.686	-0.428	0.447	-0.544	0.159	0.355	-0.682	0.326
18	0.099	-0.015	-0.086	-0.065	0.081	-0.026	-0.266	0.613	-0.334	-0.574	0.354	0.181	0.01	-0.015	0.005

19	0.13	-0.135	0.011	0.05	0.089	-0.145	0.053	0.015	-0.078	0.136	0.113	-0.264	-0.277	0.582	-0.304
20	-0.204	-0.298	0.532	-0.76	0.407	0.292	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.01	-0.015	0.005
21	-0.552	0.297	0.248	-0.375	-0.287	0.674	0.667	-0.381	-0.383	-0.574	0.354	0.181	-0.296	0.606	-0.308
22	0.403	0.269	-0.705	0.378	-0.608	0.296	-1.195	0.698	0.671	0.415	-0.577	0.229	0.01	-0.015	0.005
23	0.448	-0.61	0.197	-0.375	-0.287	0.674	-0.268	-0.333	0.669	0.104	0.08	-0.195	0.02	-0.026	0.007
24	-0.204	-0.298	0.532	-0.76	0.407	0.292	-0.268	-0.333	0.669	0.104	0.08	-0.195	0.326	-0.647	0.32
25	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.232	-0.27	0.536	0.01	-0.015	0.005
26	0.099	-0.015	-0.086	-0.317	-0.283	0.614	0.354	0.254	-0.686	0.479	-0.51	0.09	-0.607	0.277	0.312
27	0.782	-0.446	-0.324	0.36	0.458	-0.845	0.359	-0.656	0.271	0.751	-0.228	-0.501	0.02	-0.026	0.007
28	-0.204	-0.298	0.532	0.05	0.089	-0.145	0.053	0.015	-0.078	0.073	0.046	-0.125	-0.928	-0.041	0.93
29	-0.204	-0.298	0.532	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.104	0.08	-0.195	0.01	-0.015	0.005

30	-0.204	-0.298	0.532	-0.007	0.085	-0.085	-0.581	0.302	0.366	0.073	0.046	-0.125	-0.301	-0.344	0.625
31	-0.583	0.417	0.151	-1.397	0.736	0.551	-0.266	0.613	-0.334	0.104	0.08	-0.195	0.02	-0.026	0.007
32	0.099	-0.015	-0.086	0.32	-0.612	0.356	0.046	-0.021	-0.032	0.447	-0.544	0.159	0.029	-0.038	0.009
33	0.193	-0.374	0.205	0.165	0.097	-0.265	0.067	0.088	-0.172	0.2	0.18	-0.404	0.049	-0.062	0.013
34	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
35	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
36	0.068	0.105	-0.184	-0.065	0.081	-0.026	1.298	1.188	-2.787	0.073	0.046	-0.125	0.01	-0.015	0.005
37	0.403	0.269	-0.705	-0.007	0.085	-0.085	-0.581	0.302	0.366	-0.2	-0.236	0.466	-0.607	0.277	0.312
38	-0.204	-0.298	0.532	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
39	-0.173	-0.418	0.629	-0.007	0.085	-0.085	-0.266	0.613	-0.334	0.136	0.113	-0.264	-0.607	0.277	0.312
40	0.372	0.388	-0.802	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-1.867	0.969	0.794	0.331	0.303	-0.614

41	-0.249	0.581	-0.37	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.447	-0.544	0.159	0.02	-0.026	0.007
42	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.542	0.387	0.112	0.02	-0.026	0.007
43	0.13	-0.135	0.011	0.745	-0.236	-0.463	-0.574	0.338	0.32	-0.2	-0.236	0.466	0.029	-0.038	0.009
44	0.751	-0.327	-0.421	-0.007	0.085	-0.085	0.039	-0.058	0.015	0.136	0.113	-0.264	0.029	-0.038	0.009
45	-0.173	-0.418	0.629	-0.007	0.085	-0.085	-0.574	0.338	0.32	0.136	0.113	-0.264	0.029	-0.038	0.009
46	0.099	-0.015	-0.086	-0.335	0.783	-0.527	0.361	0.29	-0.732	0.104	0.08	-0.195	-0.286	0.594	-0.306
47	-0.28	0.7	-0.467	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.751	-0.228	-0.501	-0.296	0.606	-0.308
48	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.352	-0.693	0.317	0.073	0.046	-0.125	0.34	0.291	-0.611
49	0.479	-0.73	0.294	-0.26	-0.279	0.554	-1.195	0.698	0.671	0.168	0.147	-0.334	0.34	0.291	-0.611
50	-0.249	0.581	-0.37	0.378	-0.608	0.296	-0.266	0.613	-0.334	-0.847	0.072	0.772	-0.593	1.214	-0.619
51	0.099	-0.015	-0.086	1.072	-0.933	-0.022	-0.581	0.302	0.366	-0.232	-0.27	0.536	0.34	0.291	-0.611

53	-0.552	0.297	0.248	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.232	-0.27	0.536	0.029	-0.038	0.009
54	0.068	0.105	-0.184	0.687	-0.24	-0.404	0.669	0.565	-1.386	-0.232	-0.27	0.536	0.01	-0.015	0.005
55	-1.249	1.488	-0.319	-1.397	0.736	0.551	0.039	-0.058	0.015	0.409	0.396	-0.855	-0.296	0.606	-0.308
56	0.479	-0.73	0.294	0.745	-0.236	-0.463	0.359	-0.656	0.271	-1.189	0.695	0.418	-0.291	-0.355	0.627
57	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.136	0.113	-0.264	0.02	-0.026	0.007
58	0.099	-0.015	-0.086	0.378	-0.608	0.296	0.046	-0.021	-0.032	-0.574	0.354	0.181	0.02	-0.026	0.007
59	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
60	0.068	0.105	-0.184	0.302	0.454	-0.785	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
61	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
62	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.415	-0.577	0.229	0.02	-0.026	0.007
63	-0.204	-0.298	0.532	-0.375	-0.287	0.674	0.039	-0.058	0.015	0.104	0.08	-0.195	0.02	-0.026	0.007

64	-1.325	2.486	-1.317	-0.605	1.484	-1.028	1.919	-1.974	-0.176	-1.221	0.662	0.488	-1.244	0.592	0.615
65	0.068	0.105	-0.184	-0.393	0.779	-0.467	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
66	0.782	-0.446	-0.324	0.05	0.089	-0.145	0.039	-0.058	0.015	0.415	-0.577	0.229	0.02	-0.026	0.007
67	0.099	-0.015	-0.086	0.378	-0.608	0.296	0.046	-0.021	-0.032	0.447	-0.544	0.159	-0.607	0.277	0.312
68	0.858	-1.445	0.675	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.542	0.387	0.112	-0.281	-0.367	0.629
69	0.175	-1.013	0.912	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.542	0.387	0.112	-0.607	0.277	0.312
70	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.34	0.291	-0.611
71	0.175	-1.013	0.912	-0.375	-0.287	0.674	0.669	0.565	-1.386	0.073	0.046	-0.125	0.01	-0.015	0.005
72	0.479	-0.73	0.294	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
73	0.175	-1.013	0.912	0.378	-0.608	0.296	-0.581	0.302	0.366	0.441	0.429	-0.925	-0.291	-0.355	0.627
74	-0.521	0.177	0.346	0.32	-0.612	0.356	-0.574	0.338	0.32	0.783	-0.194	-0.571	0.039	-0.05	0.011

75	0.13	-0.135	0.011	0.05	0.089	-0.145	0.053	0.015	-0.078	0.136	0.113	-0.264	0.029	-0.038	0.009
76	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.2	-0.236	0.466	-0.286	0.594	-0.306
77	-0.204	-0.298	0.532	0.302	0.454	-0.785	-0.581	0.302	0.366	0.104	0.08	-0.195	0.01	-0.015	0.005
78	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
79	0.068	0.105	-0.184	0.302	0.454	-0.785	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
80	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.542	0.387	0.112	0.02	-0.026	0.007
81	-0.249	0.581	-0.37	0.378	-0.608	0.296	0.039	-0.058	0.015	0.447	-0.544	0.159	0.647	-0.329	-0.299
82	-0.552	0.297	0.248	-0.007	0.085	-0.085	-0.882	0.063	0.974	0.136	0.113	-0.264	0.029	-0.038	0.009
83	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
84	-0.204	-0.298	0.532	0.32	-0.612	0.356	0.039	-0.058	0.015	0.073	0.046	-0.125	-0.617	0.288	0.31
85	0.448	-0.61	0.197	0.745	-0.236	-0.463	0.046	-0.021	-0.032	0.142	-0.86	0.82	0.02	-0.026	0.007

86	0.099	-0.015	-0.086	0.687	-0.24	-0.404	0.046	-0.021	-0.032	-0.542	0.387	0.112	0.02	-0.026	0.007
87	0.13	-0.135	0.011	0.05	0.089	-0.145	0.674	-0.345	-0.43	-0.542	0.387	0.112	0.029	-0.038	0.009
88	-0.583	0.417	0.151	-0.065	0.081	-0.026	0.039	-0.058	0.015	-0.542	0.387	0.112	0.331	0.303	-0.614
89	0.751	-0.327	-0.421	-0.375	-0.287	0.674	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
90	-0.583	0.417	0.151	-0.393	0.779	-0.467	0.046	-0.021	-0.032	0.104	0.08	-0.195	-0.286	0.594	-0.306
91	0.099	-0.015	-0.086	0.687	-0.24	-0.404	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
92	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	-0.301	-0.344	0.625
93	0.51	-0.85	0.391	0.05	0.089	-0.145	0.359	-0.656	0.271	0.136	0.113	-0.264	0.029	-0.038	0.009
94	-1.235	0.729	0.486	0.705	-1.306	0.737	0.051	-0.931	0.925	0.136	0.113	-0.264	0.049	-0.062	0.013
95	-0.204	-0.298	0.532	0.687	-0.24	-0.404	0.046	-0.021	-0.032	-0.232	-0.27	0.536	0.02	-0.026	0.007
96	0.13	-0.135	0.011	-1.397	0.736	0.551	0.669	0.565	-1.386	-1.183	-0.278	1.503	0.982	0.925	-1.848

97	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
98	-0.204	-0.298	0.532	0.378	-0.608	0.296	-0.266	0.613	-0.334	-0.232	-0.27	0.536	1.283	-0.644	-0.602
99	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
100	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
101	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
102	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
103	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
104	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
105	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
106	0.193	-0.374	0.205	0.165	0.097	-0.265	0.067	0.088	-0.172	0.2	0.18	-0.404	0.049	-0.062	0.013
107	-0.173	-0.418	0.629	-0.007	0.085	-0.085	-0.266	0.613	-0.334	0.136	0.113	-0.264	-0.607	0.277	0.312

108	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
109	0.099	-0.015	-0.086	-0.007	0.085	-0.085	-0.581	0.302	0.366	0.136	0.113	-0.264	0.01	-0.015	0.005
110	0.13	-0.135	0.011	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.751	-0.228	-0.501	0.029	-0.038	0.009
111	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.067	0.088	-0.172	0.073	0.046	-0.125	0.01	-0.015	0.005
112	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
113	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
114	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
115	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
116	-0.204	-0.298	0.532	-0.375	-0.287	0.674	-0.266	0.613	-0.334	-0.542	0.387	0.112	0.02	-0.026	0.007
117	0.479	-0.73	0.294	-0.007	0.085	-0.085	-0.574	0.338	0.32	0.073	0.046	-0.125	-0.301	-0.344	0.625
118	-0.552	0.297	0.248	0.745	-0.236	-0.463	0.046	-0.021	-0.032	0.789	-1.167	0.514	-0.291	-0.355	0.627

119	0.479	-0.73	0.294	-0.007	0.085	-0.085	0.046	-0.021	-0.032	-0.542	0.387	0.112	0.336	-0.658	0.322
120	-0.583	0.417	0.151	0.378	-0.608	0.296	-0.268	-0.333	0.669	0.452	-1.517	1.244	0.02	-0.026	0.007
121	-0.173	-0.418	0.629	-0.317	-0.283	0.614	0.039	-0.058	0.015	-0.536	-0.585	1.196	0.34	0.291	-0.611
122	0.099	-0.015	-0.086	-0.007	0.085	-0.085	-0.268	-0.333	0.669	0.073	0.046	-0.125	0.331	0.303	-0.614
123	0.372	0.388	-0.802	-0.065	0.081	-0.026	-0.581	0.302	0.366	-0.574	0.354	0.181	0.331	0.303	-0.614
124	0.099	-0.015	-0.086	-0.007	0.085	-0.085	0.354	0.254	-0.686	0.073	0.046	-0.125	0.01	-0.015	0.005
125	0.162	-0.254	0.108	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007
126	0.844	-0.686	-0.13	0.32	-0.612	0.356	0.067	0.088	-0.172	0.751	-0.228	-0.501	0.029	-0.038	0.009
127	0.706	0.552	-1.323	0.378	-0.608	0.296	0.354	0.254	-0.686	-0.574	0.354	0.181	0.029	-0.038	0.009
128	-0.173	-0.418	0.629	0.745	-0.236	-0.463	-0.268	-0.333	0.669	-0.542	0.387	0.112	0.336	-0.658	0.322
129	0.372	0.388	-0.802	-0.007	0.085	-0.085	0.046	-0.021	-0.032	0.104	0.08	-0.195	0.02	-0.026	0.007

130	1.192	-1.281	0.154	0.475	0.465	-0.965	0.067	0.088	-0.172	-0.142	0.804	-0.758	-0.597	0.265	0.314
131	0.068	0.105	-0.184	-0.065	0.081	-0.026	-0.581	0.302	0.366	0.073	0.046	-0.125	0.01	-0.015	0.005
132	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
133	0.099	-0.015	-0.086	-0.007	0.085	-0.085	-0.57	-0.571	1.276	0.104	0.08	-0.195	0.049	-0.062	0.013
134	-0.855	0.014	0.867	-0.007	0.085	-0.085	0.039	-0.058	0.015	0.073	0.046	-0.125	0.02	-0.026	0.007
135	0.448	-0.61	0.197	0.687	-0.24	-0.404	0.039	-0.058	0.015	0.104	0.08	-0.195	0.01	-0.015	0.005
136	0.068	0.105	-0.184	-0.065	0.081	-0.026	0.039	-0.058	0.015	0.073	0.046	-0.125	0.01	-0.015	0.005
137	0.479	-0.73	0.294	0.378	-0.608	0.296	-0.268	-0.333	0.669	0.415	-0.577	0.229	-0.301	-0.344	0.625

Appendix 2: SPSS Analysis

Table 4.8: Descriptive Analysis of the Variables

Metric	Min	Max	Mean	Std Dev	Skewness	Kurtosis
Emotional competence	1	5	3.93674	0.895279	-0.96692	0.983045
Managerial competence	1	5	4.107056	0.929662	-1.64982	3.188917
Intellectual competence	1	5	4.029197	0.855083	-1.23341	2.243595
Project success	1	5	3.990268	0.906532	-1.05221	1.402453
Top management support	1	5	3.912409	1.002668	-1.04108	0.969857

Table 4.9: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.827
Bartlett's Test of Sphericity	Approx. Chi-Square	311.084
	df	6
	Sig.	<0.001

Table 4.10: Communalities

Metric	Initial	Extraction
Emotional competence	1.000	0.729
Managerial competence	1.000	0.764

Intellectual competence	1.000	0.792
Project success	1.000	0.739
Top management support	1.000	0.729
<i>Extraction Method: Principal Component Analysis.</i>		

Table 4.11: Inter – Item Correlation Matrix

Metric	Emotional competence	Intellectual competence	Managerial competence	Project success	Top management support
Emotional competence	1.000	0.587	0.428	0.506	0.285
Intellectual competence	0.587	1.000	0.561	0.492	0.350
Managerial competence	0.428	0.561	1.000	0.589	0.464
Project success	0.506	0.492	0.589	1.000	0.431
Top management support	0.285	0.350	0.464	0.431	1.000

Table 4.12: Factorial ANOVA

Tests of Between-Subjects Effects					
Dependent Variable: PS					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.

Corrected Model	128.055 ^a	86	1.489	8.586	<.001
Intercept	587.779	1	587.779	3389.235	<.001
MC	25.106	9	2.790	16.085	<.001
EC	7.435	9	0.826	4.763	<.001
IC	6.650	9	0.739	4.261	<.001
MC * EC	2.054	12	0.171	0.987	0.474
MC * IC	3.295	10	0.330	1.900	0.067
EC * IC	2.690	12	0.224	1.292	0.253
MC * EC * IC	.000	0	.	.	.
Error	8.671	50	0.173		
Total	2233.778	137			
Corrected Total	136.727	136			
a. R Squared = .937 (Adjusted R Squared = .827)					

Appendix 3: Questionnaire

INFORMATION PAGE

Project Title: Investigating the Relationship Between Competence and Project Success:
The Moderating Impact of Top Management Support

Investigators: Sandra Shella Anak Alek

Introduction: Thank you for considering participating in this research on the "Relationship Between Competence and Project Success: The Moderating Impact of Top Management Support". This research aims to understand the impact that top management support has on the relationship between competence and project success.

Procedures: If you choose to participate, you will complete an anonymous online survey about the competence, project success and top management support. The survey takes 5-10 minutes to complete.

Confidentiality: Your data will be stored securely and anonymized. No personally identifiable information will be collected or disclosed.

Voluntary Participation and Withdrawal: Participation is voluntary, and you can withdraw at any time without penalty. This decision will not affect your relationship with the researchers or institutions

QUALIFYING QUESTION

Are you currently/in the past involved in a team project/task/assignment?

Yes

No

DEMOGRAPHICS GENDER

Male

Female

AGE

18-25 years old

26-33 years old

34-41 years old

42-49 years old

50 years and above

QUALIFICATIONS

SPM

Diploma

Bachelor's

degree

Master's

degree

PhD/Doctorat

e

JOB-DESIGNATION

Fresh/Entry-level

Assistant

Junior

Senior

Manager

Director

CEO / Chairman

Owner

TEAM SIZE

9 people or less

10 to 19 people

20 people or

more

TASK DURATION

1 year or less

2 to 4 years

5 years or more

JOB EXPERIENCE

Less than 3

years 3 to 5

years

5 to 10 years

10 to 15 years

More than 15

years

INDEPENDENT VARIBALE – MANAGERIAL COMPETENCE

How do you rate the managerial competence of the team members in your most current project/task/assignment as a whole.

- The team members organized and coordinated the project resources according to clear objectives and converted long-term goals into action plans.
- The team members actively support tasks and communicate among the team members.
- The team members create ideas and solve problems with responsibility.

Likert-scale of 1-5: Strongly disagree – strongly agree

INDEPENDENT VARIBALE – EMOTIONAL COMPETENCE

How do you rate the emotional competence of the team members in your most

current project/task/assignment as a whole.

- The team members were aware of their own feelings and managed and controlled themselves.
- The team members consistently maintained their concentration and performed tasks in a variety of situations, under pressure.
- The team members motivated and influenced each other to achieve clear results.

Likert-scale of 1-5: Strongly disagree – strongly agree

INDEPENDENT VARIABLE – INTELLECTUAL COMPETENCE

How do you rate the intellectual competence of the team members in your most current project/task/assignment as a whole.

- The team members demonstrated their ability to collect, analyze, and judge information from a wide range of sources.
- The team members demonstrated the ability to present the future direction and vision of the organization.
- The team members demonstrated the ability to think strategically.

Likert-scale of 1-5: Strongly disagree – strongly agree

DEPENDENT VARIABLE – PROJECT SUCCESS

How do you rate the project's success in your most current project/task/assignment as a whole.

- The project was delivered on schedule

- The project deliverables were of high quality
- The project deliverables met user requirements

Likert-scale of 1-5: Strongly disagree – strongly agree

MODERATING FACTOR - TOP MANAGEMENT SUPPORT

How do you rate the top management's support in your most current project/task/assignment as a whole.

- Top management provided sufficient resources to complete the project successfully
- Top management established effective communication strategy to enhance project and organizational efficiency
- Top management ensured effective system implementation to institute organizational change

Likert-scale of 1-5: Strongly disagree – strongly agree

END OF SURVEY

We thank you for your time spent taking this survey.