

The Influence of IT Project Manager's Performance and Personal Competencies on Project Performance is Mediated by Agile Methodology in Software Development Projects

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Abstract

This study aims to examine the influence of performance competencies and personal competencies on project performance through the mediating role of Agile methodology. As IT projects are increasingly exposed to risks of failure, cost overruns, and delays, the role of project manager (PM) competencies becomes more critical. The Project Manager Competency Development Framework (PMCDF) classifies competencies into two key dimensions: performance (technical) and personal (interpersonal), yet its integration with Agile project environments remains underexplored. This research adopts a quantitative approach, collecting data from 150 IT project managers in Indonesia involved in software development. The data were analyzed using Structural Equation Modeling with Partial Least Squares (SEM-PLS). Results indicate that both performance and personal competencies significantly influence project performance. In addition, Agile methodology plays a mediating role, strengthening the positive effect of these competencies on outcomes. The findings suggest that PMs who are technically skilled and possess strong interpersonal abilities perform better when operating in Agile environments. Agile practices such as iterative delivery, stakeholder collaboration, and responsiveness enhance the application of competencies in real-world scenarios. Organizations are advised to integrate Agile principles into their competency development frameworks to improve project success rates. This study contributes to the literature by bridging classical competency models with Agile project execution.

Keywords: Agile Methodology, Personal Competencies, Performance Competencies, Project Manager, Project Performance.

INTRODUCTION

In the era of digital transformation, information technology (IT) projects have become strategic assets for organizations seeking innovation, efficiency, and competitive advantage. However, the failure rate of IT projects remains alarmingly high compared to other sectors. Budzier (2021) reported that IT projects are 20 times more likely to experience cost overruns than construction projects. This is further supported by Jorgensen (2023), who found that 33% of IT projects encounter significant delays, while Sauer (2022) noted that over 56% fail to meet established quality standards. These statistics reflect a systemic challenge in managing the complexity and uncertainty inherent in IT project environments.

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One critical factor contributing to these failures is the competency of the project manager. The role of a project manager (PM) in IT projects is far more than operational oversight—it encompasses leadership, stakeholder coordination, risk management, and the ability to respond to rapidly evolving requirements. Studies by the Project Management Institute (PMI, 2017) emphasize the importance of both performance competencies (technical knowledge, project execution, process control) and personal competencies (leadership, communication, professionalism) in driving successful project outcomes. However, traditional competency frameworks, including the PMCDF, are often criticized for not aligning with the agile and iterative nature of modern IT development cycles.

In recent years, Agile methodology has become the dominant approach in software development projects due to its adaptability, customer focus, and iterative process. Agile promotes collaboration, continuous feedback, rapid delivery, and flexible planning, which shift the required managerial competencies away from rigid, plan-driven models toward dynamic, people-centered leadership (Highsmith & Cockburn, 2001). The integration of Agile into project environments has challenged existing competency standards to adapt to these new realities. Despite the popularity of Agile, there is limited empirical research investigating how Agile practices interact with or mediate the effects of managerial competencies on project outcomes.

This research responds to that gap by investigating the influence of performance and personal competencies on project performance in IT development settings, with Agile methodology as a mediating factor. The study contributes to the evolving literature by proposing an empirically tested model that integrates PMCDF-based competencies with Agile practice indicators. It aims to determine whether Agile practices amplify or reshape the impact of project manager competencies and to what extent they contribute to the success of IT projects in the Indonesian context.

One relevant study by Dingsøyr et al. (2012) reviewed the integration of Agile practices in project management, noting that Agile methodologies promote flexibility and adaptability, which are essential for managing uncertainty in IT projects. However, Dingsøyr et al. (2012) primarily focus on the overall impact of Agile methodologies on project success, without explicitly addressing the role of managerial competencies in Agile environments. While their work provides valuable insights into the benefits of Agile, it does not fully explore how managerial skills influence the success of Agile projects, leaving a significant gap in understanding the dynamics between managerial competencies and Agile practices.

Another study by Conforto et al. (2016) examined the impact of Agile methodologies on project performance in IT projects and identified factors that contribute to successful project execution. However, this study was more focused on the organizational benefits of Agile, without investigating how the competencies of the project manager interact with Agile practices to influence project outcomes. The gap here lies in understanding whether and how specific managerial competencies, such as leadership and

communication, can enhance or hinder the implementation of Agile methodologies and project success.

The objective of this study is to examine the influence of project manager competencies—both performance-related and personal—on the success of IT projects in Agile settings. The benefits of this study include enhancing project management education, offering practical insights for organizations seeking to improve project performance, and contributing to the development of a more integrated competency framework that aligns with the needs of Agile project environments.

RESEARCH METHODS

The method used in this study is quantitative, a scientific approach that emphasizes data collection in the form of numbers or numerical data to be tested, analyzed, and presented statistically. This approach aims to objectively and measurably measure phenomena, relationships, or certain variables. Quantitative methods utilize statistical techniques to analyze data and produce findings that can be scientifically accounted for (Priadana & Sunarsi, 2021). The data collection technique used in the study was a questionnaire. The study population included all software development projects, especially in the financial technology industries such as banking and insurance in Indonesia, with a sample of 150 respondents selected using purposive sampling techniques. The sample criteria included IT project managers working in software development projects in financial technology. The collected data were analyzed using Path Analysis with the SEM-PLS program. This method was chosen to test the complex relationships between the variables studied.

RESULTS AND DISCUSSION

Measurement Model (Outer Model)

The Outer Model or Outer Measurement is also known as the measurement model. The outer model test aims to determine the relationship between latent variables and their indicators. This outer model test was carried out using the PLS Algorithm procedure. The stages of analysis on the outer model are measured by validity and reliability testing (Sholihin & Ratmono, 2021).

Table 1. Outer Loading

Indicator	(AM) Agile Methodology	(PFC) Performance Competencies	(PP) Project Performance	(PSC) Personal Competencies
AM1	0,799			
AM2	0,809			
AM3	0,822			
AM4	0,776			
PFC1		0,839		
PFC2		0,848		
PFC3		0,807		
PFC4		0,809		

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Indicator	(AM) Agile Methodology	(PFC) Performance Competencies	(PP) Project Performance	(PSC) Personal Competencies
PFC5		0,776		
PFC6		0,803		
PFC7		0,784		
PFC8		0,796		
PFC9		0,784		
PFC10		0,780		
PP1			0,802	
PP2			0,791	
PP3			0,773	
PP4			0,784	
PSC1				0,732
PSC2				0,853
PSC3				0,814
PSC4				0,818
PSC5				0,788
PSC6				0,803

From table 1 above, it can be seen that all indicators that make up each variable have met the requirements of convergent validity. This can be seen from the loading factor value which is greater than 0.70 for each indicator. Convergent validity indicates that the indicators consistently measure the variable in question, with a high loading factor value indicating a strong relationship between the indicator and the latent variable being measured.

Table 2. Average Variance Extracted

Variable	Average variance extracted (AVE)
(AM) Agile Methodology	0,643
(PFC) Performance Competencies	0,645
(PP) Project Performance	0,621
(PSC) Personal Competencies	0,644

From table 2, it is known that all indicators that make up each variable have met the discriminant validity requirements. This is evidenced by the square root value of the average variance extracted (AVE) which is greater than 0.50. This shows that each indicator is able to explain more than half of the variability, thus ensuring that the indicators are valid in measuring the intended construction. Good discriminant validity ensures that the latent variables being measured differ from each other sufficiently.

Table 3. Discriminant Validity

Variable	(AM) Agile Methodology	(PFC) Performance Competencies	(PP) Project Performance
(PFC) Performance Competencies	0,594		
(PP) Project Performance	0,839	0,707	

Variable	(AM) Agile Methodology	(PFC) Performance Competencies	(PP) Project Performance
(PSC) Personal Competencies	0,719	0,436	0,718

Based on table 3 above, it can be seen that all indicators that make up each variable in this study have met discriminant validity, because the cross loading value shows that the correlation value between the construct and its indicator is greater than the correlation value between the construct and other indicators.

Table 4. Composite Reliability

Variable	Composite reliability (rho a)
(AM) Agile Methodology	0,827
(PFC) Performance Competencies	0,942
(PP) Project Performance	0,798
(PSC) Personal Competencies	0,903

The data in the table above shows that all variables are declared reliable because the composite reliability value is greater than 0.70 and the Cronbach's alpha value is greater than 0.60.

Structural Model (Inner Model)

Inner model evaluation is carried out to assess the influence between latent variables and is used to test hypotheses. The influence between latent variables can be seen from the R-square and f-square value. The greater the R-square and f-square value, the greater the influence of exogenous latent variables on endogenous latent variables and the significance of the structural path parameter coefficient (Jamu, 2018).

Based on data processing with SEM-PLS 4.0 Professional, the following R-square values are generated:

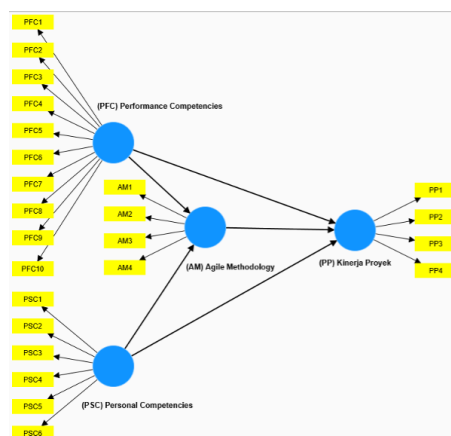


Figure 1. Structural Model

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Table 5. R-Square

Variable	R-square
(AM) Agile Methodology	0,492
(PP) Project Performance	0,607

From the table above, it is known that performance competencies, personal competencies, and agile methodology that affect project performance, it have a significant influence on the project performance with an R-square value of 0.607 or 60.7%. Then performance competencies and personal competencies that affect agile methodology, it have a significant influence on the agile methodology with an R-square value of 0,492 or 49,2%.

Based on data processing with SEM-PLS 4.0 Professional, the following f-square values are generated:

Table 6. f-Square

Variable	(PP) Project Performance	(AM) Agile Methodology
(AM) Agile Methodology	0,158	
(PFC) Performance Competencies	0,179	0,165
(PSC) Personal Competencies	0,109	0,410

From the table above, it is known that agile methodology that affect project performance, it have a significant influence on the project performance with an f-square value of 0.158 or moderate influence. Performance competencies that affect project performance, it have a significant influence on the project performance with an f-square value of 0.179 or moderate influence. Performance competencies that affect agile methodology, it have a significant influence on the agile methodology with an f-square value of 0.165 or moderate influence. Personal competencies that affect project performance, it have a significant influence on the project performance with an f-square value of 0.109 or week influence. Personal competencies that affect agile methodology, it have a significant influence on the agile methodology with an f-square value of 0.410 or strong influence.

Hypothesis Testing

Hypothesis testing is a process or step in research in which proposed hypotheses are tested to see if the data obtained support or reject the hypothesis. Hypothesis testing is evaluated using the t-statistic and p value.

Table 7. Path Coefficients

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
(PFC) Performance	0,316	0,318	0,097	3,250	0,001

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Competencies -> (PP) Project Performance (PSC) Personal					
Competencies -> (PP) Project Performance (PFC) Performance	0,271	0,276	0,081	3,343	0,001
Competencies -> (AM) Agile Methodology	0,319	0,322	0,105	3,053	0,002
Competencies -> (AM) Agile Methodology	0,504	0,501	0,099	5,068	0,000
Methodology -> (PP) Project Performance	0,350	0,340	0,090	3,892	0,000

The Path Coefficients test will serve as a reference for conducting hypothesis testing in this study, with the established criterion that the hypothesis is accepted if the P value is less than 0.05, and rejected if the P value is greater than 0.05. The test results for the hypotheses proposed in this study are as follows:

- 1) H1: Performance competencies positively impacts project performance, with a t-statistic of 3.25 and a P value of 0.001, indicating $P < 0.05$, thus the hypothesis is accepted.
- 2) H2: Personal competencies positively impacts project performance, with a t-statistic of 3.343 and a P value of 0.001, indicating $P < 0.05$, thus the hypothesis is accepted.
- 3) H3: Performance competencies positively impacts agile methodology, with a t-statistic of 3.053 and a P value of 0.002, indicating $P < 0.05$, thus the hypothesis is accepted.
- 4) H4: Personal competencies positively impacts agile methodology, with a t-statistic of 5.068 and a P value of 0.000, indicating $P < 0.05$, thus the hypothesis is accepted.
- 5) H5: Agile methodology positively impacts project performance, with a t-statistic of 3.892 and a P value of 0.000, indicating $P < 0.05$, thus the hypothesis is accepted.

Mediation Evaluation

Mediation analysis involves testing the direct effect between the dependent variable and the mediating variable, as well as the indirect effect between the independent variable and the dependent variable through the mediating variable.

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Table 8. Mediation Test

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
(PFC) Performance Competencies -> (AM) Agile Methodology -> (PP) Project Performance	0,112	0,111	0,050	2,216	0,027
(PSC) Personal Competencies -> (AM) Agile Methodology -> (PP) Project Performance	0,176	0,169	0,051	3,426	0,001

According to Baron and Kenny (1986), testing for a mediation effect involves three stages. The first stage tests the impact of the independent variable on the dependent variable, which must be significant with a t-statistic greater than 1.96. The second stage examines the effect of the independent variable on the mediating variable, which must also be significant with a t-statistic greater than 1.96. The third stage evaluates the impact of the mediating variable on the dependent variable, which must again be significant with a t-statistic greater than 1.96 (Rapali & Soelaiman, 2019). The mediation test results for the hypotheses proposed in this study are as follows:

- 1) Based on the results of testing the construct variable performance competencies on project performance through agile methodology as a mediating variable which has a t-statistic value of 2.216 and a p-value of 0.027, H6 is accepted because the t-statistic is greater than 1.96 and the p-value is smaller than 0.05.
- 2) Based on the results of testing the construct variable personal competencies on project performance through agile methodology as a mediating variable which has a t-statistic value of 3.426 and a p-value of 0.001, H7 is accepted because the t-statistic is greater than 1.96 and the p-value is smaller than 0.05.

Performance Competencies has a positive effect on Project Performance

The hypothesis testing results indicate that Performance Competencies positively affects Project Performance, thus the hypothesis is accepted. This signifies performance competencies such as integration, procurement, and scope management have been shown to significantly enhance job and project performance in e-commerce and IT sectors, especially when coupled with motivation as a mediating factor (Lin, 2021). Similarly, technical competencies like project cost, quality, and resource management directly correlate with success in construction and telecommunications projects, according to competency assessments conducted using the PMCDF

framework (Sitohang et al., 2020). Studies also highlight that both behavioral and technical competencies are essential in achieving performance goals, particularly in road construction and infrastructure sectors, where technical proficiency strongly influences timelines and cost-efficiency (Manuka, 2021).

Further empirical research reinforces that competencies act as key mediators between other variables such as communication, innovation, and overall project performance. For instance, in capital project settings, project technical and managerial competencies fully mediated the impact of communication and team dynamics on performance outcomes (Chen, 2021). In Ethiopia's construction industry, a correlation was found between the prevalence of performance competencies and successful delivery in terms of cost, quality, and time metrics (Abebe & Tsehayae, 2024). Lastly, El Sawalhi and Lafy (2021) demonstrated that communication, team leadership, and problem-solving skills were primary drivers of project success, further underscoring the strategic value of both performance and technical competencies (El Sawalhi & Lafy, 2021). These findings confirm that technical and performance competencies are not just supporting factors but foundational drivers for successful IT project execution.

Personal Competencies has a positive effect on Project Performance

The hypothesis testing results indicate that Personal Competencies positively affects Project Performance, thus the hypothesis is accepted. Personal competencies such as self-management, decision-making ability, cognitive awareness, and interpersonal skills are increasingly recognized as critical drivers of successful project delivery. Park and Kim (2024) found that among private construction clients, personal competencies had the most substantial impact on participation attitude and project partnership, which in turn significantly improved project outcomes (Park & Kim, 2024). Similarly, Lin (2021) showed that personal motivation and competencies especially in decision-making and integration management were highly correlated with improved job and project performance in the e-commerce industry (Lin, 2021). Jemal et al. (2024) also highlighted that the ability to assess personal competency profiles accurately leads to more effective project manager performance predictions, thereby improving overall project delivery (Jemal et al., 2024).

Furthermore, recent studies have explored the role of personal traits in mediating broader organizational outcomes. Titov and Titova (2024) emphasized that competencies like adaptability, optimism, and integrity are core to project leadership, directly impacting emotional intelligence and communication within teams (Titov & Titova, 2024). Amdan et al. (2024) corroborated this by showing that personal attributes such as ambition, responsibility, and open-mindedness are strongly linked to organizational performance, suggesting their transferability to project contexts (Amdan et al., 2024). Finally, Shrivastava and Mishra (2024) proposed a validated framework for personal effectiveness competency that includes initiative, dependability, and lifelong learning all of which are crucial for long-term

project success in dynamic environments (Shrivastava & Mishra, 2024). Together, these studies substantiate the claim that personal competencies have a significant and positive effect on project performance.

Agile Methodology mediates the effect of Performance and Personal Competencies on Project Performance

Based on the results of testing the construct variable performance competencies on project performance through agile methodology as a mediating variable which has a t-statistic value of 2.216 and a p-value of 0.027, H6 is accepted because the t-statistic is greater than 1.96 and the p-value is smaller than 0.05. Da Costa Filho et al. (2022) found that agile environments require not only technical expertise but also interpersonal competencies, which together influence activity planning and iteration quality, ultimately improving project outcomes (da Costa Filho et al., 2022). Similarly, Bushuyev et al. (2021) demonstrated that as organizations transition from traditional models to agile frameworks, project manager competencies evolve to align with agility-based performance indicators, confirming that agile practices amplify the impact of core competencies on performance metrics (Bushuyev et al., 2021). Almeida and Simões (2021) added that leadership competencies such as team management and feedback become more effective under agile structures, reinforcing the mediating role of agile environments in competency-performance dynamics (Almeida & Simões, 2021).

The agile methodology's process-oriented attributes also contribute to increased project performance when linked to high-performance competencies. For example, Khormi et al. (2024) reported that in large-scale infrastructure projects like NEOM, agile significantly improved both quality and task efficiency particularly when supported by technical and managerial competence (Khormi et al., 2024). Moloto et al. (2021) found that agile features like iterative delivery and environmental feedback mediate the effectiveness of technical skills in driving software project success in the South African banking sector (Moloto et al., 2021). Furthermore, Ansari et al. (2024) confirmed that leadership competencies enhance project excellence by facilitating agile implementation acting as a functional bridge between skill and outcome (Ansari et al., 2024). Thus, these findings collectively substantiate that agile methodology not only supports but significantly strengthens the impact of technical and performance competencies on project success.

Based on the results of testing the construct variable personal competencies on project performance through agile methodology as a mediating variable which has a t-statistic value of 3.426 and a p-value of 0.001, H7 is accepted because the t-statistic is greater than 1.96 and the p-value is smaller than 0.05. Personal competencies such as self-management, adaptability, and communication play a critical role in project outcomes, especially when structured within agile environments. Ahsan and Ho (2022) found that organizations frequently emphasize personal competencies such as

team leadership and adaptability in their recruitment of agile project managers, suggesting their foundational role in agile team dynamics (Ahsan & Ho, 2022). Likewise, Almeida and Simões (2021) highlighted that competencies like people skills, performance feedback, and team management directly enhance productivity in agile environments (Almeida & Simões, 2021). Moreover, da Costa Filho et al. (2022) demonstrated that interpersonal competencies significantly support agile processes, especially during iterative planning and execution phases (da Costa Filho et al., 2022).

Additional findings underscore how agile methodologies enhance the influence of personal competencies on project performance. Bushuyev et al. (2021) proposed a behavioral competency model in agile leadership, showing that attributes like integrity, communication, and conflict resolution are magnified in agile project management settings (Bushuyev et al., 2021). Castaño Urueña et al. (2024) further supported this by demonstrating that agile implementation in academic team settings facilitated the development of employability competencies such as collaboration and goal achievement (Castaño Urueña et al., 2024). Lastly, Saruchera (2022) introduced a self-reflection framework for agile project leadership, reinforcing that personal growth and reflection are vital in achieving agile project goals (Saruchera, 2022). Altogether, these studies validate that agile methodology amplifies the impact of personal competencies, thereby significantly improving project performance.

CONCLUSION

The results of hypothesis testing confirm that both personal and performance competencies have a significant positive influence on project performance. Furthermore, Agile methodology plays a mediating role in this relationship, as indicated by the significant t-statistic and p-value results. This suggests that the implementation of Agile methodology enhances the impact of individual attributes such as adaptability, communication, and self-management (personal competencies), as well as technical planning, problem-solving, and execution skills (performance competencies), on the successful delivery of projects. When team members possess strong competencies and Agile principles are effectively applied, project outcomes tend to be more efficient, adaptive, and aligned with stakeholder expectations.

This study highlights the critical role of Agile practices in maximizing the benefits of both personal and technical capabilities within project teams. Agile methodology acts as an enabling framework that channels these competencies into structured, collaborative, and responsive workflows. As a result, the integration of competencies with Agile methods leads to improved team coordination, faster decision-making, and greater project success. However, the findings are limited to the context in which Agile methodology is implemented and may not be generalizable to non-Agile project environments. Therefore, future research is recommended to explore how Agile practices mediate the influence of various competency types across different sectors and project types.

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