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Agile Leadership and Digital Work Integration on Team Performance: The Mediating Role of Psychological Safety

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ABSTRACT

Purpose – This study aims to analyze the effect of agile leadership and digital work integration on team performance, with psychological safety as a mediating variable. **Methodology/approach –** This study employs a quantitative approach with an explanatory research design. Data were collected through a structured questionnaire distributed via purposive sampling to work team members accustomed to digital work systems, and analyzed using Structural Equation Modeling based on Partial Least Squares (PLS-SEM). **Findings –** Agile leadership and digital work integration both have a positive and significant effect on psychological safety. Digital work integration and psychological safety have a significant direct effect on team performance, whereas agile leadership does not; its effect on team performance is fully indirect, mediated by psychological safety. Psychological safety also mediates the effect of digital work integration on team performance. **Novelty/value –** This study extends the agile leadership and digital transformation literature by testing an integrative team-level model in the Indonesian manufacturing sector, clarifying psychological safety as the key mechanism linking adaptive leadership and digital work integration to team performance.

INTRODUCTION

The development of digital technology has driven a fundamental transformation in the way organizations operate and compete. The integration of technologies such as artificial intelligence, the Internet of Things, big data analytics, and cloud computing has become a defining feature of the Industry 4.0 era, in which operational effectiveness and innovation are largely determined by an organization's ability to integrate digital technology into its work processes (Vial, 2019). Digital transformation is no longer optional but has become a prerequisite for organizational sustainability and competitiveness amid the dynamics of the global business environment. In Indonesia, the digital economy has shown a significant growth trend, driven by increasing internet penetration and technology adoption across various industrial sectors (Google et al., 2023). However, the acceleration of digitalization does not always translate into successful implementation at the organizational level. Many companies still face challenges such as limited human resource competence, resistance to change, weak cross-functional integration, and a lack of adaptive leadership in managing technological change (Syarifuddin & Winarno, 2021). These challenges become even more complex in the manufacturing sector. The layered, standardized, and interdependent nature of manufacturing work processes means that digital transformation involves not only technology adoption but also the re-engineering of work processes and comprehensive organizational readiness (Frank et al., 2019). The high failure rate of digital transformation projects in manufacturing indicates that non-technical aspects, such as organizational coordination and human readiness, are often the main obstacles to successful digitalization (McKinsey & Company, 2020).

In this context, digital work integration has become a relevant concept for explaining the extent to which digital technology is truly integrated into employees' daily workflows. Effective digital work integration enables faster information flow, better cross-functional coordination, and improved efficiency and accuracy of team work, particularly in complex manufacturing environments (Frank et al., 2019; Maroufkhani et al., 2022). In manufacturing settings specifically, where production, quality control, and logistics functions must operate in close coordination, gaps in digital work integration can quickly cascade into scheduling delays, quality deviations, and miscommunication between shifts (Maroufkhani et al., 2022). Beyond technology, leadership plays a key role in determining the success of digital transformation. Rapid and uncertain changes in work systems demand a flexible, adaptive, and collaborative leadership style. Agile leadership is considered relevant because it emphasizes responsiveness to change, team empowerment, and continuous learning, which are essential for supporting the adoption of digital technology in the workplace (Denning, 2018; Sousa & Rocha, 2019). Furthermore, the success of digital transformation is also strongly influenced by employees' psychological conditions. Digitalization requires employees to learn, experiment, and adapt to new ways of working. Psychological safety allows team members to voice ideas, acknowledge mistakes, and ask for help without fear, thereby fostering continuous learning and adaptation (Edmondson & Lei, 2014). Work environments with a high level of psychological safety have been shown to support team effectiveness in facing change and innovation.

Team performance is an important outcome of the digital transformation process, particularly in the manufacturing sector, which relies heavily on cross-functional coordination in production and distribution processes. Previous studies have shown that adaptive leadership, digital integration, and psychological safety contribute to improved team effectiveness (Caniëls et al., 2020; Schuster et al., 2021). Although the literature on digital transformation continues to grow, most studies still focus on the organizational level, using macro-level constructs such as digital transformation, digital capability, or digital maturity, and linking them to aggregate firm performance. Empirical studies examining how digitalization is genuinely internalized into teams' daily workflows, particularly through the concept of digital work integration, remain relatively limited, especially in the manufacturing sector. Meanwhile, research on agile leadership has generally been conducted in the context of the service sector, start-ups, or small and medium enterprises, while empirical evidence in manufacturing environments, characterized by hierarchical structures and layered work processes, remains scarce. In addition, although psychological safety has been shown to play an important role in team learning and innovation, its role as an explanatory mechanism linking leadership and digital work integration to team performance in the Indonesian manufacturing context has not been widely tested empirically. Thus, a significant research gap remains regarding the testing of an integrative model linking Agile Leadership, Digital Work Integration, Psychological Safety, and Team Performance at the team level in the Indonesian manufacturing industry.

Recent multi-level reviews further underscore this gap. Trenerry et al. (2021) argue that most research on digital transformation still privileges organizational-level antecedents, while individual- and team-level mechanisms, such as how employees make sense of new digital workflows and how teams translate digital tools into coordinated action, remain comparatively under-theorized. Similarly, a recent conceptualization of agile teams by Krüger et al. (2025) shows that the processes and emergent states connecting agile practices to team performance are still not consistently specified across studies, despite the growing adoption of agile principles outside the software industry from which they originated. These calls for more granular, team-level research reinforce the relevance of examining agile leadership and digital work integration jointly, and of clarifying the psychological mechanism, namely psychological safety, through which they translate into team performance in the Indonesian manufacturing context.

Taken together, prior studies have examined agile leadership, digital work integration, and psychological safety largely in isolation or in service-sector and start-up settings, and have rarely tested all three constructs jointly as predictors of team performance within Indonesian manufacturing firms undergoing digital transformation. This leaves a research gap regarding how these mechanisms operate together at the team level in a hierarchical, process-driven manufacturing context.

Theoretically, it remains unclear whether agile leadership and digital work integration influence team performance directly or only indirectly through psychological safety, since prior studies rarely test both pathways simultaneously within a single model. Practically, manufacturing organizations undergoing digital transformation face a concrete problem: leadership-development and technology-adoption investments do not always translate into measurable improvements in team performance, and managers lack clear empirical guidance on why this gap occurs and how to close it.

This study aims to: (1) examine the effect of Agile Leadership and Digital Work Integration on Psychological Safety; (2) examine the direct effect of Agile Leadership and Digital Work Integration on Team Performance; (3) examine the effect of Psychological Safety on Team Performance; and (4) examine the mediating role of Psychological Safety in the relationship between Agile Leadership, Digital Work Integration, and Team Performance.

This study offers novelty by integrating Agile Leadership, Digital Work Integration, and Psychological Safety into a single team-level structural model tested in the Indonesian manufacturing sector, a context that combines hierarchical operating structures with active digital transformation. Rather than assuming leadership and technology translate automatically into performance, this study positions Psychological Safety as the explanatory mechanism that determines whether they do, offering a more precise account of how and when digital-era leadership pays off in team-level outcomes.

LITERATURE REVIEW

Building on the gap identified above, this study proposes an integrative research framework linking four constructs: Agile Leadership and Digital Work Integration as exogenous variables, Psychological Safety as an intervening (mediating) variable, and Team Performance as the endogenous outcome variable. The framework is developed around seven hypotheses. Hypotheses H1 and H2 propose that Agile Leadership and Digital Work Integration each positively affect Psychological Safety. Hypotheses H3 and H4 propose that Agile Leadership and Digital Work Integration each positively affect Team Performance directly. Hypothesis H5 proposes that Psychological Safety positively affects Team Performance. Finally, Hypotheses H6 and H7 propose that Psychological Safety mediates the effects of Agile Leadership and Digital Work Integration, respectively, on Team Performance. The theoretical basis for each hypothesis is elaborated in the following subsections.

Agile Leadership and Psychological Safety

Agile leadership is regarded as a leadership style that is relevant in the context of organizations facing rapid and complex change driven by digitalization. A number of studies indicate that adaptive and responsive leadership plays an important role in creating a work climate that supports openness, learning, and active employee participation (Dabić et al., 2023; Detzen & Verbeeten, 2025; Siminto et al., 2024). In this context, agile leaders tend to encourage open dialogue, tolerance for mistakes, and collaborative decision-making, which are prerequisites for the formation of psychological safety. The environment created allows teams to work effectively without psychological barriers, which ultimately strengthens the foundation of teamwork in the digital era. This pattern is consistent with evidence from other organizational settings; for instance, Akkaya et al. (2022) found that agile leadership behavior enhances employees' sense of job embeddedness and career confidence by reducing ambiguity and reinforcing supportive supervisory relationships, mechanisms that overlap conceptually with the interpersonal trust underlying psychological safety.

H1: Agile Leadership affects Psychological Safety

Digital Work Integration and Psychological Safety

The use of well-integrated digital technology facilitates communication, collaboration, and information access among team members. The clarity of workflow and information transparency generated by digital systems reduces uncertainty and misunderstanding, making team members feel more confident in carrying out their roles and responsibilities. This finding supports Gilson et al. (2015), who state that digital work systems can create a more supportive work environment, particularly in the context of modern work. Effective digital integration creates a transparent and structured work environment, thereby reducing employee anxiety in facing work dynamics. This demonstrates that digital transformation is not only about operational efficiency but also about creating a communication ecosystem that supports team members' mental health and willingness to speak up. This is consistent with Trenerry et al. (2021), who note that at the individual and team level, successful digital transformation depends heavily on employees' perceptions of support and clarity during technological change, rather than solely on the sophistication of the technology itself.

H2: Digital Work Integration affects Psychological Safety

Agile Leadership and Team Performance

Adaptive and responsive leadership styles have a positive relationship with team effectiveness and performance. Denning (2018) states that agile leadership enables teams to respond to change more quickly and efficiently, thereby supporting the achievement of team goals. In addition, Hoch and Kozlowski (2014) assert that leadership plays an important role in coordinating team work processes and aligning individual efforts toward collective performance. In the context of modern teamwork, leadership that is able to adapt to environmental demands is believed to enhance team productivity and output quality (Mathieu et al., 2017). This aligns with recent evidence from agile team research showing that the link between agile leadership behaviors and team performance is rarely direct, but instead operates through intervening team processes and emergent states such as trust, coordination, and shared understanding (Krüger et al., 2025).

H3: Agile Leadership affects Team Performance

Digital Work Integration and Team Performance

Digital work integration plays an important role in improving team performance. In this study, an integrated digital work system helps teams increase work efficiency, accelerate coordination, and minimize communication barriers. These conditions enable teams to work more effectively in achieving targets and completing tasks on time. This is in line with Mathieu et al. (2017), who state that good work-system support directly contributes to increased team effectiveness and productivity. It is also consistent with Das et al. (2023), who found that firms with higher workforce agility, partly enabled by well-integrated digital work systems, reported stronger financial and non-financial performance outcomes.

H4: Digital Work Integration affects Team Performance

Psychological Safety and Team Performance

When psychological safety is at a good level, team members feel comfortable sharing ideas, providing input, and learning from mistakes that occur during the work process. Such a work environment encourages collaboration and continuous team learning, which in turn positively affects overall team performance. This finding supports Edmondson and Lei (2014) and Newman et al. (2017), who assert that psychological safety is an important factor in improving team effectiveness. This is corroborated by Kim et al. (2020), who found that psychological safety alone did not directly predict team effectiveness in a sample of field teams in Korea, but exerted a full mediation effect through team learning behavior and efficacy, which underscores that psychological safety functions as an enabling condition rather than a direct driver of performance. Likewise, Jin and Peng (2024) demonstrated that team psychological safety improves employee innovative performance largely through its effect on open communication behavior, further supporting the view that psychological safety operates through intervening team processes rather than acting alone.

H5: Psychological Safety affects Team Performance

Agile Leadership, Psychological Safety, and Team Performance

Agile leadership does not directly drive team performance; rather, it first shapes a psychologically safe work environment. Leaders who apply agile principles tend to give team members room to voice opinions, take initiative, and learn from mistakes without fear. This condition enhances psychological safety, which in turn fosters collaboration and team work effectiveness. This finding reinforces the view that psychological safety is an important mechanism explaining how leadership behavior influences team performance. Thus, the role of agile leadership is more facilitative in nature, creating internal team conditions that enable sustained performance improvement (Denning, 2018; Edmondson & Lei, 2014).

H6: Psychological Safety mediates the effect of Agile Leadership on Team Performance

Digital Work Integration, Psychological Safety, and Team Performance

The indirect-effect analysis also shows that Psychological Safety mediates the relationship between Digital Work Integration and Team Performance. This finding indicates that good digital work integration can improve team performance by enhancing team members' sense of psychological safety. In this study, an integrated digital work system helps create clarity in work processes, information transparency, and smooth communication among team members. This clarity reduces uncertainty and the potential for misunderstanding in task execution, making team members feel more comfortable and confident in interacting and contributing. The resulting sense of psychological safety then fosters collaboration and team effectiveness, which positively affects overall team performance. This finding supports the view that digital technology functions not only as a work tool but also plays a role in shaping the team's psychological condition. When the digital work environment supports safe and open interaction, team performance tends to improve (Edmondson & Lei, 2014; Gilson et al., 2015).

H7: Psychological Safety mediates the effect of Digital Work Integration on Team Performance

Based on the theoretical review and hypothesis development above, the research framework linking Agile Leadership, Digital Work Integration, Psychological Safety, and Team Performance is presented in Figure 1.

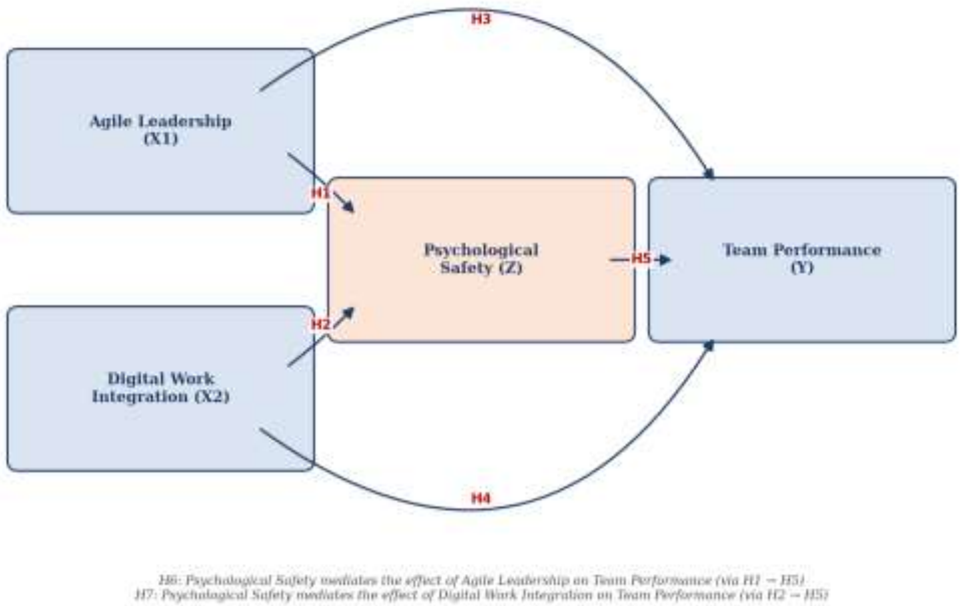

Figure 1. Research Framework

METHOD

This study employs a quantitative approach with an explanatory research design, aimed at testing the causal relationships between agile leadership and digital work integration on team performance, with psychological safety as a mediating variable. The quantitative approach was chosen because it allows for the objective testing of hypotheses through inferential statistical analysis (Sekaran & Bougie, 2016).

The study population consists of work team members in organizations that have implemented digital work practices. The sampling technique used was purposive sampling, with the criteria that respondents are employees who work in teams and are accustomed to using digital systems in their daily work activities. Primary data were collected through a structured questionnaire using a five-point Likert scale, adapted from previous research instruments and adjusted to fit the context of this study.

The measurement instrument consisted of four constructs adapted from established scales in the leadership, digital transformation, and team-effectiveness literature. Agile Leadership was measured using 12 indicator items (AL1–AL12) capturing responsiveness to change, team empowerment, and adaptive decision-making; Digital Work Integration was measured using 12 items (DWI1–DWI12) capturing the extent to which digital tools are embedded in daily task execution and cross-functional coordination; Psychological Safety was measured using 12 items (PS1–PS12) capturing team members' willingness to take interpersonal risks, voice concerns, and admit mistakes; and Team Performance was measured using 15 items (TP1–TP15) capturing task completion, work quality, and collaborative outcomes. All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Data analysis was conducted using Structural Equation Modeling (SEM) based on Partial Least Squares (PLS). This method was chosen because it can simultaneously test direct relationships and mediation effects, and is suitable for predictive and complex research models (Hair et al., 2014). This choice is further supported by Dash and Paul (2021), who show that PLS-SEM is particularly well-suited to prediction-oriented studies with relatively complex models and moderate sample sizes, in contrast to covariance-based SEM, which is more appropriate for strictly confirmatory theory testing. Validity and reliability testing was carried out through convergent validity, discriminant validity, and composite reliability tests. The mediating effect of psychological safety was tested using bootstrapping analysis of indirect effects within the structural model, performed with 5,000 subsamples as recommended by Hair et al. (2019), to assess its role in explaining the relationship between the independent variables and team performance.

RESULT AND DISCUSSION

Before presenting the measurement model results, the demographic profile of the 250 respondents retained after the data-cleaning process is summarized in Table 1.

Table 1. Respondent Demographic Profile

Characteristic	Category	n	%
Position	Staff	229	91.6%
	Supervisor/Team Leader level	16	6.4%
	Manager level	5	2.0%
Department	Production	90	36.0%
	Warehouse	62	24.8%
	Sales & Marketing	50	20.0%
	General Administration	25	10.0%
	Finance/Accounting/Tax	13	5.2%
	Human Resource	3	1.2%
	IT	3	1.2%
	Other	4	1.6%
Total		250	100%

Source: Primary data, processed data (2026)

The results are presented in four stages, beginning with the measurement model evaluation (convergent validity, discriminant validity, and construct reliability), followed by the structural model evaluation (R-square values and path coefficients), and concluding with a discussion of the findings in relation to the hypothesized model and prior literature.

Convergent Validity Test

The results of the convergent validity test show that, in the initial stage, several indicators had outer loading values below the threshold of 0.70. Therefore, indicators were dropped progressively until all remaining indicators met the convergent validity criteria. After model re-estimation, all constructs showed outer loading values ≥ 0.70 and Average Variance Extracted (AVE) values above 0.50. These findings indicate that each latent construct is able to explain more than 50% of the variance of its indicators, thereby meeting the convergent validity standard (Hair et al., 2019).

Table 2 presents the outer loading values for every indicator before and after the dropping process, based on the final N = 250 model. In the initial estimation, all 51 indicators across the four constructs produced loadings between 0.541 and 0.740, with only TP1 (0.740) meeting the 0.70 threshold; the remaining 50 indicators were below 0.70 and were therefore dropped progressively. After re-estimation on the final 250-respondent dataset, 18 indicators were retained: five for Agile Leadership (AL6, AL7, AL9, AL11, AL12; loadings 0.740–0.781), four for Digital Work Integration (DWI1, DWI2, DWI3, DWI5; loadings 0.714–0.785), three for Psychological Safety (PS3, PS4, PS6; loadings 0.780–0.827), and six for Team Performance (TP1, TP5, TP6, TP8, TP11, TP13; loadings 0.740–0.786), all exceeding 0.70 and confirming convergent validity at the indicator level.

Table 2. Outer Loading Values Before and After Dropping

Latent Construct	Indicator	Loading (Before)	Description	Loading (After)	Description
Agile Leadership (X1)	AL1	0.618	Invalid	–	Dropped
	AL2	0.565	Invalid	–	Dropped
	AL3	0.652	Invalid	–	Dropped
	AL4	0.653	Invalid	–	Dropped
	AL5	0.622	Invalid	–	Dropped
	AL6	0.651	Invalid	0.758	Valid
	AL7	0.676	Invalid	0.781	Valid
	AL8	0.655	Invalid	–	Dropped
	AL9	0.661	Invalid	0.768	Valid
	AL10	0.669	Invalid	–	Dropped
	AL11	0.668	Invalid	0.740	Valid
	AL12	0.668	Invalid	0.758	Valid
Digital Work Integration (X2)	DWI1	0.654	Invalid	0.742	Valid
	DWI2	0.653	Invalid	0.714	Valid
	DWI3	0.665	Invalid	0.785	Valid
	DWI4	0.620	Invalid	–	Dropped
	DWI5	0.656	Invalid	0.771	Valid
	DWI6	0.647	Invalid	–	Dropped
	DWI7	0.587	Invalid	–	Dropped
	DWI8	0.541	Invalid	–	Dropped

	DWI9	0.638	Invalid	–	Dropped
	DWI10	0.599	Invalid	–	Dropped
	DWI11	0.619	Invalid	–	Dropped
	DWI12	0.623	Invalid	–	Dropped
Psychological Safety (Z)	PS1	0.619	Invalid	–	Dropped
	PS2	0.616	Invalid	–	Dropped
	PS3	0.655	Invalid	0.827	Valid
	PS4	0.634	Invalid	0.780	Valid
	PS5	0.626	Invalid	–	Dropped
	PS6	0.634	Invalid	0.807	Valid
	PS7	0.612	Invalid	–	Dropped
	PS8	0.563	Invalid	–	Dropped
	PS9	0.614	Invalid	–	Dropped
	PS10	0.592	Invalid	–	Dropped
	PS11	0.631	Invalid	–	Dropped
	PS12	0.628	Invalid	–	Dropped
Team Performance (Y)	TP1	0.740	Valid	0.748	Valid
	TP2	0.580	Invalid	–	Dropped
	TP3	0.662	Invalid	–	Dropped
	TP4	0.644	Invalid	–	Dropped
	TP5	0.670	Invalid	0.740	Valid
	TP6	0.645	Invalid	0.769	Valid
	TP7	0.594	Invalid	–	Dropped
	TP8	0.655	Invalid	0.764	Valid
	TP9	0.610	Invalid	–	Dropped
	TP10	0.565	Invalid	–	Dropped
	TP11	0.635	Invalid	0.745	Valid
	TP12	0.613	Invalid	–	Dropped
	TP13	0.689	Invalid	0.786	Valid
	TP14	0.613	Invalid	–	Dropped
	TP15	0.596	Invalid	–	Dropped

Source: Primary data, processed data (2026)

Table 3 presents the AVE values before and after the dropping process. Before re-estimation, all four constructs had AVE values below the 0.50 threshold (0.383–0.419). After re-estimation, all constructs exceeded 0.50: Agile Leadership (0.579), Digital Work Integration (0.568), Psychological Safety (0.648), and Team Performance (0.576), confirming that each construct explains more than half of the variance in its retained indicators and meets the convergent validity standard at the construct level (Hair et al., 2019).

Table 3. AVE Values Before and After Dropping

Latent Construct	AVE (Before)	Description	AVE (After)	Description
Agile Leadership (X1)	0.419	Invalid	0.579	Valid
Digital Work Integration (X2)	0.392	Invalid	0.568	Valid
Psychological Safety (Z)	0.383	Invalid	0.648	Valid
Team Performance (Y)	0.404	Invalid	0.576	Valid

Source: Primary data, processed data (2026)

Discriminant Validity Test

Discriminant validity was evaluated using three complementary criteria: the Fornell–Larcker criterion, the heterotrait-monotrait ratio of correlations (HTMT) proposed by Henseler et al. (2015), and cross loading.

Table 4. Fornell–Larcker Criterion Values

	Agile Leadership (X1)	Digital Work Integration (X2)	Psychological Safety (Z)	Team Performance (Y)
Agile Leadership (X1)	0.761			
Digital Work Integration (X2)	0.696	0.753		
Psychological Safety (Z)	0.649	0.565	0.805	
Team Performance (Y)	0.609	0.660	0.640	0.759

Source: Primary data, processed data (2026)

The HTMT values are presented in Table 5. As shown in Table 5, all HTMT values fall between 0.726 and 0.888, well below the conservative 0.90 threshold. The highest value is between Agile Leadership and Digital Work Integration (0.888), which, while the largest in the matrix, still remains below the cutoff, while the lowest is between Agile Leadership and Team Performance (0.726). Together with the Fornell–Larcker results, this confirms that all four constructs are empirically distinct.

As shown in Table 4, the Fornell–Larcker criterion is satisfied for all constructs: the square root of the AVE on the diagonal is larger than the construct's correlations with the other constructs. For example, Agile Leadership has a diagonal value of 0.761, which exceeds its correlations with Digital Work Integration (0.696), Psychological Safety (0.649), and Team Performance (0.609). The same pattern holds for Digital Work Integration (0.753), Psychological Safety (0.805), and Team Performance (0.759), confirming that each construct shares more variance with its own indicators than with the other constructs.

Table 5. HTMT Values

	Agile Leadership (X1)	Digital Work Integration (X2)	Psychological Safety (Z)	Team Performance (Y)
Agile Leadership (X1)	–			
Digital Work Integration (X2)	0.888	–		
Psychological Safety (Z)	0.837	0.762	–	
Team Performance (Y)	0.726	0.821	0.810	–

Source: Primary data, processed data (2026)

Table 6. Cross Loading Values

Indicator	Agile Leadership (X1)	Digital Work Integration (X2)	Psychological Safety (Z)	Team Performance (Y)
AL11	0.740	0.506	0.465	0.434
AL12	0.758	0.514	0.471	0.442
AL6	0.758	0.514	0.488	0.434
AL7	0.781	0.562	0.536	0.505
AL9	0.768	0.548	0.506	0.496
DWI1	0.525	0.742	0.469	0.521
DWI2	0.504	0.714	0.370	0.443
DWI3	0.543	0.785	0.446	0.499
DWI5	0.524	0.771	0.408	0.519
PS3	0.587	0.462	0.827	0.507
PS4	0.452	0.448	0.780	0.531
PS6	0.525	0.454	0.807	0.509
TP1	0.434	0.492	0.519	0.748
TP11	0.460	0.425	0.472	0.745
TP13	0.465	0.490	0.447	0.786
TP5	0.438	0.483	0.439	0.740
TP6	0.504	0.545	0.518	0.769
TP8	0.469	0.557	0.509	0.764

Source: Primary data, processed data (2026)

Table 6 shows the cross-loading results. Each retained indicator loads highest on the construct it is intended to measure. For Agile Leadership, loadings on its own construct range from 0.740 (AL11) to 0.781 (AL7), each higher than that indicator's loadings on Digital Work Integration, Psychological Safety, or Team Performance (which stay below 0.57). For Digital Work Integration, loadings range from 0.714 (DWI2) to 0.785 (DWI3); for Psychological Safety, from 0.780 (PS4) to 0.827 (PS3); and for Team Performance, from 0.740 (TP5) to 0.786 (TP13). Because every indicator's highest loading falls on its own construct, discriminant validity is further confirmed at the indicator level, consistent with the Fornell–Larcker and HTMT results above.

Construct Reliability Test

The next evaluation is the construct reliability test. A construct is considered reliable if its composite reliability value exceeds 0.70 (Hair et al., 2019). As shown in Table 7, all four constructs exceed this threshold: Agile Leadership (0.821), Digital Work Integration (0.749), Psychological Safety (0.730), and Team Performance (0.854). The corresponding Cronbach's alpha values (0.819, 0.746, 0.728, and 0.853, respectively) all exceed the 0.60 minimum, corroborating the composite reliability results. Team Performance shows the highest internal consistency of the four constructs, while Psychological Safety, though the lowest, still comfortably clears both thresholds.

Table 7. Composite Reliability Values

Construct	Cronbach's Alpha	Composite Reliability (rho_a)	Description
Agile Leadership (X1)	0.819	0.821	Reliable
Digital Work Integration (X2)	0.746	0.749	Reliable
Psychological Safety (Z)	0.728	0.730	Reliable
Team Performance (Y)	0.853	0.854	Reliable

Source: Primary data, processed data (2026)

Thus, it can be concluded that all the variable constructs used in this study have a high level of validity and reliability. This means that the research model is able to generate consistent and reliable data, so that the interpretations and conclusions drawn from this study have a strong and valid foundation.

Structural Model Evaluation (Inner Model)

The structural model evaluation results are presented in Table 8. As shown in Table 8, the R-square value for Psychological Safety is 0.446, meaning that 44.6% of the variance in Psychological Safety is explained by Agile Leadership and Digital Work Integration jointly. Team Performance has a higher R-square value of 0.547, indicating that 54.7% of the variance in Team Performance is explained by Agile Leadership, Digital Work Integration, and Psychological Safety together. Following the moderate/strong benchmarks commonly used in PLS-SEM (Hair et al., 2019), both values fall into the moderate-to-strong predictive category, with the model explaining more than half of the variation in the primary outcome variable, Team Performance.

Table 8. R-Square Values

Variable	R-Square
Psychological Safety (Z)	0.446
Team Performance (Y)	0.547

Source: Primary data, processed data (2026)

The structural (inner) model with standardized path coefficients and R^2 values is presented in Figure 2.

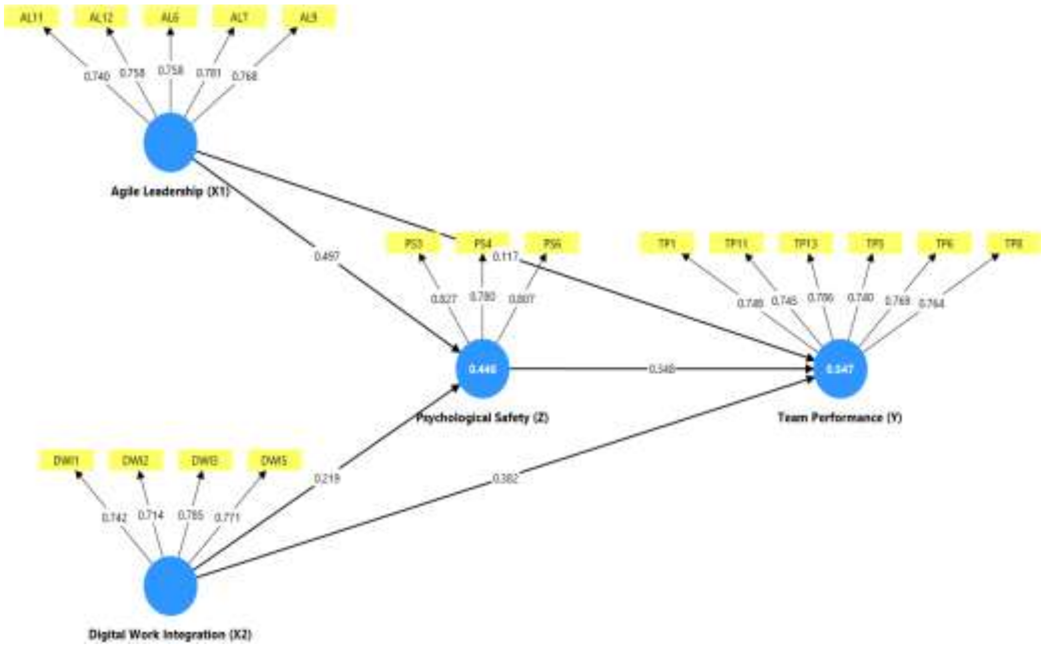

Figure 2. Structural (Inner) Model Results

The path coefficient and hypothesis testing results, obtained through the bootstrapping procedure with 5,000 subsamples, are presented in Table 9. As shown in Table 9, for the direct effects: Agile Leadership has a significant positive effect on Psychological Safety ($\beta = 0.497$, $t = 6.436$, $p = 0.000$), supporting H1. Digital Work Integration also has a significant positive effect on Psychological Safety ($\beta = 0.219$, $t = 2.978$, $p = 0.003$), supporting H2. Agile Leadership does not have a significant direct effect on Team

Performance (β = 0.117, t = 1.346, p = 0.178), so H3 is rejected. Digital Work Integration has a significant positive direct effect on Team Performance (β = 0.382, t = 4.627, p = 0.000), supporting H4. Psychological Safety has a significant positive effect on Team Performance (β = 0.348, t = 4.554, p = 0.000), supporting H5. For the indirect effects, Psychological Safety significantly mediates the effect of Agile Leadership on Team Performance (β = 0.173, t = 3.520, p = 0.000), supporting H6, and significantly mediates the effect of Digital Work Integration on Team Performance (β = 0.076, t = 2.604, p = 0.009), supporting H7. Overall, six of the seven hypotheses are supported; only H3, the direct path from Agile Leadership to Team Performance, is not.

Table 9. Path Coefficient Values

Relationship	T Statistics	P Values	Hypothesis	Description
Direct Effect				
Agile Leadership (X1) → Psychological Safety (Z)	6.436	0.000	H1	Accepted
Digital Work Integration (X2) → Psychological Safety (Z)	2.978	0.003	H2	Accepted
Agile Leadership (X1) → Team Performance (Y)	1.346	0.178	H3	Rejected
Digital Work Integration (X2) → Team Performance (Y)	4.627	0.000	H4	Accepted
Psychological Safety (Z) → Team Performance (Y)	4.554	0.000	H5	Accepted
Indirect Effect				
Agile Leadership (X1) → PS (Z) → Team Performance (Y)	3.520	0.000	H6	Mediation confirmed
Digital Work Integration (X2) → PS (Z) → Team Performance (Y)	2.604	0.009	H7	Mediation confirmed

Source: Primary data, processed data (2026)

Source: Primary data, processed using SmartPLS 4.0 (2026)

Discussion

The results of this study show that Agile Leadership has a significant effect on Psychological Safety but does not have a direct effect on Team Performance. This finding indicates that adaptive leadership does not automatically improve team performance; rather, it plays a role in creating psychological conditions that support the team's work processes. Agile leaders tend to encourage openness, tolerance for mistakes, and collaborative decision-making, which contribute to the formation of psychological safety within teams (Dabić et al., 2023; Denning, 2018).

The insignificant direct effect of Agile Leadership on Team Performance indicates that the role of leadership is more facilitative than instrumental. The influence of leadership on team performance occurs through internal psychological mechanisms rather than through a direct push toward work outcomes. This finding is consistent with Hoch and Kozlowski (2014) and Edmondson and Lei (2014), who emphasize that leadership influences team performance through psychological processes and team dynamics.

In contrast, Digital Work Integration is shown to have a significant direct effect on Team Performance. Effective digital work integration helps improve efficiency, coordination, and the quality of communication within teams, thereby directly affecting performance outcomes. In addition, Digital Work Integration also has a significant effect on Psychological Safety, indicating that a structured and transparent digital work system can reduce uncertainty and enhance team members' sense of psychological safety (Gilson et al., 2015).

Furthermore, the mediation analysis results show that Psychological Safety plays a key role in bridging the effects of Agile Leadership and Digital Work Integration on Team Performance. This finding confirms that improving team performance in digital work environments does not depend solely on leadership style or the technology used, but also on the organization's ability to create a psychologically safe work environment. Psychological safety thus becomes the primary mechanism that enables adaptive leadership and digital work integration to contribute optimally to team performance.

These findings resonate with Kim et al. (2020), who similarly found that psychological safety exerts its influence on team performance indirectly, through intervening mechanisms rather than as a direct predictor. Likewise, the present results reinforce Jin and Peng (2024), who showed that psychological safety enhances performance-related outcomes largely by enabling open communication and information sharing within teams. Taken together, these parallels suggest that the mediating role of psychological safety observed in this study is not an idiosyncratic feature of the Indonesian manufacturing sample, but reflects a broader pattern documented across different industries, countries, and performance outcomes.

From a theoretical standpoint, this study extends the agile leadership literature by demonstrating that its performance-enhancing potential in manufacturing settings, a context markedly different from the software and service industries in which agile principles originated, operates primarily through a psychological pathway rather than through direct behavioral influence. This nuances the more general claim that agile leadership uniformly improves performance outcomes (Akkaya et al., 2022; Krüger et al., 2025) by specifying psychological safety as a boundary mechanism that determines whether such leadership translates into measurable team-level results.

Practically, these findings suggest that manufacturing organizations pursuing digital transformation should not treat leadership development and technology adoption as sufficient conditions for improved team performance on their own. Instead, managers should deliberately cultivate psychologically safe team climates, for example by normalizing error reporting, encouraging cross-level dialogue, and recognizing team members who raise concerns during digital workflow transitions, so that investments in agile leadership training and digital work systems can translate into tangible performance gains. This is particularly relevant in manufacturing environments, where hierarchical structures and standardized procedures can otherwise discourage the open communication that psychological safety requires (Frank et al., 2019).

This study has several limitations that suggest directions for future research. First, the cross-sectional design limits causal inference; longitudinal or experimental designs would help clarify the temporal ordering between agile leadership, digital work integration, psychological safety, and team performance. Second, the purposive sampling approach, while appropriate for reaching respondents familiar with digital work systems, may limit the generalizability of the findings to manufacturing teams with lower levels of digital maturity. Third, the data-collection instrument captured respondents' position and department but not other demographic variables such as age, gender, and education; future studies could incorporate a broader demographic profile to test whether the observed relationships hold across these dimensions. Future studies could also extend this model by incorporating boundary conditions such as team tenure or industry sub-sector, consistent with calls for more context-sensitive research on agile teams (Krüger et al., 2025).

CONCLUSION

This study concludes that agile leadership and digital work integration have a positive and significant effect on team performance. These findings indicate that adaptive leadership and effective digital work integration play an important role in improving team performance, particularly in dynamic and technology-based work environments. In addition, psychological safety is shown to play a role as a mediating variable that strengthens the relationship between the independent variables and team performance, thereby creating work conditions that foster collaboration, openness, and team effectiveness.

Although most hypotheses were empirically supported, with the exception of the direct effect of Agile Leadership on Team Performance, the results of this study do not indicate a deterministic relationship. The effectiveness of agile leadership and digital work integration on team performance still depends on the organizational context, team characteristics, and the level of implementation of digital work practices. Therefore, this study emphasizes the importance of developing a psychologically safe work environment as a strategic mechanism to maximize the impact of leadership and digital integration on team performance.

For human resource development practice, these findings suggest that leadership and digital-transformation initiatives in manufacturing organizations should be paired with deliberate psychological-safety-building interventions, such as structured team debriefs, blameless post-mortems after process changes, and leadership coaching that emphasizes listening and error tolerance. Without such complementary interventions, investments in agile leadership training or digital infrastructure alone may fail to translate into improved team-level outcomes, as demonstrated by the non-significant direct path from Agile Leadership to Team Performance in this study.

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