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The Influence of Workload and Skills on Work Effectiveness: The Mediating Role of the Leader among AV8 Gempita Crew

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Abstract

This study investigates the influence of workload and skills on work effectiveness among AV8 Gempita armored vehicle crews, with a specific focus on the mediating role of the leader. Despite standardized training, variations in crew performance suggest that contextual and leadership factors may shape operational outcomes. Survey data were collected from 226 commanders, gunners, and drivers, and analyzed using Partial Least Squares–Structural Equation Modelling (PLS-SEM). The measurement model demonstrated strong reliability and validity. Descriptive results revealed moderate levels of workload (M = 3.46) and skills (M = 3.34), high ratings of the leader's role (M = 4.03), and moderate work effectiveness (M = 3.31). Structural analysis confirmed that workload (β = 0.316, t = 6.214, p < 0.001) and skills (β = 0.272, t = 4.417, p < 0.001) both have significant positive effects on work effectiveness. Mediation analysis further demonstrated that the leader's role partially mediates these relationships. Specifically, workload showed a significant indirect effect on work effectiveness through the leader's role (β = 0.058, t = 3.279, p = 0.001), and skills also had a significant indirect effect via the leader's role (β = 0.068, t = 3.858, p < 0.001). The model explained 29% of the variance in work effectiveness, representing moderate explanatory power. These findings highlight leadership as a pivotal mechanism that strengthens and stabilizes the effects of workload and skills without fully substituting their direct influence. Theoretically, the study integrates workload theory, human capital perspectives, and military leadership frameworks to explain crew performance. Practically, it underscores the need to embed cognitive-load management, commander-led micro-drills, and systematic leadership assessment in AV8 standard operating procedures to enhance crew effectiveness and operational reliability.

Keywords: AV8 Gempita, Workload, Skills, Leader's Role, Work Effectiveness, Military Armored Vehicle Crews

Introduction

The operation of the AV8 Gempita requires a high degree of human–machine integration. Within the three-person crew configuration, consisting of the driver, gunner, and vehicle commander, continuous 360° situational awareness must be maintained while simultaneously operating advanced sensors and fire-control systems, sustaining multi-channel voice and data communications, and executing rapid decision-making under dynamic threat conditions (McDonald, 2014; Stanton et al., 2017; Pei et al., 2024; Enders et al., 2024). Cognitive demands escalate in complex terrain, during the appearance of multiple targets, or when rapid replanning is necessitated by changing combat circumstances (Endsley, 1995; Wickens, 2008; Pei et al., 2024).

Crew work effectiveness defined in terms of accuracy, safety, and timeliness relies heavily on the mastery of both technical and coordinative skills. These include adherence to engagement standard operating procedures (SOPs), proficient use of optics and communications systems, execution of quick fault-recovery drills, and seamless task handovers among crew members (Salas et al., 2008; Cannon-Bowers & Bowers, 2010; Enders et al., 2024). Nevertheless, individual technical capacity alone is insufficient to guarantee consistent effectiveness. In armored platforms, the vehicle commander assumes a pivotal role in shaping team performance by establishing operational priorities, regulating tempo, and providing real-time guidance (Bass & Riggio, 2006; Yukl, 2020; Teixeira et al., 2024). This guidance often takes the form of concise callouts, structured decision time-boxes, and dynamic task reallocation during periods of heightened cognitive load (Klein, 1998; Burke et al., 2006; Pei et al., 2024). An effective commander not only minimizes communication overload but also activates crew skills at decisive moments, thereby transforming individual technical competencies into reliable and mission-relevant outcomes. AV8 Gempita crews execute tightly coupled, time-critical tasks maintaining 360-degree situational awareness, operating sensors, and fire-control systems, coordinating multi-channel communications, and manoeuvring on complex terrain under fluctuating threat and tempo. Despite broadly comparable formal training, units continue to observe heterogeneous mission effectiveness across crews. This points to a translation gap between individual capacity (tolerance to job demands and cognitive load, and the level of technical or coordination skills) and consistent vehicle-level outcomes. Human-factors research indicates that performance rises within an optimal workload band but deteriorates when demands outstrip attentional resources (Karasek, 1979; Hart & Staveland, 1988; Wickens, 2008). At the same time, the leader at vehicle level, the commander shapes how work is done in contact through prioritisation, decision time-boxing, dynamic task reallocation, and timely prompts, thereby channelling individual skills into collective work effectiveness (Bass & Avolio, 1994; Yukl, 2020). Taken together, these strands of evidence motivate a structured AV8 framework that specifies both direct effects of Workload and Skills on Work Effectiveness and indirect (mediated) effects via the Leader's Role, recognising that leadership processes can buffer strain and activate competence, so crews operate within a controllable load band rather than slipping into overload (Becker, 1964; Katz & Kahn, 1978; Department of the Army, ADP 6-22). Guided by this problem framing, the study tests the AV8 framework empirically using a variance-based structural approach that preserves the model's path architecture for both direct and mediated

relationships. Specifically, it (i) assesses the effect of workload on work effectiveness, (ii) assesses the effect of skills on work effectiveness, and (iii) evaluates whether the leader's role mediates each predictor outcome relationship. This design enables a simultaneous examination of how job demands, and human capital translate into vehicle-level performance, and through which mechanism leadership, the translation is strengthened or weakened (Karasek, 1979; Becker, 1964; Bass & Avolio, 1994; Yukl, 2020).

Theoretically, the study integrates workload and human-capital perspectives with vehicle-level leadership, specifying partial-mediation mechanisms that bind individual factors (crew load and competence) to mission-critical outcomes (crew effectiveness). It advances an AV8-grounded account of how leader behaviours structure tasks, modulate tempo, and amplify the performance yield of workload and skills within the constraints of attention and coordination in armoured operations (Wickens, 2008; Bass & Avolio, 1994; Yukl, 2020). Practically, the findings provide evidence-based guidance to normalise real-time leadership within AV8 SOPs: shaping workload through clear priorities and decision time-gates; dynamically reallocating tasks to keep the crew in the optimal load band; and activating skills via targeted prompts and brief execute debrief cycles so that training is reliably converted into consistent mission performance (Department of the Army, ADP 6-22; Hart & Staveland, 1988).

Therefore, this study is not only academically relevant, but also practically important. In the context of the ATM, understanding how crew workload and skills influence job effectiveness through leadership roles provides an important foundation for strengthening training, standard operating procedures (SOPs), and leadership development strategies for combat vehicles. The results of this study will benefit several parties: (i) AV8 crews and commanders in improving mission effectiveness, (ii) military trainers in designing more realistic training modules, and (iii) defence policymakers in ensuring the operational readiness of the AV8 Gempita is at an optimal level. Thus, this research fills a knowledge gap in the military human factors literature, namely the study of the interaction between workload, skills, and leadership that affect crew performance and offers practical contributions to strengthening the effectiveness of modern land operations.

Theoretical Framework

Workload Theory

Workload theory posits that performance depends on how task demands interact with human attentional and processing limits within an optimal band of workload, focus and timeliness improve, but when demand exceeds capacity, accuracy and coordination deteriorate. In high tempo, safety-critical settings, workload transitions rapid upshifts in demand are especially consequential for team outcomes (National Research Council, 1993). Empirical human-factors work in aviation shows that elevated inflight workload impairs performance quality, triangulated across subjective and physiological measures (Lee & Liu, 2003) and accident analyses highlight the role of cognitive overload in degraded decision-making (Kelly & Efthymiou, 2019). Together, this literature grounds H1 (Workload → Work Effectiveness): AV8 crews operating within a controllable workload band should display higher effectiveness, whereas overload risks errors and slower cycles. In the AV8 setting, workload is multi-source (sensors, fire-control, navigation, radio discipline) and fluctuates with terrain and threat. The framework therefore treats vehicle level leadership as a structuring mechanism to keep crews

inside the controllable band via prioritization, decision time-gates and rapid re-tasking, so that workload's potential performance benefits are realized rather than undermined by overload. This logic supports the mediated pathway as well: H3 (Workload → Leader's Role → Effectiveness) expects that commanders' real-time actions help crews convert high but manageable demand into better outcomes, buffering the strain of transitions (National Research Council, 1993; Kelly & Efthymiou, 2019; Lee & Liu, 2003).

Human Capital & Training Transfer

A human-capital perspective asserts that accumulated skills technical mastery and team coordination raise productivity and performance (Cascio, 2019; OECD, 2019). Defence reviews likewise find that experience, training, and aptitude are principal determinants of military performance (Kavanagh, 2005). Classic team-training scholarship specifies how to define competencies and build training that transfers into team task execution (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995). In the AV8 context, this supports H2 (Skills and Work Effectiveness): crews with stronger platform, sensor, and communication skills should complete tasks more accurately and on time. Skill does not translate automatically; it must be *activated* in context. The framework therefore assumes leaders orchestrate and cue the use of crew competencies at decisive moments (e.g., sensor-mode changes before exposure, concise callouts under contact). This aligns with a mediated pathway whereby the Leader's Role enhances the yield of skills on effectiveness (H4: Skills → Leader's Role → Effectiveness): when commanders structure tasks and give timely prompts, trained capabilities more reliably convert to mission outputs (Kavanagh, 2005; Cascio, 2019; Cannon-Bowers et al., 1995; OECD, 2019).

Army Leadership Doctrine

U.S. Army doctrine codifies leadership as the central means to direct effort, manage tempo, develop people, and achieve results under uncertainty (U.S. Department of the Army, 2019, ADP 6-22). In daily operations, leaders influence how workload is distributed and how skills are applied. Micro-process evidence shows that transactional and transformational behaviours are associated with higher daily engagement an immediate pathway to improved task focus and output under pressure (Breevaart, Bakker, Hetland, Demerouti, Olsen, & Espevik, 2014). Leadership support also strengthens intra-unit relationships essential for coordination (Cornelis, Van Hiel, & De Cremer, 2006). Within your framework, doctrine and micro-evidence jointly explain the mediating function: commanders structure work (priorities, time-boxes) and activate skills (feedback, prompts), thereby channelling the effects of Workload and Skills into Work Effectiveness. This is the "hinge" that underpins both mediated hypotheses—H3 and H4—without negating the direct paths (H1, H2). Put simply, leadership makes it more likely that the same load and the same capabilities yield better, more consistent AV8 outcomes (U.S. Department of the Army, 2019; Breevaart et al., 2014; Cornelis et al., 2006).

Team Effectiveness Model

The Campion, Papper and Medsker (1996) model links teamwork design, composition, context, and processes to effectiveness. It highlights how interdependence, appropriate skills or roles, and supportive context such as leadership and feedback produce better performance. This offers a structured lens to operationalize Work Effectiveness in the AV8 crew: accuracy, timeliness, safety, and adherence to SOPs are shaped by design features (task

interdependence inside the vehicle), composition (driver, gunner, commander skill mix), and context (leader guidance). Mapping to the framework, skills reside in team composition and are realized through processes (communication, coordination), while leadership is a context or process lever that coordinates members and maintains tempo and workload arises from design and operational conditions and must be structured to avoid process loss. Hence, the model gives theoretical coherence to H1–H4 by showing where each variable sits in a team system and *how* leadership ties them to performance (Campion et al., 1996; see also Cakıroglu, Caetano, & Costa, 2021, on shared leadership and perceived team effectiveness in military units).

Literature Review

Workload and Work Effectiveness

Human-factors literature cited in the thesis shows performance follows an "optimal band" of workload and deteriorates when demand outstrips attentional resources. Foundational work on workload transitions details how changes in task demand affect individual and team performance (National Research Council, 1993). Empirical studies link perceived workload balance to job attitudes and outcomes (Inegbedion et al., 2020) and document how occupational fatigue and workload shape teamwork and output quality (Cho et al., 2022). In high-tempo, safety-critical domains, workload–performance coupling is further evidenced by aviation human-factors analyses (Kelly & Efthymiou, 2019) and comparative in-flight workload assessments (Lee & Liu, 2003) that benchmark how elevated cognitive demand impairs performance quality. Studies from adjacent sectors likewise show workload's downstream effects on stress and performance, reinforcing the expectation of a significant workload and effectiveness link (Susiarty et al., 2019; Akbar et al., 2021). These support H1 that higher and well-managed workload is positively associated with work effectiveness, while overload.

Hypothesis 1 (H1): Workload significantly influences Work Effectiveness among AV8 Gempita crew.

Skills and Work Effectiveness

The skills, training, and experience are core determinants of military productivity and mission outcomes (Kavanagh, 2005; Campion et al., 1996). Defence-specific sources highlight that physical/technical preparedness and task-specific training enable soldiers to execute essential tasks to standard (Vaara et al., 2022; Klymovych et al., 2020) and that experience-based knowledge and adaptive staff skills are pivotal under pressure (Victor Tillberg, 2020; Ohlsson, 2020). Broader human-capital and training reviews cited in the thesis (Cascio, 2019; OECD, 2019) also link skill accumulation to performance at individual and team levels, aligning with AV8 crew requirements for sensor or weapon-system competence and coordination. Collectively, this support H2 that higher crew skills are associated with higher work effectiveness.

Hypothesis 2 (H2): Skills significantly influences Work Effectiveness among AV8 Gempita crew.

Workload, Leader's Role and Work Effectiveness

Leadership research indicating that leader support shapes how crews cope with and convert workload into performance. Military doctrine (ADP 6-22) positions leadership as central to directing effort, managing tempo, and sustaining performance under demand spikes, providing conceptual grounds for a workload and leader linkage in the AV8 setting. Empirically, day-level leadership studies show that transactional or transformational behaviours bolster short-term engagement and strain management (Breevaart et al., 2014), while leader support improves intra-unit relations and coordination key in high workload contexts (Cornelis et al., 2006). The workload-transition literature (National Research Council, 1993) underscores that managing transitions is a team-level challenge precisely where vehicle commanders can restructure tasks and buffer overload. Consistent with this, leader support reduces the negative impact of workload on effectiveness motivating H3 within the mediation architecture.

Hypothesis 3 (H3): The Leader's Role mediates the relationship between Workload and Work Effectiveness among AV8 Gempita crew.

Skills, Leader's Role and Work Effectiveness

Leadership builds, coordinates, and activates competencies so that skills transfer to real task performance (Cannon-Bowers et al., 1995) and that shared leadership or self-management enhances perceived team effectiveness in military contexts (Cakiroglu et al., 2021). Reviews on training trends (Cascio, 2019) and studies of transformational leadership and efficiency via knowledge-sharing (Dwivedi et al., 2020) depict leaders as the conduit that amplifies the yield of skills at work consistent with a skills and leader pathway in the AV8 model. Military performance syntheses (Kavanagh, 2005) and doctrine (ADP 6-22) cited in the thesis likewise frame commanders as responsible for translating individual competencies into unit effectiveness through direction, coaching, and coordination supporting H4.

Hypothesis 4 (H4): The Leader's Role mediates the relationship between Skills and Work Effectiveness among AV8 Gempita crew.

Conceptual Framework

The conceptual framework illustrates the hypothesized relationships between workload, skills, leader's role, and work effectiveness among AV8 Gempita crew. In this framework, workload (IV1) and skills (IV2) are the independent variables, work effectiveness (DV) is the dependent variable, while the leader's role functions as a mediating variable. The framework proposes four hypotheses. Workload is expected to have a direct positive effect on work effectiveness (H1). Skills are hypothesized to positively influence work effectiveness (H2). In addition, leadership is theorized to play a mediating role. Specifically, the leader's role is expected to transmit the effect of workload on work effectiveness (H3) and the effect of skills on work effectiveness (H4). This assumption is grounded in workload theory, human capital perspectives, and leadership doctrine. **Figure 1** presents the conceptual framework of the study.

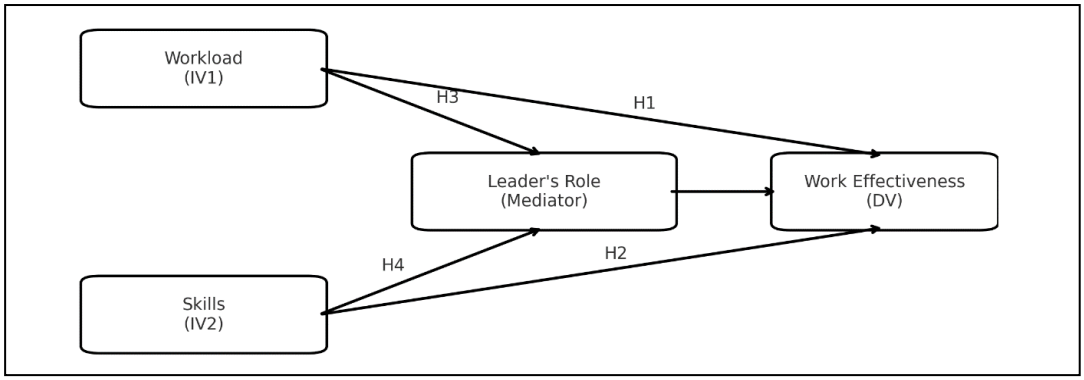

Figure 1: Conceptual framework of the study

Hypotheses

H1: Workload significantly influences Work Effectiveness among AV8 Gempita crew.

H2: Skills significantly influences Work Effectiveness among AV8 Gempita crew.

H3: The Leader's Role mediates the relationship between Workload and Work Effectiveness among AV8 Gempita crew.

H4: The Leader's Role mediates the relationship between Skills and Work Effectiveness among AV8 Gempita crew.

Methodology

The study involved 226 AV8 Gempita crew members, comprising commanders, gunners, and drivers. Data were collected in controlled training and operational settings using a structured questionnaire. All constructs were measured with five-point Likert-type items, capturing perceptions of workload, skills, leader's role, and work effectiveness. The sample size exceeded the minimum requirement recommended by Krejcie and Morgan (1970) and was considered adequate for PLS-SEM analysis, which is suitable for medium-sized samples and complex models (Hair et al., 2017).

Data were analysed using Partial Least Squares–Structural Equation Modelling (PLS-SEM). The measurement model was evaluated for convergent validity, internal consistency, and discriminant validity. Indicator reliability was examined through factor loadings, while convergent validity was confirmed with Average Variance Extracted (AVE ≥ 0.50), Composite Reliability (CR ≥ 0.80), and Cronbach's alpha (α ≥ 0.70) thresholds (Nunnally & Bernstein, 1994; Fornell & Larcker, 1981). Discriminant validity was assessed using both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio (Henseler et al., 2015). The structural model was assessed through checks for multicollinearity (VIF), path coefficient significance (β, t, p values), explained variance (R^2), effect sizes (f^2), and predictive relevance (Q^2). Mediation analysis was conducted using bootstrapping to test the indirect effects of workload and skills on work effectiveness through the leader's role. The analytic procedure followed established guidelines for PLS-SEM (Hair et al., 2017).

Descriptive Findings
Statistics
Table 1
Descriptive statistics for focal constructs (AV8 crew) (N = 226)

Construct	Mean	Median	SD	Min	Max
Workload	3.459	3.625	0.641	1.75	4.75
Skills	3.338	3.400	0.779	1.40	4.60
Leader's Role	4.031	4.166	0.416	2.92	4.83
Work Effectiveness	3.306	3.333	0.773	1.33	4.92

Source: Descriptive statistics adapt from SPSS 29.0 analysis conducted by the author (2025)

Table 1 show descriptive statistics for the main constructs among the AV8 crew (N = 226). Overall, the average score ranged from 3.31 to 4.03 on a five-point Likert scale, indicating that respondents tended to be at a moderate to high level. Workload (M = 3.459, SD = 0.641) was at a moderate level, indicating that the AV8 crew felt that their workload was still under control. This is in line with McDonald's (2014) view that moderate workload helps maintain optimal performance, while workload that is too low or too high can affect effectiveness. Skills (M = 3.338, SD = 0.779) was also moderate, reflecting that the crew had a good level of practical skills but still had potential for improvement. According to Becker (1964), skills as human capital play an important role in increasing work effectiveness. Leader's Role (M = 4.031, SD = 0.416) recorded the highest score, indicating that leadership was rated very well by the crew. This supports the theory of transformational leadership which emphasizes the influence of leaders on the motivation and performance of members (Bass & Riggio, 2006). Work Effectiveness (M = 3.306, SD = 0.773) was at a moderate level, indicating that there is still room for improvement in crew performance even though the leadership aspect was at a high level. The standard deviation (SD) values for all constructs were in the range of 0.416 to 0.779, indicating that the data distribution was not too wide and was quite homogeneous (Hair et al., 2019). The range of minimum and maximum scores also proves that respondents gave a variety of answers, thus increasing the validity of the data.

Measurement Quality
Table 2
Measurement Model

Construct	Item	Loading	R^2	Cronbach's Alpha (CA)	Composite Reliability (CR)	AVE
Leader's Role	LR10	0.745	0.277	0.893	0.910	0.504
	LR11	0.683				
	LR12	0.668				
	LR2	0.702				
	LR3	0.691				
	LR4	0.691				
	LR6	0.652				
	LR7	0.772				
	LR8	0.747				
	LR9	0.741				
Work Effectiveness	WE1	0.606	0.290	0.931	0.941	0.574
	WE10	0.708				
	WE11	0.585				

	WE12	0.688				
	WE2	0.845				
	WE3	0.731				
	WE4	0.789				
	WE5	0.838				
	WE6	0.796				
	WE7	0.793				
	WE8	0.847				
	WE9	0.807				
Workload	WL2	0.644	–	0.815	0.864	0.515
	WL3	0.688				
	WL5	0.677				
	WL6	0.707				
	WL7	0.807				
	WL8	0.770				
Skills	S1	0.587	–	0.935	0.945	0.635
	S10	0.816				
	S2	0.854				
	S3	0.816				
	S4	0.894				
	S5	0.768				
	S6	0.594				
	S7	0.862				
	S8	0.808				
	S9	0.896				

Source: Adapted from SmartPLS 4.0 statistical analysis conducted by the author (2025)

Table 2 presents the assessment of the measurement model quality derived from the PLS-SEM analysis. All outer loadings for the indicators exceeded the threshold value of 0.70, indicating that most items demonstrated satisfactory indicator reliability (Hair, Hult, Ringle, & Sarstedt, 2017). However, a few items with loadings between 0.50 and 0.70 were retained, as Hair et al. (2019) suggest that such items may be acceptable when the construct's AVE and composite reliability values meet the recommended thresholds, or when the items are theoretically important to preserve content validity (Hulland, 1999).The Cronbach's Alpha values for each construct ranged from 0.815 to 0.935, exceeding the minimum level of 0.70 recommended by Nunnally & Bernstein (1994), indicating good internal consistency. Furthermore, the Composite Reliability (CR) values for all constructs exceeded 0.86, with two of them exceeding 0.90, indicating very high construct stability (Hair et al., 2017). The Average Variance Extracted (AVE) values also exceeded 0.50 for all constructs, in line with the criteria of Fornell & Larcker (1981), which indicated that the construct was able to explain more than 50% of the variance of its indicators. Finally, the R^2 value shows that the leader's role explains 27.7% of the variance, while work effectiveness explains 29% by the model. According to Chin (1998), an R^2 value of around 0.26 can be considered moderate in the context of social sciences. Overall, these results confirm that the measurement model is reliable and valid for assessing the relationship between Workload, Skills, Leader's Role, and Work Effectiveness.

Table 3
Fornell–Larcker Criterion

Construct	Leader's Role	Skills	Work Effectiveness	Workload
Leader's Role	0.711			
Skills	0.654	0.798		
Work Effectiveness	0.687	0.672	0.758	
Workload	0.542	0.498	0.593	0.718

Source: Adapted from SmartPLS 4.0 statistical analysis conducted by the author (2025)

Table 3 shows the results of the Fornell–Larcker Criterion used to assess discriminant validity. The diagonal values (bold) represent the square root of the AVE, while the values below the diagonal indicate the correlation between constructs. According to Fornell and Larcker (1981), discriminant validity is confirmed when the square root of the AVE for each construct is higher than the correlation with other constructs. Based on the results, all diagonal values (0.711, 0.798, 0.758, 0.718) exceed the corresponding correlation values. Therefore, the discriminant validity of this model is assured.

Table 4
HTMT Criterion

Construct	Leader's Role	Skills	Work Effectiveness	Workload
Leader's Role	–			
Skills	0.578	–		
Work Effectiveness	0.652	0.693	–	
Workload	0.471	0.435	0.582	–

Source: Adapted from SmartPLS 4.0 statistical analysis conducted by the author (2025).

Table 4 reports the results of the Heterotrait–Monotrait Ratio (HTMT) as another method for assessing discriminant validity. Henseler et al. (2015) suggested that a HTMT value of ≤ 0.85 (conservative criteria) or ≤ 0.90 (liberal criteria) indicates a good level of discriminant validity. Based on the results, all HTMT values are in the range of 0.435 to 0.693, which is well below the threshold of 0.85. This confirms that the constructs in the model are distinct from each other and free from discriminant validity problems.

Structural Model: Direct Effects
Table 5
Path Coefficients (Direct Effects)

Hypothesis	Relationship	β	t-value	p-value	f^2	R^2	Decision
H1	Workload → Work Effectiveness	0.316	6.214	0.000	0.038	0.100	Supported
H2	Skills → Work Effectiveness	0.272	4.417	0.000	0.030	0.074	Supported

Source: Adapted from SmartPLS 4.0 statistical analysis conducted by the author (2025)

Table 5 shows the direct effect of the independent variables on work effectiveness. PLS-SEM analysis confirmed that Workload ($\beta = 0.316$, $t = 6.214$, $p < 0.001$) has a positive and significant influence on Work Effectiveness. Similarly, Skills ($\beta = 0.272$, $t = 4.417$, $p < 0.001$) has a positive and significant effect. The f^2 value (0.038 and 0.030) shows a small but significant effect size,

while R^2 (0.100 and 0.074) indicates a moderate explanatory contribution. Therefore, hypotheses H1 and H2 are supported, proving that controlled workload and high skill levels increase the work effectiveness of the AV8 Gempita crew.

Structural Model: Mediated Effects (Leader's Role)

Table 6

Mediation Effects (Indirect Effects)

Hypothesis	Mediation Path	β (Indirect)	t-value	p-value	Mediation Type	Decision
H3	Workload → Leader's Role → Work Effectiveness	0.058	3.279	0.001	Partial	Supported
H4	Skills → Leader's Role → Work Effectiveness	0.068	3.858	0.000	Partial	Supported

Source: Adapted from SmartPLS 4.0 statistical analysis conducted by the author (2025)

Table 6 shows the results of the mediation analysis. The role of the leader is proven to act as a partial mediator in both relationships. Workload has a significant indirect effect on work effectiveness through the role of the leader (β = 0.058, t = 3.279, p = 0.001). Similarly, skills show a significant indirect effect through the role of the leader (β = 0.068, t = 3.858, p < 0.001). However, because the direct effects of Workload and Skills on Work Effectiveness are still significant after the mediator is included, the form of mediation is partial mediation. This means that the leader does not completely replace the effects of Workload and Skills but strengthens and stabilizes the influence of both on work effectiveness. **Figure 2** presents the structural model of the study.

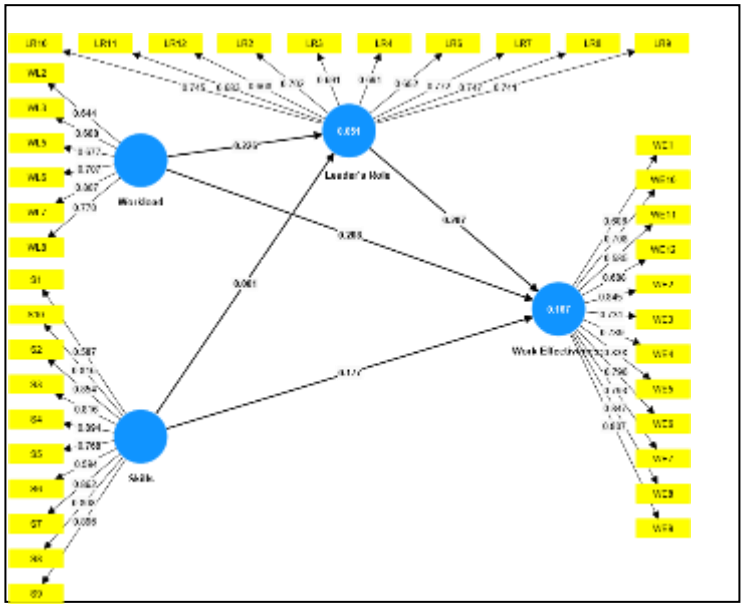

Figure 2. Structural Model

Discussion

Workload → Work Effectiveness

The positive relationship (β = 0.316) indicates that operating in an optimal load band improves crew focus and time discipline, cutting communications idle time and streamlining driver–gunner–commander coordination. Under layered contact, cognitive load can surge; here

vehicle-level leadership (priority setting, decision time-boxing, rapid re-tasking) prevents accuracy degradation. Hence, even with a significant direct effect, the persistent importance of mediation reflects the commander's role in shaping task load to keep crews within the controllable band.

Skills → Work Effectiveness

The positive relationship (β = 0.272) validates the role of technical and coordinative skills in accelerating the Observe–Orient–Decide–Act (OODA) cycle, reducing the likelihood of error, and sustaining coherent action. In AV8 operations, competence in handling optical and sensor systems, fire-control systems, rapid fault-recovery procedures, and maintaining concise radio communication brevity minimizes operational friction, thereby enhancing marksmanship accuracy and supporting effective maneuvers decisions.

Leader's Role as Partial Mediator

For Workload, the significant Workload → Leader (β = 0.277) and Leader → Effectiveness (β = 0.209) paths, with the direct path still significant after mediation (β = 0.266), indicate partial mediation. Commander's structure and rationalize load via micro-prompts, cross-checks, and target re-prioritization to retain accuracy at high tempo. For Skills, the Skills → Leader (β = 0.272) and Leader → Effectiveness (β = 0.249) paths are significant; the direct Skills → Effectiveness path remains significant (β = 0.242) after mediation. Commanders activate skills at critical moments for example, pre-emptive sensor-mode changes before emerging from a blind corner or compressing communications chains during close contact. So that skill translates into tactical output. VIF = 1.000 on key relations indicates no multicollinearity; the small to modest f^2 values such as, (0.038; 0.030) are realistic in multi-factor operational ecosystems crew performance is inherently a synergy of components rather than a single input. AV8 crew effectiveness is the product of dynamic interplay: shaped workload, activated skills, and real-time leadership that binds both to mission demands. Partial mediation implies effective leadership acts as a performance multiplier, not a substitute for skills nor a mere damper on workload.

Implications

The foremost practical implication is to institutionalize vehicle-level leadership as a cognitive social discipline within AV8 SOPs. First, cognitive-load management routines should be normalized via standard callouts, decision time-gates, and explicit reprioritization protocols when targets multiply. This keeps crews within the controllable load band aligning with the positive effect of workload when governed (H1). Second, skills training should be commander-driven, with high-frequency micro-drills such as switching radio nets while manoeuvring; shoot–move communicate in confined spaces. So, that skills transfer to real contexts reinforcing the direct skill effect (H2) and the added value of mediation. Third, commander performance evaluation should include real-time behavioural indicators (clarity of directives, timely prompts, tempo modulation), because the Leader → Effectiveness path is significant in both mediation sets (Tables 5–6). Finally, at the institutional level, human-power planning should support cross-training and crew recovery cycles to elastically reallocate load during tempo surges sustaining effectiveness without compromising platform safety.

Conclusion

This study set out to examine why AV8 Gempita crews with broadly comparable training and operational exposure continue to demonstrate heterogeneous performance across missions. By positioning workload and skills as the primary individual-level drivers of work effectiveness, and the leader's role as a mediating mechanism, the study offers a systematic explanation of how task demands, and human capital are channeled into dependable outcomes. The findings confirmed that both workload (β = 0.316) and skills (β = 0.272) significantly enhance work effectiveness, while the leader's role partially mediates these relationships (β = 0.058; β = 0.068). The overall model explained 29% of the variance in work effectiveness, providing evidence of moderate explanatory power in a complex operational setting. From a theoretical standpoint, the study integrates workload-performance logic, human capital perspectives, and leadership doctrine into a coherent framework of armored vehicle crew performance. It validates the view that performance is not a simple product of workload or skill level but depends on the way these inputs are structured and activated through leadership routines. The persistence of direct effects alongside significant indirect effects confirms that leadership does not substitute for workload or skills, but rather amplifies and stabilizes their influence. These insights extend current understandings of team effectiveness in high-stakes environments by providing an AV8-specific model of performance. The practical implications of this study are equally important. Results underscore the centrality of leadership at the vehicle level, highlighting the need to institutionalize cognitive-load management strategies, such as standard callouts, explicit decision gates, and real-time re-prioritization protocols.

Furthermore, commander-led micro-drills should be emphasized as the core of skills transfer, ensuring that technical competence translates into mission readiness under time-sensitive conditions. Training and evaluation should also embed observable leadership behaviors including clarity of directives, tempo modulation, and timely prompts as these represent the operational levers shown to drive effectiveness. At the personnel management level, targeted selection of commanders with attentional control and communication succinctness, systematic cross-training, and fatigue-aware crew rotations are critical to sustaining performance. Despite these contributions, the study has several limitations. The analysis was confined to AV8 Gempita crews, which restricts the generalizability of findings across different armored platforms, crew compositions, or operational contexts. Moreover, reliance on cross-sectional self-reported data limits causal inferences and raises the potential for common method bias. Future research could address these limitations by adopting longitudinal designs to examine performance dynamics over time, including fatigue accumulation and adaptive learning. Qualitative studies, such as in-depth interviews or ethnographic observation, could also enrich understanding of how leadership routines are enacted in practice. Expanding to different platforms, locations, and mission profiles would enable testing of the model under varied operational and environmental conditions. In addition, incorporating moderating variables such as mission complexity, terrain, weather, and crew experience mix would provide a more nuanced understanding of when and how workload, skills, and leadership interact to influence effectiveness.

In conclusion, this study provides robust empirical evidence that workload and skills are vital for crew effectiveness, but leadership is the pivotal mechanism that transforms these inputs into consistent and reliable mission outcomes. Strengthening vehicle-level leadership

routines, embedding micro-drills into training systems, and institutionalizing load-allocation protocols are therefore the most direct and impactful pathways for enhancing AV8 crew performance. By advancing both theoretical integration and operational recommendations, the study contributes to the development of a practical blueprint for commanders, trainers, and military institutions, while setting the stage for future scholarly inquiry into armored team performance.

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