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The Influence of Competence and Job Characteristics on Performance with Organizational Commitment as Mediation (A Study on Personnel of Satrad 212 Ranai and Satrad 245 Saumlaki)

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Abstract: This study aims to analyze the effect of competence and work characteristics on performance with organizational commitment as a mediator at Satrad 212 Ranai and Satrad 245 Saumlaki. The research sample consisted of all 54 personnel at Satrad 212 Ranai and 52 personnel at Satrad 245 Saumlaki, for a total sample size of 106 individuals using a census sampling technique. The data analysis techniques used included descriptive analysis, instrument testing, model testing, hypothesis testing, and Sobel testing using SPSS 26 software. Based on the validity test, the results showed that the sample adequacy was met, and the indicators were valid and reliable. The results of the study showed that the hypothesis that competence has a positive and significant effect on organizational commitment, job characteristics have a positive and significant effect on organizational commitment, competence has a positive and significant effect on performance, job characteristics have a positive and significant effect on performance, and organizational commitment has a positive and significant effect on performance. The results of the Sobel test also show that organizational commitment mediates competency and job characteristics on performance.

Keywords: Job Characteristics, Performance, Organizational Commitment, Competence

INTRODUCTION

The development of modern fighter aircraft technology, such as stealth aircraft, fifth-generation fighter aircraft, and Unmanned Combat Aerial Vehicles (UCAV), poses significant challenges for a country's air defense system. This situation has led to an increased need for reliable radar systems for early detection, ground control interception (GCI), and integration with other air defense systems. The Indonesian Air Force (TNI AU), as the frontline of national air defense, has a strategic responsibility to maintain Indonesia's air sovereignty through the operation of various major weapon systems (alutsista), particularly radar. The rapid development of radar technology requires organizational readiness and high-quality human resources to be able to operate and maintain radar systems optimally in order to support quick and accurate decision-making in the face of potential air threats.

Human resource performance is an important indicator in assessing the success of an organization, especially in defense organizations that have high levels of risk and complexity.

Performance is defined as the work results achieved by individuals in accordance with the standards and responsibilities assigned to them (Mangkunegara, 2017) and reflects the results and process of work implementation (Rivai & Sagala, 2014). Performance is influenced by various factors, including competence, job characteristics, and organizational commitment. Competence is a combination of knowledge, skills, and attitudes that enable individuals to perform tasks effectively (Spencer & Spencer, 1993; Dubois & Rothwell, 2004). Job characteristics relate to job design, which includes skill variety, task identity, task significance, autonomy, and feedback (Hackman & Oldham, 1976), while organizational commitment is an individual's psychological bond to the organization that influences their desire to stay and contribute optimally (Meyer & Allen, 2011).

Empirical evidence shows that personnel performance challenges still exist in the Indonesian Air Force radar units, particularly in Satrad 212 Ranai and Satrad 245 Saumlaki, which face complex challenges. These two units have specific characteristics because they operate more than one radar defense system, are located in border areas and outer islands of the Republic of Indonesia, and have radar coverage sectors with high potential for airspace violations, such as the South China Sea and the Indonesia-Australia border. Based on the results of the Workload Index (IBK) calculation by the Air Force Personnel Staff, Satrad 212 Ranai has an IBK value of 164.49% (very high category), and Satrad 245 Saumlaki has an IBK value of 122.61% (high category). In addition, organizational validation through Perkasau Number 12 of 2022 and Number 15 of 2022 stipulates a Personnel Composition List of 50 people for each unit, while the actual number of personnel is currently 54 people (Ranai) and 52 people (Saumlaki), with the requirement to operate more than one radar. This situation has implications for increased work complexity, workload, and variations in personnel performance in terms of operational readiness, reporting accuracy, and decision-making.

A number of previous studies have shown that competence and job characteristics have an influence on performance. Research by Suriadarma et al. (2022), Wicaksono (2019), Sapitri and Mahayasa (2022), and Harwina (2022) proves that competency has a significant effect on performance, but research conducted by Hidayat (2021) found that competency does not affect performance. Similarly, the results of studies by Affandy (2016), Purwanto and Soliha (2017), Aminin and Rijanti (2022), Nelson et al. (2019), and Ulfani and Alam (2024) show that job characteristics have a positive effect on performance. However, this differs from Chandra et al. (2014), who found that job characteristics do not have a significant effect on performance. In addition, studies conducted by Susilowati et al. (2024), Sumarlin et al. (2024), Aryani et al. (2021), Heriyawan and Setyowati (2015), and Susilowati et al. (2024) show that organizational commitment plays an important role as a mediating variable in the relationship between competence and performance. However, there is also research by Aminin and Rijanti (2022), which shows that organizational commitment is unable to mediate the influence of competence on performance. Organizational commitment has also been proven to mediate job characteristics on performance, as in the study by Heriyawan and Setyowati (2015), but there are also studies that find that organizational commitment does not mediate the influence of job characteristics on performance, as in the study by Monica and Tjahjaningsih (2021).

Based on these empirical phenomena and research gaps, this study aims to analyze the influence of competencies and job characteristics on the performance of personnel at Satrad 212 Ranai and Satrad 245 Saumlaki, with organizational commitment as a mediating variable. This study is expected to contribute theoretically to the development of human resource management studies, particularly in defense organizations, and to provide practical implications for unit leaders in formulating HR management policies to improve personnel performance in a sustainable manner.

Literature

Competence

Personnel competency is a fundamental element defined as a combination of skills, knowledge, and attitudes to achieve superior performance (Spencer & Spencer, 1993). According to Spencer and Spencer (1993), there are five main categories of competency, including motives, traits, self-concept, knowledge, and skills, which collectively determine how individuals respond to tasks and their environment. In line with this, Dubois and Rothwell (2004) emphasize that mastery of competency is crucial in creating organizational competitive advantage through continuous human resource development. The quality of these competencies does not stand alone, but is influenced by internal factors such as motivation and education, as well as external factors such as organizational culture and training systems (Armstrong & Taylor, 2014). Therefore, organizations must design systematic and adaptive development strategies so that individual competencies can have a positive impact on the overall success of the organization.

Job Characteristics

Job characteristics are crucial factors that determine motivation and productivity levels through effective task design. According to Hackman and Oldham (1976), through the Job Characteristics Model (JCM), there are five main dimensions, namely skill variety, task identity, task significance, autonomy, and feedback, which directly increase employee satisfaction and performance (Robbins & Judge, 2017). In addition to these technical aspects, Armstrong and Taylor (2014) emphasize the importance of skill variety in attracting interest in work, while Morgeson and Humphrey (2006) expand on this concept by adding social and contextual dimensions to address the dynamics of modern organizations. Flexible job designs that provide full control (autonomy) have been shown to not only increase engagement and innovation (Grant & Parker, 2009) but also maintain employees' psychosocial well-being by reducing the risk of stress and burnout (Parker et al., 2017; Humphrey et al., 2007). Therefore, organizations must prioritize adaptive job design to ensure sustainable operational effectiveness.

Organizational Commitment

Organizational commitment is a psychological bond between personnel and the organization that determines an individual's desire to continue contributing to mutual success (Meyer & Allen, 2011). Through a three-component model, this commitment encompasses affective (emotional attachment), normative (moral obligation), and continuance (cost-benefit considerations) aspects, with affective commitment proving most effective in enhancing adaptability and performance (Meyer et al., 2019). High commitment not only increases productivity and participation in decision-making (Afsar et al., 2020) but also significantly reduces employee turnover rates (Kumar & Shekhar, 2012). Therefore, organizations need to create a conducive work environment through effective leadership, a positive culture (Albrecht et al., 2015), and welfare and career development policies to maintain loyalty and competitive advantage (Yucel & Bektas, 2021).

Performance

Performance is a fundamental aspect that reflects the actual work results of individuals based on organizational standards and behavioral processes in carrying out tasks (Mangkunegara, 2017; Rivai & Sagala, 2014). Performance measurement encompasses various dimensions such as quality, quantity, timeliness, and initiative, which, according to Armstrong and Taylor (2014), are the result of synergy between ability, motivation, and a supportive work environment. More specifically, Colquitt, LePine, and Wesson (2019) divide performance into three main dimensions: task performance (effectiveness in main tasks), citizenship behavior (voluntary positive contributions), and counterproductive behavior (behavior that is detrimental to the organization). Bernardin and Russell (2013) and Noe et al. (2015) emphasize that

performance evaluations must be measurable and include behavioral contributions that are aligned with the efficiency of achieving organizational goals. Thus, comprehensive performance management is a strategic priority for improving organizational productivity and competitiveness in the global era.

Hypothesis Development

The Influence of Competence on Organizational Commitment

Individual competence plays an important role in shaping organizational commitment because it reflects the combination of knowledge, skills, and attitudes needed to perform tasks effectively. Individuals with high competence tend to have better self-confidence, are able to complete work optimally, and feel valued and empowered by the organization. These conditions can strengthen individuals' emotional attachment, loyalty, and identification with the organization, which ultimately increases organizational commitment (Meyer & Allen, 1991). Theoretically, competence is a factor that strengthens the psychological bond between individuals and organizations. Empirical findings support this view, with research by Anggraini and Fauzan (2022), Yuliati and Soliha (2019), Andana et al. (2023), and Zunizar et al. (2023) showing that competence has a positive effect on organizational commitment. The higher the competency, the higher the organizational commitment, so in this study, the following hypothesis was taken:

H1: Competence has a positive effect on organizational commitment.

The Influence of Job Characteristics on Organizational Commitment

Job characteristics are dimensions of work that influence individual motivation, engagement, and commitment to the organization. Based on the Job Characteristics Model, jobs that offer skill variety, autonomy, clear feedback, and social meaning and relevance can increase individual satisfaction and emotional attachment to the organization (Hackman & Oldham, 1976). Jobs that are designed to be interesting and challenging make individuals feel that their work is meaningful and contributes significantly to the achievement of organizational goals, thereby strengthening their identification and loyalty. Thus, good job characteristics play a role in increasing organizational commitment through increased job satisfaction and engagement. Empirical findings support this, with research by Januardi and Budiono (2021), Sugeng and Niswah (2023), and Setiawan et al. (2023) showing that job characteristics have a positive effect on organizational commitment. The higher the job characteristics, the higher the organizational commitment, so inthis study, the following hypothesis was taken:

H2: Job characteristics have a positive effect on organizational commitment.

The Influence of Competence on Performance

Individual competence is directly related to the ability to perform work effectively and efficiently, including the technical and interpersonal skills necessary to achieve optimal work results. Individuals with high levels of competency tend to demonstrate better performance in terms of speed, accuracy, and quality of work results (Spencer & Spencer, 1993). In the context of Radar Unit personnel, competency in operating radar devices and the ability to analyze data are key factors that determine the effectiveness of task implementation. Therefore, improving competency is believed to have a positive impact on individual performance. Empirical findings support this view, with research by Suriadarma et al. (2022), Wicaksono (2019), Sapitri and Mahayasa (2022), and Harwina (2022) proving that competency has a significant effect on performance. The higher the competency, the higher the performance, so in this study, the following hypothesis was taken:

H3: Competence has a positive effect on performance.

The Influence of Job Characteristics on Performance

Job characteristics designed to support intrinsic motivation and provide positive challenges have been shown to improve individual performance. Jobs with skill variety, autonomy, and clear feedback provide individuals with room to innovate, feel empowered, and gain job satisfaction (Hackman & Oldham, 1976). In military organizations such as the Radar Unit, challenging and responsibility-laden job characteristics encourage personnel to work more optimally, thereby improving performance. Good job design allows for maximum utilization of skills and strengthens the sense of accomplishment. Empirical findings support this, with research by Affandy (2016), Purwanto and Soliha (2017), Aminin and Rijanti (2022), Nelson et al. (2019), and Ulfani and Alam (2024) showing that job characteristics have a positive and significant effect on performance. The higher the job characteristics, the higher the performance, so in this study, the following hypothesis was tested:

H4: Job characteristics have a positive effect on performance.

The Influence of Organizational Commitment on Performance

High organizational commitment is directly related to the level of dedication and effort that individuals put into their work. Individuals who are highly committed to the organization tend to be more motivated to contribute to the maximum extent possible because they feel responsible for the success of the organization (Meyer & Allen, 1991). Strong organizational commitment leads to high emotional involvement with the tasks performed, increasing the sense of responsibility in completing work well. This has an impact on improving individual performance because emotional commitment encourages individuals to do their work with more attention and dedication. Research conducted by Sabiila and Nugraheni (2019), Kurniati et al. (2024), Meutia (2017), Perdamean (2021), and Hardiyanti et al. (2022) proves that organizational commitment affects performance. The higher the organizational commitment, the higher the performance, so in this study, the following hypothesis was tested:

H5: Organizational commitment has a positive effect on performance.

Organizational Commitment Mediates the Influence of Competence on Performance

Organizational commitment acts as a mediator in the relationship between competence and performance. Although competence directly improves individual performance, organizational commitment strengthens that relationship. Individuals with high competence are more likely to feel valued by the organization, which strengthens their commitment to the organization. Higher commitment increases individuals' effort and dedication in their work, which in turn affects their performance. In other words, competence improves performance both directly and through its influence on stronger organizational commitment. Research shows that individuals who are more committed to the organization are more likely to strive to meet or exceed the organization's expectations, thereby improving their performance. Research conducted by Susilowati et al. (2024), Sumarlin et al. (2024), and Aryani et al. (2021) states that organizational commitment acts as a mediator in explaining the effect of competence on performance, so in this study, the following hypothesis was taken:

H6: Organizational commitment mediates the influence of competence on performance.

Organizational Commitment Mediates the Influence of Job Characteristics on Performance

Good job characteristics can increase organizational commitment, which in turn affects individual performance. Interesting and challenging jobs, with a good level of autonomy and feedback, can increase individual motivation and strengthen their emotional attachment to the organization. Strong organizational commitment will encourage individuals to work harder and give their best effort in their work, which ultimately improves performance. Research conducted by Heriyawan and Setyowati (2015) states that organizational commitment acts as a mediator between job characteristics and performance. Thus, although job characteristics

directly affect performance, organizational commitment functions as a mediating variable that strengthens this relationship. Therefore, the following hypothesis was taken in this study:
H7: Organizational commitment mediates the influence of job characteristics on performance.

Based on this description, it can be explained using an empirical research model as shown in Figure 1.

Mathematical Model

$$Y_1 = \alpha_1 + \beta_1 X_1 + \beta_2 X_2 + e_1$$

$$Y_2 = \alpha_2 + \beta_3 X_1 + \beta_4 X_2 + \beta_5 Y_1 + e_2$$

Explanation:

Y1	: Organizational Commitment
Y2	: Performance
α1, α2	: Constant
X1	: Competency
X2	: Job Characteristics
β1, …, β5	: Independent Variable Coefficients
e1, e2	: Residuals or errors

Empirical Research Model

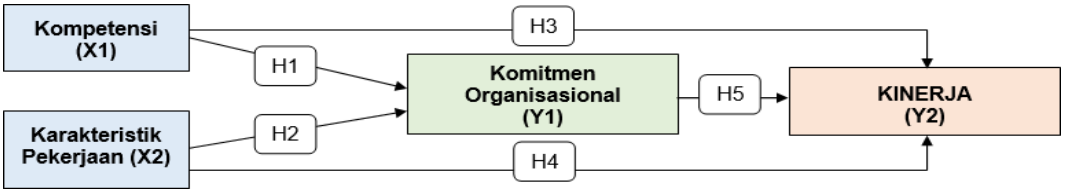

Figure 1. Empirical research model

METHOD

Type of Research

This study uses explanatory research with a quantitative approach to explain the cause-and-effect relationship between variables in depth. According to Sekaran and Bougie (2016), explanatory research focuses on identifying complex relationships and answering the questions of why and how one variable affects another, which in this context aims to test the influence of competence and job characteristics on performance through the mediation of organizational commitment. In line with this, the use of quantitative methods, according to Sugiyono (2019), enables the collection and analysis of number-based data through statistical techniques that are precise, objective, and scientifically accountable. By combining explanatory design and quantitative methods, this study not only measures direct relationships but also validates the mediation mechanism that strengthens the performance of Radar Unit personnel.

Data Source

This study relies on the synergy between two data sources to provide comprehensive and valid analysis results. Primary data, as defined by Sekaran and Bougie (2016), is data obtained directly by researchers from primary sources through the distribution of questionnaires to respondents at Satrad 212 Ranai and Satrad 245 Saumlaki, so that the information produced is specific and relevant to the research objectives. Meanwhile, secondary data refers to

information that has been collected and published by other parties, such as annual reports, internal documents, and scientific journal articles that serve as a theoretical basis and support for previous research results (Cooper & Schindler, 2014). By combining primary data as a direct measurement instrument and secondary data as comparative material and argument reinforcement, researchers can produce accurate findings regarding the influence of competence and job characteristics on personnel performance.

Population and Sample

This study determined the population and sample through a census approach to ensure comprehensive data accuracy. The study population included all personnel in two strategic units, namely Satrad 212 Ranai (54 people) and Satrad 245 Saumlaki (52 people), with a total of 106 people. Given the relatively small and specific population size, the researcher used a saturated sampling or census technique, in which all members of the population were included in the research sample (Sugiyono, 2019). The selection of these locations was based on crucial criteria, namely the possession of more than one advanced radar defense equipment (such as Thomson Radar, Weibel, Master T, and Vera-NG Passive Radar) and their geographical location in sensitive border areas such as the South China Sea and the Australian border. In addition, the Workload Index (IBK) conditions, which are categorized as "high" to "very high" due to organizational validation, provide a strong basis for analyzing how competence and job characteristics affect personnel performance in such challenging operational situations.

Data Collection Methods

The data collection method in this study was designed systematically using a questionnaire as a strategic step to obtain accurate data (Sugiyono, 2012). According to Sugiyono (2013), the questionnaire was conducted by providing a set of written statements to personnel from Satrad 212 Ranai and Satrad 245 Saumlaki as respondents. To measure the attitudes, opinions, and perceptions of respondents towards the variables of competence, job characteristics, commitment, and performance, the researcher applied a Likert scale with a range of 1 to 7. The use of this 7-point scale aims to obtain a higher level of precision and more nuanced answer choices compared to the standard 5-point scale, so that personnel's perceptions of social and professional phenomena in the Radar Unit environment can be described in a more in-depth and objective manner.

Data Analysis Techniques

The data analysis technique in this study used a quantitative approach processed through SPSS software to accurately test the causal relationship between variables. The analysis began with descriptive analysis to summarize the respondent profiles and variable data distribution through measures of central tendency, such as mean and frequency (Sekaran & Bougie, 2016). Next, the instrument test was carried out through a validity test using Kaiser-Meyer-Olkin (KMO > 0.5) to assess sample adequacy, as well as a reliability test with Cronbach's Alpha (> 0.7) to ensure the internal consistency of the questionnaire (Ghozali, 2018; Sugiyono, 2014). Multiple linear regression analysis was used to predict performance scores based on a combination of competencies and job characteristics (Field, 2013). Model testing was conducted using the F-test to determine the significance of the model simultaneously and the coefficient of determination (R^2) to measure the extent to which performance variation could be explained by the regression model. Next, hypothesis testing was conducted using the t-test to measure the partial effect of each variable and the Standardized Beta Coefficient to compare the strength of influence between variables (Sekaran & Bougie, 2016). Finally, to answer the mechanism of organizational commitment mediation, this study applied the Sobel Test. This method specifically tests the significance of indirect effects with a Z value > 1.96 to state that

the influence of independent variables on performance is indeed significantly mediated by organizational commitment (Preacher & Hayes, 2004).

RESULTS AND DISCUSSION

Descriptive Analysis

This study was conducted by involving all 106 personnel from Radar Unit 212 Ranai (54 people) and Satrad 245 Saumlaki (52 people) as respondents, using a census method. The respondent profile shows that all personnel are male. Demographically, the majority were in the productive age group of 20-30 years (67.9% or 72 people) and had a relatively medium length of service of 2-7 years (61.3% or 65 people), which indicates the dynamics of human resource regeneration. In terms of education, most had a high school/vocational school background (86.8% or 92 people). Descriptive analysis of the research variables using a 1-7 Likert scale revealed the actual conditions of the four main constructs. Competence recorded the highest average score of 6.16 (high category), with excellence in task understanding, but still needing improvement in technological insight. Job Characteristics obtained an average of 6.09 (high category), indicating a positive perception, although aspects of task variety and the social impact of work still need to be optimized. Organizational Commitment had the lowest score among all variables, namely 5.77 (high category). Although still in the high category, this was mainly driven by low emotional attachment, indicating the need to strengthen the psychological bonds of personnel. Meanwhile, Performance achieved an average of 6.09 (high category) with strengths in work accuracy, but the aspects of task quantity and response speed were identified as areas requiring further evaluation and improvement.

Instrument Testing

Validity and reliability tests were conducted to ensure the suitability of the research instruments in measuring the variables studied, namely competence (X1), job characteristics (X2), organizational commitment (Y1), and performance (Y2), using SPSS version 26. The validity test results showed that all variables had Kaiser-Meyer-Olkin (KMO) values above 0.9, namely competence and job characteristics at 0.904, organizational commitment at 0.925, and performance at 0.920, indicating that the sample adequacy was met. In addition, all indicators in each variable had a factor loading value of more than 0.55, which was declared valid. The reliability test using Cronbach's Alpha showed values above 0.7 for all variables, namely competence at 0.946, job characteristics at 0.942, organizational commitment at 0.933, and performance at 0.951. Thus, all research instruments were declared valid, reliable, and suitable for use in the next testing stage.

Table 1. Validity Test Results

No	Variable	KMO Value	Indicator	Factor Loading Value	Note
1	Competence (X1)	0.904	X1.1	0.922	Valid
			X1.2	0.885	Valid
			X1.3	0.675	Valid
			X1.4	0.855	Valid
			X1.5	0.888	Valid
			X1.6	0.824	Valid
			X1.7	0.787	Valid
			X1.8	0.878	Valid
			X1.9	0.896	Valid
2	Job characteristics (X2)	0.904	X2.1	0.818	Valid
			X2.2	0.737	Valid
			X2.3	0.848	Valid
			X2.4	0.880	Valid

			X2.5	0.928	Valid
			X2.6	0.871	Valid
			X2.7	0.700	Valid
			X2.8	0.853	Valid
			X2.9	0.884	Valid
3	Organizational commitment (Y1)	0.925	Y1.1	0.800	Valid
			Y1.2	0.899	Valid
			Y1.3	0.890	Valid
			Y1.4	0.838	Valid
			Y1.5	0.833	Valid
			Y1.6	0.905	Valid
			Y1.7	0.823	Valid
			Y1.8	0.766	Valid
			Y1.9	0.572	Valid
4	Performance (Y2)	0.920	Y2.1	0.647	Valid
			Y2.2	0.857	Valid
			Y2.3	0.836	Valid
			Y2.4	0.883	Valid
			Y2.5	0.912	Valid
			Y2.6	0.867	Valid
			Y2.7	0.867	Valid
			Y2.8	0.903	Valid
			Y2.9	0.902	Valid

Source: Processed primary data, 2025

Table 2. Reliability Test Results

No	Variable	Alpha Cronbach	Standard Score Reliable	Criteria
1	Competency (X1)	0.946	0.7	Reliable
2	Job Characteristics (X2)	0.942	0.7	Reliable
3	Organizational Commitment (Y1)	0.933	0.7	Reliable
4	Performance (Y2)	0.951	0.7	Reliable

Source: Processed primary data, 2025

Model Test

Model testing in this study was conducted through analysis of the coefficient of determination and the F-test to ensure the reliability and accuracy of the regression model used. Based on the results of the coefficient of determination test (Adjusted R2), the first equation shows that competence and job characteristics are able to explain 63.8% of the variation in organizational commitment, while in the second equation, the combination of competence, job characteristics, and organizational commitment has a very strong explanatory power on performance, reaching 87%. The accuracy of this model is reinforced by the F test results, where both equations show a significance value of 0.000 ($p < 0.05$) with calculated F values of 234.569 for the commitment model and 62.766 for the performance model. Thus, it can be concluded that all independent variables simultaneously have a significant effect on the dependent variable, so that this research model is declared to be very feasible (fit) and reliable for explaining the phenomenon of personnel performance in the Radar Unit.

Hypothesis Testing

Hypothesis testing using the t-test in this study proves that all independent variables have a positive and significant effect on the dependent variable, with a significance value below 0.05. Competence has a positive and significant effect on organizational commitment with a beta coefficient of $\beta=0.249$ and a significance value of $p=0.038<0.05$, so H1 is accepted. Job

characteristics also have a positive and significant effect on organizational commitment with a beta coefficient of β=0.577 and a significance value of p=0.000<0.05, thus H2 is accepted. Furthermore, competence has a positive and significant effect on performance with a beta coefficient of β=0.383 and a significance level of p=0.000< 0.05; H3 is accepted, and job characteristics have a positive and significant effect on performance with a beta coefficient of β=0.389 and a significance level of p=0.000< 0.05; H4 is accepted. In addition, organizational commitment is proven to have a positive and significant effect on performance with a beta coefficient of β=0.224 and significance p=0.000< 0.05, thus H5 is accepted.

Table 3. Regression Analysis Results, Model Testing, and Hypothesis Testing

Notes	Model Test			Hypothesis Testing			Result
	Adj R^2	F	Sig.	β	t	Sig	
Equation (1) Competence and Job Characteristics on Organizational Commitment	0,638	93,613	0,000				
$Y1 = 0{,}249\ X_1 + 0{,}577\ X_2$							
- Competency on Organizational Commitment				0,249	2,104	0,038	**H1 Accepted**
- Job Characteristics on Organizational Commitment				0,577	4,871	0,000	**H2 Accepted**
Equation (2) Competence and Job Characteristics, Organizational Commitment to Performance	0,870	234,569	0,000				
$Y2 = 0{,}383\ X_1 + 0{,}389\ X_2 + 0{,}224\ Y_1$							
- Competency on Performance				0,383	5,267	0,000	**H3 Accepted**
- Job Characteristics on Performance				0,389	4,929	0,000	**H4 Accepted**
- Organizational Commitment on Performance				0,224	3,794	0,000	**H5 Accepted**

Sobel Test

Mediation testing using the Sobel Test method proves that Organizational Commitment plays a significant role as a mediator that strengthens the influence of independent variables on performance. The analysis results show that the Z-Value for the Competence mediation path is 5.2677 and for the Job Characteristics path is 4.1881, both of which exceed the critical value of 1.96 with a significance level of 0.000 (p < 0.05). Thus, it can be stated that organizational commitment mediates competency on performance (H6 accepted) and organizational commitment mediates job characteristics on performance (H7 accepted).

Table 4. Sobel Test Results

Independent Variable	Mediating Variable	Z-Value	Significance (p)	Result
Competence - Performance	Organizational Commitment	5.2677	0.0000	Significant Mediation

Job Characteristics - Performance	4.1881	0.0000	Significant Mediation

Source: Processed primary data, 2025

Competence has a positive and significant influence on organizational commitment.

The results of the hypothesis analysis show a positive beta coefficient value of 0.249 with a significance level of 0.038 ($p < 0.05$). These findings prove that Competence has a positive and significant effect on Organizational Commitment. This indicates that the higher an individual's competence in performing their duties, the stronger their emotional attachment and loyalty to the organization. Competence, which includes knowledge, skills, and work attitudes, promotes self-confidence and success in completing tasks. This feeling of being valued and empowered, as stated by Meyer and Allen (1991), is the basis for increasing affective commitment. In the context of the Radar Unit, high technical and analytical competence not only facilitates task performance but also builds self-confidence that leads to psychological attachment to the institution. These results are in line with the research of Anggraini and Fauzan (2022), Yuliati and Soliha (2019), Andana *et al.* (2023), and Zunizar *et al.* (2023), which also concluded that competence has a positive and significant effect on organizational commitment.

Job Characteristics Have a Positive and Significant Effect on Organizational Commitment.

From the statistical test results, a beta coefficient of 0.577 with a significance of 0.000 ($p < 0.05$) was obtained, confirming that Job Characteristics have a positive and significant effect on Organizational Commitment. The better the job dimensions, such as skill variety, autonomy, feedback, and job meaning, the higher the commitment shown by employees. The *Job Characteristics Model* (Hackman and Oldham, 1976) explains that well-designed jobs will fulfill the basic psychological needs of employees, such as a sense of meaning, responsibility for results, and knowledge of work outcomes. This fulfillment increases intrinsic motivation and job satisfaction, which ultimately strengthens identification and emotional attachment to the organization. Research by Januardi and Budiono (2021), Sugeng and Niswah (2023), and Setiawan *et al.* (2023) supports this finding, stating that job characteristics have a positive and significant effect on organizational commitment.

Competence has a positive and significant influence on performance.

The analysis proves that Competence has a positive and significant effect on Performance with a beta coefficient of 0.383 and significance of 0.000 ($p < 0.05$). This means that an increase in individual competence will be followed by an increase in performance, both in terms of quality, accuracy, and work efficiency. Competence is the main foundation for work effectiveness. Individuals who master relevant knowledge and skills will be able to complete tasks more quickly, accurately, and innovatively (Spencer and Spencer, 1993). In the Radar Unit environment, the ability to operate technical equipment and analyze data accurately is a direct determinant of work results. Research by Suriadarma *et al.* (2022), Wicaksono (2019), Sapitri and Mahayasa (2022), and Harwina (2022) has confirmed that competence has a positive and significant effect on performance.

Job Characteristics Have a Positive and Significant Effect on Performance.

The test results show a beta coefficient of 0.389 with a significance of 0.000 ($p < 0.05$), which indicates a positive and significant effect of Job Characteristics on Performance. Jobs that provide challenges, freedom of action (autonomy), and clear feedback encourage employees to maximize their potential and skills, thereby impacting optimal performance. The Job Characteristics Model explains that meaningful and empowering jobs increase intrinsic motivation, which in turn drives effort and persistence at work. In military organizations such as Radar Units, challenging and highly responsible tasks can actually increase personnel

motivation to excel. These findings are supported by research by Affandy (2016), Aminin and Rijanti (2022), Purwanto and Soliha (2017), and Ulfani and Alam (2024), which states that job characteristics have a positive and significant effect on performance.

Organizational Commitment Has a Positive and Significant Impact on Performance.

With a beta coefficient of 0.224 and significance of 0.000 ($p < 0.05$), Organizational Commitment is proven to have a positive and significant effect on Performance. Employees who have a strong emotional attachment to the organization tend to be more dedicated, responsible, and willing to put extra effort into their work. Organizational commitment, particularly affective commitment, creates a sense of ownership towards the organization's success. This feeling transforms motivation into concrete, results-oriented actions, as explained by Meyer & Allen (1991). Highly committed employees not only work to fulfill their obligations but also to contribute to the organization's progress. These results are consistent with the findings of Sabiila & Nugraheni (2019) and Kurniati *et al.* (2024), who concluded that organizational commitment has a positive and significant effect on performance.

Organizational Commitment Mediates the Influence of Competence on Performance.

The results of the Sobel Test mediation test show a Z value of 5.2677 with a significance of 0.000 ($p < 0.05$), which far exceeds the critical value of 1.96. These findings prove that Organizational Commitment plays a significant mediating role in the relationship between Competence and Performance. This indicates that Competence also indirectly influences Performance through an increase in Organizational Commitment. This mediation mechanism can be explained through a psychological process whereby high competence makes individuals feel valued and effective in their roles. These feelings strengthen emotional attachment to the organization (commitment), which in turn encourages individuals to exert their best efforts, thereby improving performance. Research by Sumarlin *et al.* (2024) and Aryani *et al.* (2021) supports this finding, stating that organizational commitment mediates competency on performance.

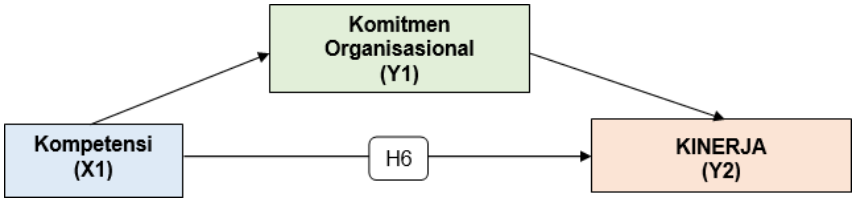

Figure 2. First mediation influence chart

Organizational Commitment Mediates the Influence of Job Characteristics on Performance.

The subsequent mediation test yielded a Z value of 4.1881 with a significance of 0.000 ($p < 0.05$), which also exceeded the critical limit of 1.96. These results confirm that Organizational Commitment significantly mediates the relationship between Job Characteristics and Performance. In other words, Job Characteristics not only have a direct impact on Performance, but also influence it through the formation of stronger Organizational Commitment. Good job characteristics (such as autonomy and feedback) fulfill the psychological needs of personnel, thereby fostering a sense of satisfaction and attachment to the organization. It is this commitment that then drives personnel to perform better. These findings are in line with the research by Heriyawan and Setyowati (2015), which concluded that organizational commitment mediates job characteristics on performance.

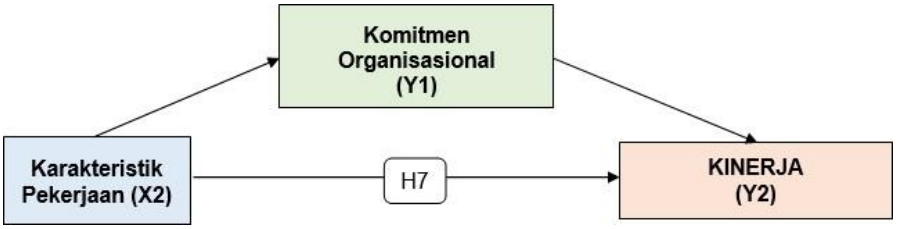

Figure 3. Second mediation influence chart

Conclusion

Based on the results of the analysis and discussion carried out in this study to determine the effect of competence and job characteristics on performance with organizational commitment mediation on Satrad 212 Ranai and Satrad 245 Saumlaki personnel, the following conclusions can be drawn:

1. Competence has a positive and significant effect on organizational commitment. The higher the competence, the greater the ability to significantly increase organizational commitment.
2. Job characteristics have a positive and significant effect on organizational commitment. The higher the job characteristics, the more significantly they will influence an increase in organizational commitment.
3. Competence has a positive and significant effect on performance. Personnel with higher competence tend to achieve better performance in carrying out their duties.
4. Job characteristics have a positive and significant effect on performance. The higher the job characteristics, the greater the effect on improving personnel performance.
5. Organizational commitment has a positive and significant effect on performance. Personnel who are highly committed to the organization demonstrate better performance and higher dedication.
6. Organizational commitment acts as a significant mediator in the relationship between competence and performance. In addition to having a direct effect, competence also influences performance through the mediation of organizational commitment.
7. Organizational commitment acts as a significant mediator in the relationship between job characteristics and performance. Job characteristics not only have a direct impact on performance but also have an indirect impact through the reinforcement of organizational commitment.

Implications

The implications of this study emphasize the importance of strengthening the synergy between operational and psychological aspects to optimize personnel effectiveness in border areas.

1. Managerial Implications: The organization is advised to transform its human resource development system through training in the latest radar technology and the refinement of job designs that provide autonomy and clear feedback. This ensures that complex tasks remain motivationally meaningful for soldiers. Additionally, leadership needs to strengthen emotional attachment through holistic reward systems and performance evaluations that measure not only technical proficiency but also dedication and commitment to the organizational mission.
2. Theoretical Implications: These findings provide strong validation for Hackman & Oldham's Job Characteristics Model and Meyer & Allen's Three-Component Model of Commitment within a unique military context. This study proves that organizational commitment is not a mere formality of loyalty but a crucial psychological mechanism bridging competence and task design with tangible performance results. By integrating

these variables into a single mediation model, this research enriches the literature on defense sector human resource management, particularly regarding the management of personnel operating dual defense systems in strategic national areas.

Recommendations for Future Research

Finally, this study provides a foundation for developing more adaptive and futuristic human resource studies within the military environment.

1. Sample Expansion: Future research should focus on expanding the sample to other Radar Units (Satrad) outside border regions to test the generalizability of these findings.
2. Longitudinal Study: Implementing a longitudinal study is recommended to monitor the dynamics of variable influence over time.
3. Mixed Methods: Using a mixed-methods approach through in-depth interviews is highly suggested to explore psychological aspects that may not have been fully captured through questionnaires.
4. Additional Variables: Future studies are encouraged to enrich the model by adding new variables such as transformational leadership or perceived organizational support as moderators.
5. Digital Literacy: Given the ongoing modernization of defense equipment, exploring the impact of digital literacy and technological adaptation on personnel performance is crucial.

REFERENSI

Affandy, Rizal Eka. (2016). Pengaruh Karakteristik Pekerjaan Terhadap Kinerja Pegawai dengan Motivasi dan Lingkungan Kerja sebagai Variabel Pemoderasi. Ekonomika-Bisnis, Vol. 07 No. 02, Juli 2016, Hal. 77-86. p-ISSN: 2088-6845, e-ISSN: 2442-8604.

Afsar, B., Umrani, W. A., Khan, A., & Shahjehan, A. (2020). "*Transformational leadership and innovative work behavior." European Journal of Innovation Management,* 23(3), 402-428.

Albrecht, S. L., Bakker, A. B., Gruman, J. A., Macey, W. H., & Saks, A. M. (2015). "*Employee engagement, human resource management practices and competitive advantage." Journal of Organizational Effectiveness: People and Performance,* 2(1), 7-35.

Aminin, N. & T., Rijanti. (2022). Pengaruh Karakteristik Pekerjaan dan Kompetensi Terhadap Kinerja Melalui Komitmen Organisasional. *Fair Value*: Jurnal Ilmiah Akuntansi dan Keuangan Volume 4, Special Issue 4, P-ISSN: 2622-2191 E-ISSN: 2622-2205

Armstrong, M., & Taylor, S. (2014). *Armstrong's Handbook of Human Resource Management Practice. Kogan Page Publishers*.

Aryani, Sapta, Sujana (2021). *The Influence of Organizational Culture and Competence on Employee Performance Mediated by Organizational Commitments in the Procurement of Goods and Services Secretariat Regency of Karangasem. Asia Pacific Journal of Management and Education* (APJME) Vol. 4 No. 3, 76-86.

Bailey, K. D. (1994). *Methods Of Social Research* (4th Ed.). *The Free Press*.

Baron, R. M., & Kenny, D. A. (1986). *The Moderator-Mediator Variable Distinction In Social Psychological Research: Conceptual, Strategic, And Statistical Considerations. Journal Of Personality and Social Psychology*, 51(6), 1173–1182.

Bedagama, F. M. H. & Tjahjaningsih, E. (2021). Bagaimana Komitmen Organisasional Memediasi Pengaruh Karakteristik Pekerjaan dan Employee Engagement Terhadap Kinerja. Tb Vol. 22, No. 1, Hal 19-32 ISSN.

Bernardin, H. J., & Russell, J. E. A. (2013). *Human Resource Management: An Experiential Approach. McGraw-Hill Education.*

Colquitt, J. A., LePine, J. A., & Wesson, M. J. (2019). Organizational Behavior: Improving Performance and Commitment in the Workplace. McGraw-Hill Education.

Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods (12th Ed.). Mcgraw-Hill Education.*

Dubois, D. D., & Rothwell, W. J. (2014). *Competency-Based Human Resource Management. Davies-Black Publishing*.

Field, A. (2013). *Discovering Statistics Using Ibm Spss Statistics (4th Ed.). Sage.*

Ghozali, I. (2018). Aplikasi Analisis Multivariate dengan Program IBM SPSS 25 (9th ed.). Badan Penerbit Universitas Diponegoro.

Grant, A. M., & Parker, S. K. (2009). "*Redesigning Work Design Theories: The Rise of Relational and Proactive Perspectives." Academy of Management Annals*, 3(1), 317-375.

Hackman, J. R., & Oldham, G. R. (1976). "*Motivation through the Design of Work: Test of a Theory." Organizational Behavior and Human Performance*, 16(2), 250-279.

Hakim, C. (2019). Penegakan Kedaulatan Negara di Udara. Jakarta: PT. Kompas Media Nusantara.

Hardiyanti, Absah, & Ginting (2022). *The Effect of Organizational Commitment and Communication on Employee Performance Through Job Satisfaction at The Medan District Court Class IA Special. International Journal of Research and Review* Vol. 9; Issue: 8.

Harwina (2022). The Influence of Competence on Employee Performance: Investigation of Automotive Companies. International Journal of Management and Business Applied.

Heriyawan, M. S. & Setyowati, W. (2015). Pengaruh Karakteristik Pekerjaan Dan Pemberdayaan Terhadap Kinerja Pegawai Dengan Mediasi Komitmen Organisasional (Studi Pada Politeknik Ilmu Pelayran Semarang).

Hidayat, Rahmat. (2021). Pengaruh Motivasi, Kompetensi dan Disiplin Kerja Terhadap Kinerja. Widya Cipta: Jurnal Sekretari dan Manajemen, Volume 5 No. 1, Maret 2021. P-ISSN 2550-0805 | E-ISSN 2550-0791.

Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). "*Integrating Motivational, Social, and Contextual Work Design Features: A Meta-Analytic Summary and Theoretical Extension." Journal of Applied Psychology*, 92(5), 1332-1356.

Julindrastuti, D. & Karyadi, I. (2023). Komitmen Organisasi Sebagai Variabel Pemediasi Pengaruh Kepuasan Kerja Terhadap Kinerja Karyawan. Jurnal Ekonomi-Manajemen-Akuntansi. Volume 19, Nomor 1, April 2023. Hal. 50-58.

Kott, A., & Perconti, P. (2018). *Long-Term Forecasts Of Military Technologies For A 20- 30 Year Horizon: An Empirical Assessment Of Accuracy. Arxiv*.

Kurniati, D., Farida, R. D. M., & Putra, F. A. (2024). Pengaruh Komitmen Organisasi, Lingkungan Kerja, Disiplin Kerja, dan Motivasi terhadap Kinerja Karyawan. Jurnal Bening, Volume 11, No. 1, Mei 2024.

Kusuma, H. C. W., Abu, S., & Kustiawan, B. (2023). *Ground Radar Stealth Berbasis Microwave Absorber* Dalam Perang Udara, Jurnal Strategi Pertahanan Udara. ISSN 2830-3490 Volume 91, Nomor 1.

Kumar, P., & Shekhar, S. (2012). "*Impact of organizational commitment on employee productivity." International Journal of Research in Commerce & Management,* 3(4), 91-95.

Mangkunegara, A. P. (2017). Manajemen Sumber Daya Manusia Perusahaan. PT Remaja Rosdakarya.

Meyer, J. P., & Allen, N. J. (2011). "*A three-component conceptualization of organizational commitment." Human Resource Management Review*, 1(1), 61-89.

Meyer, J. P., Stanley, D. J., & Vandenberg, R. J. (2019). "*Employee commitment and motivation: A review of research and implications for managerial practice." Annual Review of Organizational Psychology and Organizational Behavior*, 6, 199-221.

Meyer, John P., And Natalie J. Allen. (1991). *A Three-Component Conceptualization Of Organizational Commitment. Human Resource Management Review* 1.1: 61-89.

Morgeson, F. P., & Humphrey, S. E. (2006). "*The Work Design Questionnaire (WDQ): Developing and Validating a Comprehensive Measure for Assessing Job Design and the Nature of Work." Journal of Applied Psychology,* 91(6), 1321-1339.

Mulyanto, J. C., Chandra, L., & Nugroho, A. (2014). Analisa Pengaruh Karakteristik Pekerjaan Terhadap Kepuasan Dan Kinerja Karyawan Di Hotel D'season Surabaya. Jurnal Hospitality Dan Manajemen Jasa, 2(2), 312-325.

Nelson, A., Lim, J., & Setyawan, A. (Tahun). Analisis Pengaruh Karakteristik Pekerjaan terhadap Kinerja Karyawan melalui Mediasi Motivasi Karyawan pada Industri Manufakturing di Batam. Jurnal Ekonomika-Bisnis, Volume 16, Nomor 1, Halaman 109-119.

Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. (2015). *Fundamentals of Human Resource Management. McGraw-Hill Education.*

Parker, S. K., Van den Broeck, A., & Holman, D. (2017). "*Work Design Influences: A Synthesis of Multi-Leel Factors that Affect the Design of Jobs." Academy of Management Annals*, 11(1), 267-308.

Perdamean Meutia, K. I. (2017). Pengaruh Budaya Organisasi dan Komitmen Organisasi terhadap Kinerja Karyawan Koperasi Pegawai Perum Bulog. Tesis, Program Studi Magister Manajemen, Universitas Bhayangkara Jakarta Raya.

Perdamean, Nelson. (2021). Peran Mediasi Motivasi Kerja pada Pengaruh Komitmen Organisasi dan Lingkungan Kerja terhadap Kinerja Pegawai pada Kantor Dinas Ketahanan Pangan dan Peternakan Provinsi Sumatera Utara. Tesis, Program Studi Magister Manajemen, Universitas Muhammadiyah Sumatera Utara, Medan.

Preacher, K. J., & Hayes, A. F. (2004). *Spss And Sas Procedures For Estimating Indirect Effects In Simple Mediation Models. Behavior Research Methods, Instruments, & Computers*, 36(4), 717–731.

Purwanto, B. H. & Soliha, Euis (2017). Pengaruh Karakteristik Pekerjaan dan Kompetensi Terhadap Kinerja Melalui Komitmen Organisasional. Jurnal Manajemen/Volume XXI, No. 02, 227-240.

Rani, S., Dharmayanti, G. C., & Adnyana, I. B. R. (2017). Strategi Peningkatan Kinerja Sumber Daya Manusia Pada Perusahaan Konstruksi PT. Jaya Kusuma Sarana Bali Melalui Pendekatan Budaya Organisasi. Jurnal Spektran.

Rivai, V., & Sagala, E. J. (2014). Manajemen Sumber Daya Manusia untuk Perusahaan: Dari Teori ke Praktik. Raja Grafindo Persada.

Robbins, S. P., & Judge, T. A. (2017). *Organizational Behavior. Pearson Education.*

Rosidi, I., & Santosa, A. B. (2018). Pengaruh Kompetensi Profesional dan Efikasi Guru terhadap Kinerja Guru Dimediasi Komitmen Organisasional (Studi pada Guru SMP di Kecamatan Gunungwungkal). Telaah Manajemen, Vol. 15, Edisi 1, April 2018, hal. 38-55. ISSN: 1693-9727.

Sabiila, G. R., & Nugraheni, R. (2019). Pengaruh Komitmen Organisasi dan Motivasi Kerja terhadap Kinerja Karyawan (Studi pada Karyawan Tidak Tetap dan Kontrak CV. Inspira). Jurnal Studi Manajemen Organisasi, Vol. 16, No. 2, 15 Desember 2019.

Sapitri, N. P. D. & I. G. A., Mahayasa. (2022). Pengaruh Kompetensi dan Karakteristik Pekerjaan Terhadap Kinerja Pegawai. Warmadewa Management and Business Journal (WMBJ) Volume 4, Nomor 1, Pp. 1-12.

Sebastian, Elly (2015). Peningkatan Peranan SDM Pertahanan Nasional Guna Menghadapi Perang Generasi Keempat. Jurnal Pertahanan April 2015, Volume 5, Nomor 1.

Sekaran, U., & Bougie, R. (2016). *Research Methods for Business: A Skill-Building Approach (7th Ed.). Wiley.*

Siddiqui, M. N. (2014). *Success of an Organization Is a Result of Employees Performance. Advances In Social Sciences Research Journal,* 1(4), 179-201.

Spencer, L. M. and Spencer, S. M. (1993). *"Competence At Work Models For Superrior performance," John Wily & Sons.*

Sugiyono. (2014). Metode Penelitian Kuantitatif, Kualitatif, dan R&D (Edisi Ke7). UU Nomor 34 Tahun 2004 Tentang TNI.

Sugiyono. (2012). Memahami Penelitian Kualitatif. Bandung: Alfabeta.

Sugiyono. (2013). Metode Penelitian Kuantitatif Kualitatif dan R & D. Bandung: Alfabeta

Sugiyono. (2015). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: PT Alfabet.

Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: PT Alfabet.

Sugiyono. (2012). Metode Penelitian Kuantitatif Kualitatif dan R&B. Bandung: Alfabeta.

Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sumarlin, M., Akob, M., & Alam, S. (2024). Pengaruh Kompetensi dan Sistem Informasi terhadap Kinerja Pegawai Dimediasi Komitmen Organisasional. Jurnal Bina Bangsa Ekonomika, Vol. 18, No. 1, 2024.

Suriadarma, E., Agus, D. R., & Liza, M. D. (2022). Mediasi Komitmen Organisasi Pada Kompetensi Kerja dan Motivasi Kerja Dalam Meningkatkan Kinerja Tenaga Penyuluh. Jurnal Integrasi Sumber Daya Manusia Lisensi Ciptaan Disebarluaskan Di Bawah Lisensi Creative Commons Atribusi.

Susilowati, G. R., Sahim, A. N., Pratikno, Y., & Nurakhim, B. (2024). Pengaruh Kompetensi dan Budaya Kerja Melalui Komitmen Organisasi Sebagai Variabel Mediasi Terhadap Kinerja Pegawai Pada Pusat Data dan Informasi Kementerian Pertahanan.

Sutanto, K.D. (2019). Optimalisasi Pengamanan Ruang Udara Guna Penegakan Hukum Di Wilayah Udara Nasional Dalam Rangka Menegakkan Kedaulatan Negara Dalam Buku Angkasa Cendekia. Jakarta: Dinas Penerangan Angkatan Udara.

S., Hokgy Wicaksono. (2019). Pengaruh Kompetensi, Pelatihan, dan Disiplin Kerja Terhadap Kinerja Karyawan di PT. Kharisma Gunamakmur. Agora Vol. 7, No. 2.

Ulfani & Alam (2024). *The Influence of Job Characteristics and Placement on Performance at Lampung Bank. International Journal of Progressive Sciences and Technologies* (IJPSAT).

Yucel, I., & Bektas, C. (2021). "*Organizational commitment and work engagement: The role of work environment and job characteristics." Journal of Management & Organization*, 27(4), 588-604.