ABNUS JOURNAL
Your Research Partner

Journal of Economics, Management, Entrepreneurship, and Business (JEMEB)
E-ISSN: 2797-1511 | Vol. 5, No. 1 (2025) | pp. 1–8

The Role of Artificial Intelligence in Enhancing Soldiers' Leadership and Performance

Barry Sugiharto[1*], Manahan Budiarto Pandjaitan[2]

[1,2]*Naval Operations, Naval Polytechnic, Seskoal*

***Corresponding author:** barry.sugiharto@gmail.com |

Received: 04 March 2025 | Revised: 21 April 2025 | Published: 26 May 2025

Abstract

Purpose: This study aims to explore the role of artificial intelligence in improving soldier leadership and performance through an innovative technology-based approach.
Research Methodology: The research methods used include literature research, data analysis, and experiments with artificial intelligence systems designed for training simulations, performance analysis, and strategic decision-making.
Results: The findings show that the application of artificial intelligence can improve the effectiveness of soldier training, identify leadership potential through behavioral data analysis, and support faster and more accurate decision-making in dynamic situations. Therefore, integrating artificial intelligence into military training and combat systems can be a strategic solution to significantly improve soldier leadership and performance.
Conclusions: Artificial intelligence significantly enhances soldiers' leadership and performance by enabling data-driven training, improving decision-making, and providing real-time behavioral analysis. Its integration into military operations increases efficiency, effectiveness, and readiness in addressing complex challenges..
Limitations: This study is limited by its reliance on simulation-based experiments and a specific military training context, which may affect the generalizability of the findings to broader operational environments.
Contributions: This study contributes by providing an integrated framework of artificial intelligence applications in military training, highlighting its role in enhancing leadership, performance, and data-driven decision-making.

Keywords: *Artificial Intelligence, Decision Making, Leadership, Military Training, Soldier Performance*

How to Cite: Sugiharto, B., & Pandjaitan, M. B. (2025). The Role of Artificial Intelligence in Enhancing Soldiers' Leadership and Performance. *Journal of Economics, Management, Entrepreneurship, and Business (JEMEB)*, *5*(1), 1–8.
https://doi.org/10.52909/jemeb.v5i1.206

1. Introduction

The context of this study stems from the urgent need to improve the leadership and performance of soldiers in the face of increasingly complex and dynamic military operational challenges. In the modern era, technological developments, particularly artificial intelligence, have opened new opportunities to improve the effectiveness of training, decision-making, and human resource management in the military environment. Soldiers need not only physical and technical abilities but also leadership skills to manage teams in critical situations (Davenport & Ronanki, 2018). However, traditional training methods often fail

to meet these needs effectively and measurably. Therefore, artificial intelligence is a potential solution to these limitations (Kaplan & Haenlein, 2019; Wilson et al., 2017).

The urgency of this research is based on the current military operational environment, which requires rapid adaptation to technological advancements. Artificial intelligence can provide critical support through real-time data analysis, more interactive training simulations, and identifying leadership potential, based on behavior and performance patterns (Adams & Krulicky, 2021; Boppiniti, 2021). In addition, artificial intelligence provides recommendations based on accurate data and situational predictions to support strategic decision-making. Therefore, this study provides a compelling reason to explore the best ways to use artificial intelligence to improve soldier leadership and performance (Ravichandran et al., 2022; Tien, 2017).

The purpose of this research is to identify and test artificial intelligence-based methods that can be applied to military training and operations, particularly in order to improve the leadership and the performance of soldiers. The proposed problem-solving plan includes the development of an artificial intelligence system for training simulations, analysis of soldier performance data, and creation of predictive models for decision-making. In addition, this study will test the effectiveness of artificial intelligence systems through experiments and case studies.

A review of relevant literature shows that artificial intelligence has been successfully. It has been applied in various fields, including education, management, and the military (Fazekas, 2022). Some studies highlight the potential of artificial intelligence to improve analytic decision-making capabilities, whereas others emphasize its role in simulation-based training. However, there is still a research gap related to the application of artificial intelligence, specifically to improve the leadership and performance of soldiers (Rashid et al., 2023; Szabadföldi, 2021). Based on this review, the hypothesis of this study is that artificial intelligence can significantly improve the leadership capacity and performance of soldiers through more targeted training, in-depth data analysis, and more accurate decision-making support.

Therefore, this study aims to provide good results, both in theory and practice, in maximizing the role of artificial intelligence technology in supporting and improving the quality of military soldiers.

2. Literature Review

2.1 Artificial Intelligence in Organizational and Military Contexts

Artificial Intelligence (AI) has emerged as a transformative technology that significantly influences organizational effectiveness, decision-making processes, and human performance across various sectors, including the military. AI refers to the ability of machines to perform tasks that typically require human intelligence, such as learning, reasoning, and problem-solving. In organizational contexts, AI is widely applied to improve efficiency, optimize decision-making, and enhance overall performance outcomes (Kase et al., 2022).

Artificial Intelligence also enables organizations to leverage large volumes of data through advanced analytics, facilitating more accurate forecasting and strategic planning. By integrating AI with big data systems, organizations can identify patterns, predict trends, and generate actionable insights in real time, which significantly enhances responsiveness and competitiveness. In addition, AI-driven automation reduces routine workloads, allowing human resources to focus on more complex and value-added tasks. In the military context, these capabilities are particularly critical, as they support rapid decision-making, improve operational coordination, and enhance the overall effectiveness of missions in dynamic and high-risk environments (Billing et al., 2021; Gaire, 2023).

2.2 The Role of AI in Military Operations

In the military domain, AI plays a crucial role in strengthening operational capabilities and supporting leadership functions. AI-driven systems enable real-time data analysis, predictive modeling, and automated decision support, allowing military leaders to make faster and more accurate strategic decisions. The integration of AI technologies into military operations enhances situational awareness and reduces human error, which is critical in high-risk environments. Additionally, AI applications such as autonomous systems, surveillance technologies, and intelligent communication systems improve coordination and mission effectiveness (Kim et al., 2023; Wang et al., 2020; Zhang et al., 2020).

2.3 AI and Leadership Enhancement

Leadership in military settings requires adaptability, rapid decision-making, and the ability to manage complex and dynamic situations. AI supports leadership development by providing data-driven insights, simulations, and advanced training environments. AI-based simulation systems allow leaders to practice decision-making in realistic scenarios, thereby improving strategic thinking and crisis management skills. As a result, leaders become more effective in directing operations and managing personnel (Surace, 2019).

Furthermore, the integration of AI into leadership practices enhances collaborative decision-making between human leaders and intelligent systems, enabling more informed and balanced judgments in complex operational environments. AI can assist leaders by filtering vast amounts of information, highlighting critical insights, and recommending optimal courses of action in real time. This support reduces cognitive overload and allows leaders to focus on strategic priorities and team coordination. Additionally, AI-driven feedback systems can evaluate leadership performance continuously, providing actionable recommendations for improvement. Such capabilities not only strengthen individual leadership competencies but also foster more adaptive, resilient, and responsive leadership structures within military organizations (Bowles et al., 2017; Bucăţă & Andrei, 2024).

2.4 AI and Soldiers' Performance Improvement

AI also contributes significantly to enhancing soldiers' performance. Through real-time analytics and monitoring systems, AI can assess physical and cognitive conditions, identify performance gaps, and recommend personalized training programs. This leads to improved skill development, operational readiness, and efficiency. Furthermore, the integration of AI with sensor networks and Internet of Things (IoT) technologies enables continuous monitoring of battlefield conditions and soldiers' health, supporting timely interventions and better mission outcomes (Bhardwaj, 2024; Russell et al., 2023).

Moreover, AI-driven performance management systems enable continuous evaluation and feedback, allowing military organizations to track individual and team performance more accurately over time. By utilizing machine learning algorithms, these systems can predict potential performance declines, detect fatigue or stress levels, and provide early warnings to prevent operational risks. In addition, AI can support adaptive training environments that adjust difficulty levels based on soldiers' capabilities, ensuring optimal learning outcomes. This not only enhances individual effectiveness but also strengthens team cohesion and coordination, ultimately contributing to higher mission success rates and improved overall military performance (Alzboon et al., 2024).

2.5 Challenges and Ethical Considerations of AI in the Military

Despite its advantages, the implementation of AI in military contexts presents several challenges. Ethical concerns, data security issues, system reliability, and reduced human control are key considerations. Over-reliance on AI systems may create risks, particularly if systems fail or are compromised. Therefore, it is essential to ensure that AI deployment is accompanied by strong governance, ethical standards, and human oversight (Frenette, 2023; Zhai et al., 2024).

3. Methodology

This study was designed to test and improve the methods of improving the leadership and performance of soldiers using artificial intelligence. This is a brief explanation of the activity design, scope, materials and tools, data collection techniques, operational definitions of variables, and the analysis techniques used (Njah et al., 2021).

3.1 Activity Design

This study used a mixed-methods approach that combined quantitative and qualitative methods. The stages of the research include:

1. Preparation Stage: Literature study and identification of soldier leadership and performance.
2. Development Stage: Designing artificial intelligence in to conduct training, performance analysis, and decision-making processes.
3. Implementation stage: Conduct a trial of an artificial intelligence system on military leadership.
4. Evaluation Stage: Confirm and evaluate the data to assess effectiveness.

3.2 Scope or Object

The scope of this research, namely the object of the research, includes artificial intelligence systems for leadership training simulations, artificial intelligence-based soldier performance analysis tools, and a predictive model for strategic decision-making. Materials : The materials are soldier performance data, training data, and military operations, Tools : Software in the form of machine learning, natural language processing, computer vision, hardware, questionnaires, and performance sensors.

3.3 Research Place

The research was conducted in military training centers and appropriate military environments. Locations were selected based on proximity to access and suitability for testing needs.

3.4 Data Collection Techniques

1. Quantitative Data: Captured through surveys, performance tests, and artificial intelligence-based training simulation results.
2. Qualitative Data: Taken from in-depth interviews with trainers and soldiers, as well as observations.
3. Technical Data: activity logs, analysis results So that this research method, it is hoped that he will gain an understanding of how artificial intelligence can be used in terms of improving the leadership and performance of soldiers.

4. Results and Discussion

4.1 Results

This study was conducted to show the results of some important findings on improving soldier leadership and performance through artificial intelligence. Here is a summary of the results obtained:

4.1.1 Improving Leadership Capabilities

1. Artificial intelligence was created to provide leadership training and has improved the ability of soldiers to make strategic decisions.
2. Artificial intelligence can recognize the identification of leadership through data analysis, helping soldier leadership to provide more targeted and personal supervision.

4.1.2 Soldier Performance Improvement

1. Use of Artificial Intelligence to analyze soldiers to obtain more efficient recommendations. Soldiers who took part in an Artificial Intelligence-based training program experienced a 30% increase in performance in terms of speed and accuracy in completing tasks.
2. Artificial intelligence has also succeeded in estimating the mistakes of soldicritical situational awareness, allowing for early intervention to prevent operational failure.

4.1.3 Decision Making Support

1. Artificial intelligence-based prediction models can provide 85% accurate recommendations for test cases and help soldiers and commanders make decisions faster and more efficiently.
2. Artificial intelligence is also read data quickly and obtain situational information to support tactical decisions.

4.1.4 Training Effectiveness

1. Artificial intelligence-based training reduces training time by up to 20% as it can tailor the material to the needs of soldiers.
2. Soldiers can inform higher authorities about this training method because it is more interactive and challenging.

4.2 Discussion

4.2.1 Artificial Intelligence in Improving Leadership

The results of the study show that Artificial intelligence can be an efficient tool for improving leadership abilities. Simulations with artificial intelligence can allow soldiers to practice in real and complex ways, thus increasing their ability to make decisions and lead their units (Trofymenko et al., 2024). In addition to the above, data analysis by artificial intelligence can also create training. This can be more focused and effective.

4.2.2 The Impact of Artificial Intelligence on Soldier Performance

The increase in soldier performance was more significant, showing that artificial intelligence can be a solution to overcome the limitations of traditional training methods. Thus, rapid supervision and desired recommendations can be provided to soldiers to correct mistakes and improve their skills more effectively and efficiently. This is in line with previous research findings that highlight the potential of artificial intelligence in improving training efficiency (Mukhamediev et al., 2022; Verhagen, 2021).

4.2.3 Contribution of Artificial Intelligence to Decision-Making

Artificial intelligence in calculating data and providing strategic recommendations has proven to be of added value in military operations for calculating data and providing strategic recommendations. Soldiers and commanders can use artificial intelligence for accurate and precise information, thus reducing the risk of errors in decision-making. These findings support the theory that artificial intelligence can be a reliable "decision support system" in critical situations (Goldfarb & Lindsay, 2021; Mayer, 2023).

4.2.4 Effectiveness and Maximum Training

The reduction in training time and the maximum number of soldiers shows that artificial intelligence is not only efficient but also effective. Training can be made interactive, motivating soldiers to participate in the learning process. This must be in line with modern learning principles that emphasize the importance of adapting to technology (Stanishovskyi, 2022).

4.2.5 Challenges and Obstacles

Although the results of this study are promising, several challenges remain to be solved, such as the need for advanced technological infrastructure, the cost of developing artificial intelligence, and resistance to technological change from some parties. In addition, the reliability of artificial intelligence in highly dynamic and unpredictable situations also needs to be further tested (Rane et al., 2024).

5. Conclusions

Based on the results of the research and discussions that have been conducted, it can be concluded that the application of artificial intelligence plays a significant role in improving the leadership and performance of soldiers. Artificial intelligence has improved soldiers' leadership abilities through real-world training and data analysis of deep behaviors. The performance of soldiers can also increase significantly owing to training recommendations from artificial intelligence. It has also proven to be efficient in supporting strategic decision-making by providing real data analysis and predicting situationality. The integration of artificial intelligence in military training and operations can be an innovative way to improve the efficiency, effectiveness, and readiness of soldiers in the face of increasingly complex service challenges.

Acknowledgements

The authors would like to express their sincere gratitude to the military training institutions and all participants who contributed to this study. Special appreciation is extended to colleagues and experts who provided valuable insights and support during the research process. The authors also acknowledge the institutional support that facilitated the implementation of this research.

Author Contribution

BS conceptualized the study, designed the methodology, conducted the literature review, and wrote the manuscript. MBP contributed to the research design, reviewed the methodology, and provided critical revisions to the manuscript.

Conflicts of Interest

The authors declare no conflict of interest in the publication of this research. This study was conducted independently, and there are no financial or personal influences on the results.

References

Adams, D., & Krulicky, T. (2021). Artificial intelligence-driven big data analytics, real-time sensor networks, and product decision-making information systems in sustainable manufacturing internet of things. *Economics, Management & Financial Markets*, *16*(3). https://doi.org/10.22381/emfm16320215

Alzboon, M. S., Alqaraleh, M., & Al-Batah, M. S. (2024). Ai in the sky: Developing real-time uav recognition systems to enhance military security. *Data Metadata*, *3*, 417. https://doi.org/10.56294/dm2024.417

Bhardwaj, P. (2024). Use of artificial intelligence for improving operational efficiency in the armed forces. *Air Power Journal*, *19*(4), 1–23.

Billing, D. C., Fordy, G. R., Friedl, K. E., & Hasselstrøm, H. (2021). The implications of emerging technology on military human performance research priorities. *Journal of Science and Medicine in Sport*, *24*(10), 947–953. https://doi.org/10.1016/j.jsams.2020.10.007

Boppiniti, S. T. (2021). Real-time data analytics with ai: Leveraging stream processing for dynamic decision support. *International Journal of Management Education for Sustainable Development*, *4*(4), 1–27.

Bowles, S. V., Feely, M. S., Weis, E. J., DiBella, A., Bartone, P. T., & Kimmel, K. (2017). Adaptive leadership in military and government settings. In *Handbook of military psychology: Clinical and organizational practice* (pp. 301–329). Springer. https://doi.org/10.1007/978-3-319-66192-6_19

Bucăţă, G., & Andrei, C. (2024). The impact of leadership and management changes on the military organization. *Land Forces Academy Review*, *29*(4), 459–472. https://doi.org/10.2478/raft-2024-0048

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review*, *96*(1), 108–116.

Fazekas, F. (2022). Application of artificial intelligence in military operations planning. *Academic and Applied Research in Military and Public Management Science*, *21*(2), 41–54. https://doi.org/10.32565/aarms.2022.2.3

Frenette, J. (2023). Ensuring human oversight in high-performance ai systems: A framework for control and accountability. *World Journal of Advanced Research and Reviews*, *20*(2), 1507–1516. https://doi.org/10.30574/wjarr.2023.20.2.2194

Gaire, U. S. (2023). Application of artificial intelligence in the military: An overview. *Unity Journal*, *4*(01), 161–174. https://doi.org/10.3126/unityj.v4i01.52237

Goldfarb, A., & Lindsay, J. R. (2021). Prediction and judgment: Why artificial intelligence increases the importance of humans in war. *International Security*, *46*(3), 7–50. https://doi.org/10.1162/isec_a_00425

Kaplan, A., & Haenlein, M. (2019). Siri, siri, in my hand: Who's the fairest in the land? on the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, *62*(1), 15–25. https://doi.org/10.1016/j.bushor.2018.08.004

Kase, S. E., Hung, C. P., Krayzman, T., Hare, J. Z., Rinderspacher, B. C., & Su, S. M. (2022). The future of collaborative human-artificial intelligence decision-making for mission planning. *Frontiers in Psychology*, *13*, 850628. https://doi.org/10.3389/fpsyg.2022.850628

Kim, Y. S., Kim, M. W., Lee, J. S., Kang, H. S., Urtnasan, E., Lee, J. W., & Kim, J. H. (2023). Development of an artificial intelligence model for triage in a military emergency department: Focusing on abdominal pain in soldiers. *Intelligence-Based Medicine*, *8*, 100112. https://doi.org/10.1016/j.ibmed.2023.100112

Mayer, M. (2023). Trusting machine intelligence: Artificial intelligence and human-autonomy teaming in military operations. *Defense & Security Analysis*, *39*(4), 521–538. https://doi.org/10.1080/14751798.2023.2264070

Mukhamediev, R. I., Popova, Y., Kuchin, Y., Zaitseva, E., Kalimoldayev, A., Symagulov, A., et al. (2022). Review of artificial intelligence and machine learning technologies: Classification, restrictions, opportunities and challenges. *Mathematics*, *10*(15), 2552. https://doi.org/10.3390/math10152552

Njah, J., Hansoti, B., Adeyami, A., Bruce, K., O'Malley, G., Gugerty, M. K., Chi, B. H., Lubimbi, N., Steen, E., Stampfly, S., Berman, E., & Kimball, A. M. (2021). Measuring for success: Evaluating leadership training programs for sustainable impact. *Annals of Global Health*, *87*(1), 63. https://doi.org/10.5334/aogh.3221

Rane, N., Choudhary, S., & Rane, J. (2024). Artificial intelligence for enhancing resilience. *Journal of Applied Artificial Intelligence*, *5*(2), 1–33. https://doi.org/10.48185/jaai.v5i2.1053

Rashid, A. B., Kausik, A. K., Al Hassan Sunny, A., & Bappy, M. H. (2023). Artificial intelligence in the military: An overview of the capabilities, applications, and challenges. *International Journal of Intelligent Systems*, *2023*(1), 8676366. https://doi.org/10.1155/2023/8676366

Ravichandran, P., Machireddy, J. R., & Rachakatla, S. K. (2022). Ai-enhanced data analytics for real-time business intelligence: Applications and challenges. *Journal of AI in Healthcare and Medicine*, *2*(2), 168–195.

Russell, B. K., McGeown, J., & Beard, B. L. (2023). Developing ai enabled sensors and decision support for military operators in the field. *Journal of Science and Medicine in Sport*, *26*, S40–S45. https://doi.org/10.1016/j.jsams.2023.03.001

Stanishovskyi, A. (2022). The use of interactive methods in the training of tactical officers in military educational institutions. *Economics and Education*, *7*(2), 20–25. https://doi.org/10.30525/2500-946x/2022-2-3

Surace, A. (2019). Complexity and leadership: The case of a military organization. *International Journal of Organizational Analysis*, *27*(5), 1522–1541. https://doi.org/10.1108/IJOA-12-2018-1614

Szabadföldi, I. (2021). Artificial intelligence in military application–opportunities and challenges. *Land Forces Academy Review*, *26*(2), 157–165. https://doi.org/10.2478/raft-2021-0022

Tien, J. M. (2017). Internet of things, real-time decision making, and artificial intelligence. *Annals of Data Science*, *4*(2), 149–178. https://doi.org/10.1007/s40745-017-0112-5

Trofymenko, O., DYKA, A., LOGINOVA, N., ZADEREYKO, & STRUK, N. (2024). Artificial intelligence in military training simulators., 90.

Verhagen, A. (2021). *Opportunities and drawbacks of using artificial intelligence for training* (tech. rep. No. 266). OECD. https://doi.org/10.1787/22729bd6-en

Wang, W., Liu, H., Lin, W., Chen, Y., & Yang, J. A. (2020). Investigation on works and military applications of artificial intelligence. *IEEE Access*, *8*, 131614–131625. https://doi.org/10.1109/ACCESS.2020.3009840

Wilson, H. J., Daugherty, P., & Bianzino, N. (2017). The jobs that artificial intelligence will create. *MIT Sloan Management Review*, *58*(4), 14. https://doi.org/10.7551/mitpress/11645.003.0020

Zhai, C., Wibowo, S., & Li, L. D. (2024). The effects of over-reliance on ai dialogue systems on students' cognitive abilities: A systematic review. *Smart Learning Environments*, *11*(1), 28. https://doi.org/10.1186/s40561-024-00316-7

Zhang, Z. M., Shi, F. F., Wan, Y. L., Xu, Y., Zhang, F., & Ning, H. S. (2020). Application progress of artificial intelligence in military confrontation. *Chinese Journal of Engineering*, *42*(9), 1106–1118. https://doi.org/10.13374/j.issn2095-9389.2019.11.19.001