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The Effect of Artificial Intelligence Technology Utilization on the Effectiveness of Bank Indonesia Employee Performance with Digital Literacy as an Intervening Variable

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Abstract. *The purpose of this study is to determine the effect of the use of Artificial Intelligence technology on the effectiveness of Bank Indonesia employee performance with Digital Literacy as an intervening variable. Respondents in this study were 100 Bank Indonesia employees determined by the census method. This empirical research is explanatory quantitative research using the Structural Equation Model (SEM) based on Partial Least Square (PLS) with the help of the SmartPLS.4 program as a data analysis tool. The results of this study show that Artificial Intelligence technology has a positive and significant effect on the effectiveness of Bank Indonesia employee performance. Artificial Intelligence has a positive and significant effect on increasing the Digital Literacy of Bank Indonesia employees. Digital Literacy has a positive and significant effect on the effectiveness of Bank Indonesia employee performance. And Digital Literacy acts as an intervening variable to strengthen the effect of the use of Artificial Intelligence technology on the effectiveness of employee performance. This means that the success of the implementation of AI technology at Bank Indonesia is highly dependent on the level of digital literacy possessed by employees.*

Keywords: *Artificial; Effectiveness; Intelligence; Technology.*

1. Introduction

The use of Artificial Intelligence (AI) is experiencing rapid growth in various countries, making human work easier and more efficient. According to a report by Writer Buddy, there were over 24 billion visits to AI applications from September 2022 to August 2023. This figure only includes the top AI applications. The United States is the world's largest user of AI applications, generating 5.5 billion visits to AI applications from September 2022 to August 2023.(Erwin et al., 2023)This figure represents 22.62% of total traffic/visits. Indonesia ranks third, surpassing developed countries like Brazil, the UK, Japan, and Germany, which generated 1.4 billion visits to artificial intelligence applications, accounting for 5.6% of total traffic in the artificial intelligence industry.

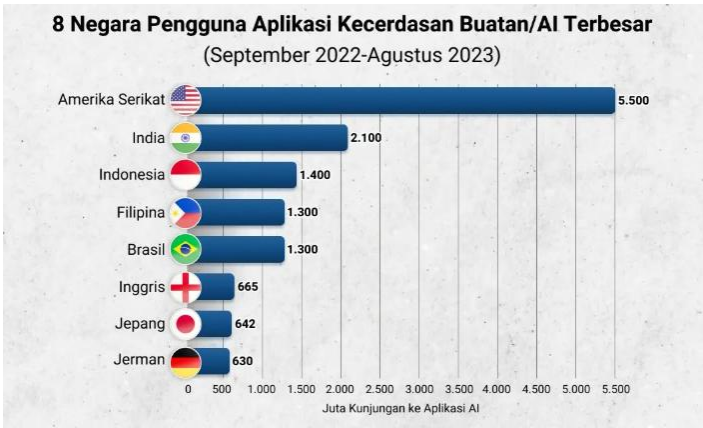

Figure Eight Countries Using Artificial Intelligence (AI)

Source: IG.dataindonesia_id2024

The data above shows that Indonesia continues to experience significant digital transformation, with a population of 270.2 million and 197.71 million internet users. This high internet penetration has encouraged many companies that previously operated conventionally to shift to a digital model by developing various innovative applications.(Amalia, 2023)One of the technologies at the center of this transformation is Artificial Intelligence (AI), which enables companies to improve operational efficiency, particularly in cloud-based data management and storage. The use of cloud computing in the corporate environment is now increasingly profound, and digital transformation is accelerating with the support of comprehensive big data analytics.(Subekti et al., 2024).

In the current era of the Industrial Revolution 4.0, the banking sector is undergoing a drastic digital transformation. As a national strategic sector, the banking sector faces demands to improve its services by providing efficient network infrastructure to meet customer needs and maintain the stability of Indonesia's financial system. The new challenge facing banks is the need to increase network capacity, reliability, and security in line with the rapid growth of digital transactions.(Abubakar & Handayani, 2022). As digital activity in the banking sector increases, the threat of cybercrime and digital fraud also increases. Therefore, banks are required to improve digital security by implementing the latest technology, Artificial Intelligence (AI), which can detect anomalous patterns in transactions and enhance customer protection.(Davenport & Ronanki, 2018).

The changes in digital transformation not only impact banking services to customers but also the internal dynamics of bank operations, including the performance of its employees, according to Sriekaningsih.(2020)Bank Indonesia, as the central bank with a strategic role in maintaining national economic and monetary stability, is also faced with the challenge of adapting to the latest technological developments. As an institution that implements monetary policy, payment systems, and financial stability, Bank Indonesia needs to ensure that all its regional offices, including those in North Sumatra Province, can optimize employee

performance by utilizing the latest technologies such as Artificial Intelligence (AI). North Sumatra Province is one of the provinces with dynamic economic activity in Indonesia. With a population of over 14 million people and a significant contribution to national GDP, the role of Bank Indonesia Regional Office of North Sumatra Province is crucial in overseeing monetary policy and the payment system.(Oktania, Alisya, Nainggolan, Putri, & Manihuruk, 2024).

Changing work patterns and increasingly digital organizational environments also demand the use of Artificial Intelligence (AI)-based technology. According to Dedi Nugraha and Sri Winiarti (2014), AI is designed to mimic human thinking and is implemented in computer algorithms. Russel and Norvig (2010) explain that AI has the ability to learn, reason, and solve problems automatically. Furthermore, McCarthy (2022) states that AI aims to mimic human thought processes in completing specific tasks. Proper use of AI can help employees complete work more efficiently and on time, while reducing repetitive administrative workloads. Research by Prasetio (2024) states that artificial intelligence has a significant impact on employee performance, where AI assists in data management and completing work with high accuracy.

However, the optimal use of AI cannot be achieved without strong digital literacy among employees. Digital literacy is a crucial competency in today's workplace. Gilster (1997) defines digital literacy as the ability to effectively understand and utilize information from various digital sources. Eshet (2004) emphasizes that digital literacy encompasses not only technical skills but also the ability to optimally utilize various digital media. Martin (2008) defines digital literacy as the ability to access, manage, evaluate, and integrate digital information effectively. Research by Mudjiono & Fatoni (2024) shows that digital literacy significantly impacts employee productivity and performance in the public sector. Oladimeji et al. (2024) found that digital literacy significantly impacts employee productivity, particularly when information and communication technology is used to improve work processes.

Given the gaps in previous studies, it is important for researchers to conduct more comprehensive research on the relationship between work productivity, artificial intelligence, and employee performance, considering the mediating or moderating variable of digital literacy. Most studies are still sector-specific (MSMEs, banking, education) and limited to quantitative approaches. The novelty of this study lies in the integration of work productivity variables and the use of Artificial Intelligence (AI) technology on employee performance effectiveness, by adding Digital Literacy as an intervening variable in the context of the Bank Indonesia Representative Office of North Sumatra Province. Previous studies have mostly examined the direct influence of work productivity or AI utilization on employee performance separately, without considering the role of Digital Literacy as a link that can strengthen this relationship.

While previous research has largely focused on the private sector or MSMEs, this study focuses on a state-owned financial institution, Bank Indonesia, which has a distinct work system and regulations. This study is unique in that it examines how Bank Indonesia employees' digital literacy levels can bridge or mediate the influence of work productivity and

AI technology on improving employee performance effectiveness. Thus, this study not only broadens theoretical insights into the importance of digital literacy in the era of digital transformation but also provides practical contributions to the development of performance improvement strategies in state-owned financial institutions adapting to the digitalization of their work systems.

The results of this study demonstrate that work productivity has a positive influence on employee performance effectiveness at the Bank Indonesia Regional Representative Office in North Sumatra Province. The use of Artificial Intelligence (AI) technology is expected to improve performance effectiveness by increasing work efficiency and quality. Digital literacy serves as an intervening variable that strengthens the relationship between work productivity and AI utilization on performance effectiveness. Employees with a high level of digital literacy are better able to utilize technology effectively, thereby improving their performance. Furthermore, internal and external organizational factors also influence the effectiveness of AI technology use in improving employee performance.

2. Research Methods

This research uses an explanatory research method. According to Sugiyono (2015)Explanatory research aims to explain the relationship between the variables studied and their influence on each other. In the context of this research, this approach is used to clarify the relationship between the independent and dependent variables formulated in the hypothesis. This method was chosen because its primary goal is to test the proposed hypothesis.

3. Results and Discussion

The presentation of research results is based on data collected from respondents. Primary data was obtained from respondents' answers to the distributed research questionnaire. The questionnaire was created in a Google Form, accessible via a link and QR code, to facilitate distribution and data collection from respondents. The questionnaire was distributed online via WhatsApp and in person.There are 100 employees at the Bank Indonesia Regional Representative Office in North Sumatra Province. The saturated sampling method was used to determine respondents, a sampling technique where all members of the population are used as samples. Based on the questionnaires collected from 100 respondents, a description of the characteristics of the respondents, grouped by gender, highest education, age, work unit, and rank, is shown in the following table:

Respondent Characteristics Table

Characteristics	Information	Frequency	Percent
Gender	Man	88	88%
	Woman	12	12%
	Total	100	100%
Last education	S1 (Bachelor's Degree)	81	81%
	S2 (Masters)	19	19%
	Total	100	100%

Characteristics	Information	Frequency	Percent
Respondent Age	26-34 years	32	32%
	35-43 years	57	57%
	> 44 years	11	11%
	Total	100	100%
Work unit	Bank Indonesia Representative Office in Sibolga	33	33%
	Bank Indonesia Representative Office in Pematang Siantar	36	36%
	Bank Indonesia Representative Office, North Sumatra Province (Medan)	31	31%
	Total	100	100%
Rank Position	Deputy Director	1	1%
	Assistant Director	2	2%
	Manager	8	8%
	assistant manager	13	24%
	Staff	32	32%
	Executor	44	44%
	Total	100	100%

Source: SmartPLS output, 2025

The table explains that, based on gender, of the 100 respondents involved in the study, 88 people, or 88%, were male, while only 12 people, or 12%, were female. This disparity reflects that the work environment at Bank Indonesia in the research area (North Sumatra, specifically the representative offices in Medan, Sibolga, and Pematang Siantar) is still dominated by male employees. This could be due to a number of factors, including past recruitment structures that may have opened up more opportunities for men, or a tendency for men to be more interested in certain job fields. However, even though women are fewer in number, their contribution remains important in creating diversity and inclusivity in the workplace.

The respondents' final educational background indicates that the majority of Bank Indonesia employees, 81 (81%), have completed their education to a Bachelor's degree (S1), while 19% (19%) have pursued further education at the Master's degree (S2) level. No respondents had an education level below a Bachelor's degree, indicating that Bank Indonesia, as a state financial institution, places high academic qualifications as a requirement in the recruitment and human resource development process. This high level of educational background indicates that employees generally possess a strong scientific foundation in facing work challenges, including adopting technologies such as Artificial Intelligence and improving their digital literacy in the workplace.

The age distribution of respondents shows that the 35–43 age group dominates, with 57 respondents, or 57% of the total. This indicates that most respondents are in the mature adult age category, who generally have sufficient work experience and are at a stage of professional maturity. Furthermore, the 26–34 age group comprises 32 respondents, or 32% of respondents, and can be categorized as the younger generation or millennial generation. This group typically exhibits flexibility and speed in adapting to technology. Meanwhile, the age

group over 44 years old only comprises 11 people (11%). This composition indicates that the majority of the workforce is of productive age and ready to actively participate in digital transformation, although training and coaching approaches may differ according to the age characteristics of each group.

Based on work units, respondents came from three Bank Indonesia work units in the North Sumatra region, with a fairly even distribution. A total of 36 respondents, or 36%, came from the Bank Indonesia Representative Office in Pematang Siantar, 33 respondents, or 33%, came from the Bank Indonesia Representative Office in Sibolga, and 31 respondents, or 31%, came from the Bank Indonesia Representative Office in North Sumatra Province (Medan). This diversity of work unit origins provides a broader and more representative picture of the use of Artificial Intelligence technology, digital literacy, and employee performance across various work unit levels and geographic locations. Each representative office certainly has different work characteristics, so the research results are expected to reflect the actual conditions and become relevant policy input for all work areas.

The rank structure of respondents shows that the majority are at the executive level, amounting to 44 people, or 44% of the total respondents. This is followed by the staff level with 32 people, or 32%, and 13 assistant managers, or 13%. Meanwhile, managerial and leadership positions (managers, assistant directors, and deputy directors) only total 11 people (11%). This composition indicates that the majority of respondents are executive employees at the operational level of the organization. They are the ones who interact directly with technology-based work systems, including the use of Artificial Intelligence. Therefore, their perception, digital literacy, and performance effectiveness are important elements in assessing the success of technology implementation within Bank Indonesia. Meanwhile, the managerial group plays a crucial role in strategy, decision-making, and facilitating technology training to support the work of subordinate teams.

This analysis confirms that Bank Indonesia employees have developed a mature digital literacy that is integrated into their professional activities. This aligns with Bawden's concept of digital literacy.(2008), which includes the ability to use technology effectively, critically evaluate digital information, and communicate and collaborate in digital environments. A high score on this variable is also a key factor supporting employee performance effectiveness in today's era of digital transformation.

Overall, all measurement items are valid, reflecting the measurement of the variables in this study. Outer loading testing on the Digital Literacy variable, all seven indicator items have values above 0.70, which means they have met the convergent validity criteria and are declared valid. This indicates that all indicators are able to represent the Digital Literacy construct significantly. Indicator DL3 (“I realize the importance of digital images (digital footprints) in supporting my career”) has the highest outer loading value of 0.868, followed by DL6 (“I can use the internet to find learning materials that suit my needs”) at 0.867 and DL5 (“I am accustomed to using digital collaboration tools to work in a team”) at 0.866.

These three indicators show that the active use of digital technology and awareness of its impact are dominant aspects of employee digital literacy. Other indicators such as DL2 ("I am able to use various digital platforms to communicate effectively"), DL4 ("I am able to compose the right keywords to find the information I need on the internet"), DL1 ("I am able to distinguish between factual information and hoaxes in digital media"), and DL7 ("I am able to operate digital devices such as computers, laptops, and smartphones for daily activities") also provide significant contributions with outer loading values of 0.823, 0.820, 0.767, and 0.760, respectively. The Average Variance Extracted (AVE) value of 0.681 also indicates that this variable has a good ability to explain the variance of its indicators. Thus, all indicators in the Digital Literacy variable can be concluded as valid and suitable for use in measuring the level of employee digital literacy.

For the Artificial Intelligence Technology variable, all three indicators also showed very high outer loading values, all above 0.80, reflecting very strong convergent validity. Indicator TAI3 ("I feel the use of AI technology can improve my work efficiency") had the highest value of 0.957, followed by TAI1 ("I use AI technology to support my daily work") with a value of 0.924, and TAI2 ("I understand how AI technology works used in organizational systems") at 0.839. These high values indicate that the understanding, use, and perception of the effectiveness of AI consistently form a unified whole construct. The very high AVE value of 0.825 reinforces that these indicators are very representative in explaining the Artificial Intelligence Technology variable. Based on Table 4.5, it shows that all indicators have outer loading values > 0.70 and AVE values > 0.50, thus meeting the valid criteria, indicating that the convergent validity of all these variables meets good standards.

The discriminant validity test was conducted using SmartPLS Version 3.0 and evaluated based on the Fornell-Larcker criterion value by comparing the AVE root (diagonal value) > the correlation value between constructs. Second, by looking at the cross-loading values of the construct indicators which are considered adequate if they reach at least 0.7 or by looking at the cross-loading values of each indicator on the construct and comparing them with the indicator loadings on other constructs. Indicators must have a higher loading on the intended construct compared to other constructs to meet the discriminant validity criteria. The results of the discriminant validity test are as in the following table:

Discriminant Validity Test Table of Fornell-Larcker Values

Variables	DL	KP	TAI
Employee Performance	0.825		
Artificial Intelligence Technology	0.687	0.815	
	0.524	0.490	0.908

Source: SmartPLS output, 2025

The table shows that all Fornell-Larcker values for each indicator are greater than the values of the other constructs (correlations), thus meeting the discriminant validity criteria. This indicates that the measurement items for each focal variable measure that variable and measure the other variables to a lesser extent.

Discriminant Validity Test Table Cross Loadings Values

Indicator	Digital Literacy	Employee Performance	Artificial Intelligence Technology
DL1	0.767	0.517	0.465
DL2	0.823	0.492	0.291
DL3	0.868	0.613	0.517
DL4	0.820	0.592	0.436
DL5	0.866	0.626	0.555
DL6	0.867	0.600	0.387
DL7	0.760	0.494	0.305
KP1	0.513	0.804	0.501
KP2	0.592	0.835	0.487
KP3	0.589	0.862	0.438
KP4	0.589	0.806	0.414
KP5	0.532	0.818	0.279
KP6	0.533	0.761	0.242
TAI1	0.513	0.431	0.924
TAI2	0.432	0.417	0.839
TAI3	0.481	0.484	0.957

Source: SmartPLS output, 2025

The table shows that all indicators marked in red have cross-loading values >0.70, and these values are higher than the values of other constructs (correlations), thus meeting the criteria for discriminant validity. This indicates that the measurement items for each focal variable measure that variable and measure the other variables to a lesser extent.

Reliability testing measures the extent to which measurements are consistent and reliable, producing uniform data across the same measurement. Reliability testing can be performed using Cronbach's alpha, Composite reliability (rho_a), and Composite reliability (rho_c). All values must be >0.70 to be considered consistent or reliable (Ghozali and Kusumadewi, 2023).

The direct effect hypothesis was evaluated by examining the original sample values and the t-statistic for the direct effect. The test was performed using the bootstrapping procedure in SmartPLS 3.0. Significance was considered achieved if the t-statistic value was >1.660 and the p-value was <0.05.

Direct Effect Hypothesis Test Table

Variables	Original Sample (O)	Standard Deviation	T Statistics (|O/STDEV|)	P Values	Information
Digital Literacy -> Employee Performance	0.606	0.128	4,753	0,000	Accepted
Artificial Intelligence Technology -> Digital Literacy	0.524	0.098	5,344	0,000	Accepted
Artificial Intelligence Technology -> Employee Performance	0.508	0.128	3,963	0,000	Accepted

Source: Processed primary data, 2024

Based on the table, the values produced in the direct influence test can be described as follows:

1) Hypothesis 1 (H1): The effect of Artificial Intelligence Technology on the effectiveness of Employee Performance at Bank Indonesia, shows a coefficient value (original sample) of 0.508 (positive), a t-statistic value of 3.963 (>1.660), and a p-value of 0.000 (<0.05). These results indicate that Artificial Intelligence Technology has a positive and significant effect on Employee Performance, so that hypothesis H1 is declared accepted.

2) Hypothesis 2 (H2): The effect of Artificial Intelligence Technology on Digital Literacy among Bank Indonesia Employees, shows a coefficient value (original sample) of 0.524 (positive), a t-statistic value of 5.344 (>1.660), and a p-value of 0.000 (<0.05). These results indicate that Artificial Intelligence Technology has a positive and significant effect on Digital Literacy, so that hypothesis H2 is accepted.

3) Hypothesis 3 (H3): The effect of Digital Literacy on the effectiveness of Employee Performance at Bank Indonesia, shows a coefficient value (original sample) of 0.606 (positive), a t-statistic value of 4.753 (>1.660), and a p-value of 0.000 (<0.05). These results indicate that Digital Literacy has a positive and significant effect on Employee Performance, so that hypothesis H3 is accepted.

The indirect effect hypothesis was evaluated by examining the original sample values and the t-statistic for the indirect effect with the moderating variable. The test was performed using the bootstrapping procedure in SmartPLS 3.0. Significance was considered achieved if the t-statistic value was >1.600 and the p-value was <0.05.

Direct Effect Hypothesis Test Table

Variables	Original Sample (O)	Standard Deviation	T Statistics (|O/STDEV|)	P Values	Information
Artificial Intelligence Technology -> Digital Literacy -> Employee Performance	0.318	0.087	3,667	0,000	Accepted

Source: Processed primary data, 2024

Based on Table the values produced in the indirect influence test can be described as follows:

Hypothesis 4 (H4): The influence of Digital Literacy as an intervening factor between the utilization of Artificial Intelligence Technology and the effectiveness of Bank Indonesia employee performance shows a coefficient value (original sample) of 0.318 (positive), a t-statistic value of 3.667 (>1.660), and a p-value of 0.000 (<0.05). These results indicate that Digital Literacy is able to mediate the influence of Artificial Intelligence Technology on the effectiveness of Employee Performance in a positive and significant manner. Thus, the role of Digital Literacy strengthens the relationship between the utilization of Artificial Intelligence Technology and the effectiveness of Employee Performance, so that the H4 hypothesis is declared accepted.

The discussion is implemented as follows:

1) The Utilization of Artificial Intelligence Technology Influences the Effectiveness of Bank Indonesia Employee Performance.

Results testing the first hypothesis (H1) shows that Artificial Intelligence (AI) technology has a positive and significant effect on the effectiveness of employee performance at Bank Indonesia, with a coefficient value of 0.508, a t-statistic value of 3.963 (>1.660), and a p-value of 0.000 (<0.05). This means that the higher the level of utilization of Artificial Intelligence technology in the work environment, the more effective the performance of Bank Indonesia employees. Based on observations and field data at the Bank Indonesia Representative Offices in Sibolga, Pematang Siantar, and North Sumatra Province (Medan), the implementation of Artificial Intelligence technology has had a significant impact on employee work patterns. Several work units have utilized AI in the form of data automation systems, digital dashboard monitoring, predictive financial analysis systems, and chatbots for internal administrative services. The presence of this technology has reduced manual workloads, accelerated work process times, and increased accuracy in reporting and decision-making.

The use of AI technology also contributes to increased work efficiency, allowing employees to allocate time and resources more effectively. Employees who previously required considerable time to collect and process data can now complete their work more quickly thanks to the support of AI-based systems. This has a direct impact on improving their productivity and the quality of their performance. The use of AI encourages employees to be more innovative and open to technological change. A work culture responsive to digital transformation is beginning to take shape, particularly among younger employees and those with strategic roles in data processing and decision-making. Employees also demonstrate the ability to integrate technology into their daily work routines and adapt to dynamic digital work systems. The use of Artificial Intelligence technology plays a significant role in driving the effectiveness of Bank Indonesia employees' performance in the North Sumatra region. Strengthening support for digital infrastructure, ongoing technical training, and active employee involvement in the technology adoption process are key elements in maintaining and improving optimal performance in today's digital era.

Artificial Intelligence Artificial intelligence (AI) is a technology that enables computer systems to perform tasks that typically require human intelligence, such as decision-making, data analysis, and natural language processing. The use of AI can significantly increase the efficiency and effectiveness of work processes. According to Laudon and Laudon (2020), AI can accelerate work processes, reduce human error, and provide intelligent, data-driven recommendations to support managerial decision-making. Employee performance effectiveness refers to how well an employee can achieve work targets according to established standards and timelines. The higher the performance effectiveness, the greater the employee's contribution to achieving the organization's strategic goals. The use of AI in the workplace can support this effectiveness through the automation of routine tasks, the

provision of real-time data for decision-making, and the optimization of adaptive and precise work systems.

Prasetio's (2024) research states that artificial intelligence has a significant impact on employee performance, where AI assists in data management and completing work with high accuracy. Yunita, Meutia, & Azhar (2023) prove that an AI-based accounting information system has a positive effect on the performance of Bank Syariah Indonesia employees. Mudjiono & Fatoni (2024) emphasize that the use of Artificial Intelligence Personal Assistance can significantly improve employee performance. Bank Indonesia, as a complex and technology-oriented central bank, utilizes AI highly relevant. The use of Artificial Intelligence technology has a positive relationship with the effectiveness of Bank Indonesia employee performance, as AI can accelerate work processes, increase accuracy, and support more precise and effective data-based decision-making.

2) The Utilization of Artificial Intelligence Technology Influences the Digital Literacy of Bank Indonesia Employees.

The results of the study on Hypothesis 2 indicate that Artificial Intelligence (AI) technology has a positive and significant effect on the Digital Literacy of Bank Indonesia employees, with a coefficient value of 0.524, a t-statistic of 5.344 (>1.660), and a p-value of 0.000 (<0.05). This means that the more optimal the use of Artificial Intelligence technology in the work environment, the higher the level of digital literacy of employees. Based on field findings at the Bank Indonesia Representative Offices in Sibolga, Pematang Siantar, and North Sumatra Province (Medan), the use of Artificial Intelligence technology encourages increased knowledge, understanding, and ability of employees to manage and adapt to the ever-evolving digital system. In the Bank Indonesia work environment, AI technology has been used in various applications such as economic prediction systems, big data management, internal service chatbots, and automation of financial reporting and analysis processes.

The existence of this technology requires employees to acquire new skills in operating and understanding the workflow of AI-based digital systems, thus directly encouraging them to improve their digital literacy abilities. Internal training and independent learning undertaken by employees to understand AI-based systems contribute to the growth of a work culture that is adaptive to technology. Improved digital literacy is also evident in employees' ability to utilize AI features to support faster and more accurate decision-making and to increase work efficiency. For example, employees who previously focused solely on manual input can now better interpret data processed by AI and take accurate, data-driven work actions. The integration of Artificial Intelligence technology into work processes at Bank Indonesia not only acts as a tool but also serves as a crucial catalyst in strengthening employee digital literacy. Continuous support from management in the form of training, digital infrastructure improvements, and technological assistance are key factors in accelerating the increase in digital literacy evenly across all work units.

Research by Yunita, Meutia, & Azhar (2023) states that the use of AI-based accounting information systems significantly improves employee performance, which of course requires mastery of digital literacy as a prerequisite. Rahayu & Suaidah (2025) show that AI-based tax services have an impact on digital literacy, where employees exposed to this technology experience an increase in their mastery of digital technology. Ichsani (2024) states that although it does not directly mediate the influence of technological facilities on performance, digital literacy continues to develop along with the use of technology in the work environment. Bank Indonesia employees, who are increasingly involved in digital-based work such as big data analysis, electronic payment systems, and digital currency, the use of AI technology is a catalyst for improving digital literacy.

3) *Digital Literacy* Influence on the Effectiveness of Bank Indonesia Employee Performance.

The results of the study on Hypothesis 3 show that Digital Literacy has a positive and significant effect on the effectiveness of Bank Indonesia Employee Performance, with a coefficient value of 0.606, t-statistic of 4.753 (>1.660), and p-value of 0.000 (<0.05). This means that the higher the level of digital literacy of employees, the higher the effectiveness of their performance. Bank Indonesia Representative Offices in Sibolga, Pematang Siantar, and North Sumatra Province (Medan), digital literacy is one of the key competencies that is highly needed by employees in the era of digitalization of work processes. Employees who have the ability to understand, access, and utilize digital technology appropriately are proven to be able to complete work more quickly, accurately, and efficiently. This is especially seen in the implementation of tasks such as managing economic and financial data, preparing reports based on BI applications, to collaboration between divisions that is increasingly integrated through digital systems.

Furthermore, digital literacy also helps employees adapt to various new systems implemented by Bank Indonesia, such as the use of Artificial Intelligence-based internal applications, digital monitoring dashboards, and the use of online communication tools that accelerate coordination processes. This capability minimizes the risk of work errors, increases accountability, and supports the achievement of established performance targets. Therefore, it is crucial for Bank Indonesia management to continue encouraging increased digital literacy through training programs, socialization of new technologies, and intensive guidance in the use of digital systems. With good digital literacy, employees are not only able to keep up with technological developments but also contribute optimally to supporting the transformation and effectiveness of work within Bank Indonesia.

Research by Mudjiono & Fatoni (2024) shows that digital literacy has a significant impact on employee productivity and performance in the public sector. Research by Oladimeji et al. (2024) also supports this by showing that digital literacy has a significant positive effect on employee work productivity, especially when information and communication technology is used to improve work processes. At Bank Indonesia, where employees must manage and process large amounts of data, operate digital banking systems, and interact with other

financial technologies, digital literacy is a key factor in ensuring they can utilize technology to maximize employee performance. Employees with a high level of digital literacy will be better able to operate data analysis systems optimally, utilize technological tools to improve public services, and be better prepared to face the challenges of digitizing the banking system.

4) *Digital Literacy* as an Intervening Between the Utilization of Artificial Intelligence Technology and the Effectiveness of Bank Indonesia Employee Performance.

The results of the study indicate that Digital Literacy plays a significant role as an intervening variable in strengthening the influence of the use of Artificial Intelligence Technology on the effectiveness of Employee Performance in the Bank Indonesia Representative Offices of Sibolga, Pematang Siantar, and North Sumatra Province (Medan). The coefficient value of 0.318 with a t-statistic of 3.667 (>1.660) and a p-value of 0.000 (<0.05) indicates that the relationship is not only statistically significant, but also has a fairly strong contribution to employee work practices. The implementation of Artificial Intelligence technology such as financial reporting automation systems, transaction monitoring, and the use of chatbots or internal virtual assistants has made it easier for employees to complete routine and analytical tasks. However, the success of utilizing this technology is highly dependent on the extent to which employees have digital literacy skills, including in understanding, operating, and evaluating the results of work based on digital technology.

Digital Literacy Digital literacy refers to an individual's ability to understand and use digital technology effectively. Therefore, digital literacy can serve as an intervening variable influencing the extent to which AI technology contributes to employee performance effectiveness. According to Mayer-Schonberger and Cukier (2013), AI can improve performance effectiveness by suggesting faster and more accurate decisions based on analyzed data. However, utilizing this technology requires a good understanding of how to operate AI-based systems. Employees with high levels of digital literacy will find it easier to optimize the use of this technology, which in turn improves employee performance effectiveness. On the other hand, employees with low digital literacy may have difficulty using AI effectively, which can reduce the expected positive impact on employee performance.

Research by Rahayu & Suaidah (2025) shows that the use of AI-based services in the tax sector can influence taxpayer compliance through digital literacy. Mudjiono & Fatoni (2024) state that digital leadership and AI personal assistance have a significant impact on employee performance. Prasetio (2024) explains that the use of AI in the workplace requires digital skills so that employees can adapt quickly and maximize the potential of the technology. Employees with low digital literacy may struggle to optimize the potential of existing AI, which can ultimately reduce employee performance effectiveness. Therefore, digital literacy is a very important factor in moderating the positive influence of AI on performance effectiveness. Employees with good digital literacy can be more effective in using AI technology to improve employee performance, while employees with low digital literacy may not be able to utilize

this technology optimally, which can reduce the positive influence of AI on performance effectiveness.

4. Conclusion

Based on the results of data analysis and hypothesis testing conducted on Bank Indonesia employees, it can be concluded that: The use of Artificial Intelligence technology has been proven to have a positive and significant impact on the effectiveness of Bank Indonesia employee performance. This reflects that various AI-based systems implemented by Bank Indonesia—such as financial reporting automation systems, big data analysis, transaction pattern recognition systems for fraud detection, and internal chatbots—have helped accelerate and simplify employee work. The implementation of this technology directly increases work efficiency, reduces administrative burdens, and allows employees to focus more on strategic decision-making. The use of AI is one of the main driving forces in supporting digital transformation at Bank Indonesia and encouraging the achievement of optimal employee performance. Artificial Intelligence technology has a positive and significant impact on improving the Digital Literacy of Bank Indonesia employees. Along with the increasing use of AI-based digital systems and platforms in operational activities, employees are required to have adequate understanding and skills in operating and utilizing this technology. This is evident in the various training and competency development programs regularly held by Bank Indonesia, such as training related to financial technology (fintech), cybersecurity, data analytics, and the use of AI-based digital tools. This increase in digital literacy plays a crucial role in supporting employees to continuously adapt to technological changes and improve the quality of their work.

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