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The Effect of Artificial Intelligence on Employee Performance Mediated by Knowledge Sharing and Employee Engagement in State-Owned Banks in Indonesia

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ABSTRACT

Over the past decade, advanced technologies like artificial intelligence (AI) have significantly influenced the evolution of business processes and organizational structures. The growing adoption of these innovations has improved effectiveness, efficiency, and overall performance by combining existing knowledge with new advancements, thereby enhancing AI's capabilities. The present research adopted a descriptive quantitative methodology with a causal approach to investigate AI's effect on employee performance, with an emphasis on the mediating roles of knowledge sharing and employee engagement. The study targeted employees from four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri—and gathered data from 200 respondents using a purposive sampling technique. Structural Equation Modeling (SEM) was conducted with AMOS 24 software. The findings demonstrated that AI had a positive and significant effect on employee performance, knowledge sharing, and employee engagement. Furthermore, both knowledge sharing and employee engagement significantly and positively affected employee performance. These results underscored the significance of knowledge sharing and employee engagement as key mediators in the correlation between AI and employee performance.

Keywords : artificial intelligence; employee engagement; employee performance; knowledge sharing; state-owned banks.

INTRODUCTION

In the 21st century, organizations face the challenge of staying innovative in rapidly changing markets where competitive dynamics are in constant flux (Stank et al., 2019). Innovation plays a vital role in enabling organizations to remain competitive in such environments (Kistyanto et al., 2021). The rapid progress in information and communication technology, particularly advancements in artificial intelligence (AI), has transformed business operations by redefining processes and reshaping the corporate landscape (Belanche, 2020; Da Silva et al., 2022). Recent studies indicate that companies' use of AI has increased by 270% in the past four years (Howard & Rowsell, 2019). Initially conceptualized by John McCarthy in 1955, artificial intelligence involves computational methods that simulate human decision-making and processes, exhibiting intelligence through their ability to quickly analyze large datasets, identify patterns, and make predictions. Prentice et al. (2023) emphasize that organizations should leverage AI to enhance employee productivity. Additionally, AI contributes to greater employee engagement, as Hughes et al. (2019) discovered that its implementation provides clear guidance, encouraging employee involvement in tasks. A global survey further indicated that AI adoption has resulted in a 20-30% improvement in employee performance across multiple industries (Chintalapati, 2021).

Human resources are essential to the success of any organization (Daud & Afifah, 2021). Campbell (1990) formally defined this concept as an essential factor in achieving organizational objectives. Employee performance refers to the effective and efficient execution of tasks, reflecting employees' actions and behaviors in fulfilling their responsibilities (Darvishmotevali & Ali, 2020;

Kalogiannidis, 2020). It is seen as a measure of value creation, highlighting the contributions employees make toward organizational goals (Hendri, 2019). Globally, employee performance is increasingly important as organizations navigate intense competition and fast-paced technological advancements (Adnan et al., 2023; Afzal et al., 2023). Modern employee performance is also significantly affected by artificial intelligence (Prentice et al., 2023; Wijayati et al., 2022).

Employee performance is also affected by employee engagement, which refers to a positive mental state marked by enthusiasm, inspiration, pride, purpose, joy, and a strong commitment to tasks (Kaur et al., 2020). Gallup's business survey highlights that organizations with high employee engagement are 83% more likely to outperform their peers. Engaged employees are characterized by their enthusiasm for their roles and their willingness to contribute to organizational success (Pooja & Krishnan, 2023).

Improving performance can be achieved through mentoring programs that establish a strong correlation between experienced and less experienced individuals. Rumijati (2020), describes knowledge sharing as a structured process involving the collection, transfer, and dissemination of various forms of knowledge between individuals or organizations using different media and approaches. High levels of knowledge sharing within an organization naturally enhance employee performance, creating benefits for the organization. Ahmad & Karim (2019), highlight that knowledge-sharing actions benefit both the organization and the individuals involved, as demonstrated in studies by Masni & Ansir (2020), and Syifani (2019).

Another major factor affecting organizational success in recent years is AI (Arakpogun et al., 2021), which has become a transformative technology for businesses globally (Vijai, 2019). AI enhances employee engagement and work performance by delivering fast, accurate, reliable, and targeted outcomes (He et al., 2020). Its versatility allows it to be effectively applied across various industries. Despite extensive research on AI, findings remain inconsistent. For example, some studies report that AI has little to no effect on knowledge sharing and employee performance (Pereira et al., 2021), while others find it has no significant effect on employee engagement (Jangbahadur et al., 2024). Similarly, Zulkifli et al. (2023), discovered that knowledge sharing does not significantly affect employee performance. These discrepancies highlight opportunities for further investigation.

Motivated by these research gaps, the present study explored the correlation between AI and employee performance, focusing on the mediating roles of knowledge sharing and employee engagement. The research was conducted in Indonesia's state-owned banks—BNI, BRI, BTN, and Mandiri—given the banking sector's critical role in the nation's economy. Adopting AI is essential for banks to enhance efficiency, as many tasks are still performed manually. AI has the capability to automate repetitive tasks and provide round-the-clock financial services, significantly impacting millions of lives (Kediya et al., 2023). The rapid technological developments in the banking industry make it a highly relevant and significant area for in-depth study.

Literature Review

Artificial Intelligence and Employee Performance

Artificial intelligence (AI) involves utilizing machines to carry out tasks that mimic human intelligence, achieved through advanced technological innovations (Memarzadeh, 2020). This technology boosts operational efficiency and contributes to achieving organizational effectiveness (Renkema, 2022). Its adoption has grown extensively across multiple industries worldwide, such as healthcare, manufacturing, finance, logistics, retail, supply chain, and the public sector (Kia et al., 2021; Paschen et al., 2019). Research by Luhana et al. (2023) revealed that AI significantly affected employee performance. Similarly, other studies, like that of Fatima et al. (2023), have confirmed its potential to improve employee performance.

H1: Artificial intelligence has a direct effect on employee performance in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri.

Artificial Intelligence and Knowledge Sharing

AI has become a significant technological innovation, achieving impressive progress in recent years (Dwivedi et al., 2020). It replicates the cognitive functions of the human mind, including learning, analysis, and decision-making (Mikalef & Gupta, 2021). In the context of Industry 5.0,

where knowledge forms the basis of competitive advantage (Rezaei et al., 2024), AI is critical in enhancing knowledge sharing (Alansari, 2020). Its features enable organizations to utilize adaptable data storage, fast data processing systems, advanced algorithms, and specialized tools that promote knowledge exchange (Pandey et al., 2021). Numerous studies have highlighted AI's significant impact on facilitating knowledge sharing (Nguyen & Malik, 2022; Olan et al., 2022).

H2: Artificial intelligence has a direct effect on knowledge sharing in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri.

Artificial Intelligence and Employee Engagement

AI provides distinct benefits in a world increasingly driven by intelligent systems (Goel, 2022). Within organizations, AI improves efficiency, effectiveness, and employee engagement by streamlining and enhancing organizational processes (Nankervis et al., 2021). For AI to be effectively implemented, fostering employee engagement is essential (Brock & Von Wangenheim, 2019).

H3: Artificial intelligence has a direct effect on employee engagement in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri.

Knowledge Sharing and Employee Performance

Knowledge is an essential asset for organizations to foster innovation and create meaningful outcomes. Knowledge sharing, which involves employees exchanging ideas, information, and guidance at work, facilitates learning and skill development (Ying et al., 2021). This exchange of knowledge equips employees with fresh insights they can apply to their tasks, ultimately benefiting both individual and organizational performance. Establishing a culture that promotes knowledge sharing is vital for improving employee performance and achieving organizational success (Wen & Ma, 2021). Research indicates that knowledge sharing enhances organizational competitiveness and positively affects employee performance (Crupi et al., 2020; Nguyen & Malik, 2022).

H4: Knowledge sharing has a direct effect on employee performance in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri.

Employee Engagement and Employee Performance

Organizational performance is strongly influenced by employee engagement (Jindo et al., 2020). Adi et al. (2024) found that engaged employees generally exhibit enhanced energy, resilience, and determination, even when confronted with challenges. These employees show a strong commitment and unwavering focus on their work. Dina and Tjahjono (2023) describe engagement as the degree to which employees deeply involve themselves in their tasks, dedicating significant time and effort while viewing their work as an integral aspect of their lives. Similarly, research by Dwivedi (2021), and Al Badi et al. (2023), highlights the substantial positive effect of employee engagement on organizational performance.

H5: Employee engagement has a direct effect on employee performance in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri.

Knowledge Sharing as a Mediator Between Artificial Intelligence and Employee Performance

Gupta et al. (2023) highlight that AI's capacity to build a strong knowledge foundation plays an essential role in promoting knowledge exchange. Zhao & Chen (2019) emphasize that AI can deliver personalized knowledge through algorithms designed to recommend information aligned with employees' specific needs, thus fostering the exchange of expertise and skills among them. Studies have shown that advancements in AI could significantly contribute to knowledge sharing, which subsequently enhances employee performance (Vahdat, 2021).

H6: Artificial intelligence has an indirect effect on employee performance in four state-owned banks in Indonesia —BNI, BRI, BTN, and Mandiri—through knowledge sharing.

Employee Engagement as a Mediator Between Artificial Intelligence and Employee Performance

Organizations implementing AI often encounter challenges that hinder optimal performance (Bag et al., 2020). Hou (2020) highlights the necessity of incorporating AI into organizational workflows to enhance both employee engagement and performance. Li et al. (2021) found that

employee engagement served as a mediating factor in the correlation between AI and employee performance. Similarly, other studies have affirmed that employee engagement could act as a bridge connecting AI to better employee outcomes (Rehman et al., 2023; Wang et al., 2023).

H7: Artificial intelligence has an indirect effect on employee performance in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri—through employee engagement.

METHOD

This research employed a causal design, collecting data through a questionnaire targeting respondents who met predefined eligibility criteria. The questionnaire employed a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) to gauge participants' agreement with various statements (Sekaran & Bougie, 2016). The AI construct was assessed utilizing seven items modified from Paschen et al. (2019), while knowledge sharing was evaluated using seven items modified from Swanson et al. (2020). Employee engagement was evaluated using nine items based on Soane et al. (2012), and employee performance was measured with seven items derived from Bernanthos (2018) and Lestari & Guritno (2021).

The study sampled 200 respondents, comprising employees from four state-owned banks—BNI, BRI, BTN, and Mandiri—located in various major Indonesian cities, including Bandung, Batam, Bekasi, Jakarta, Makassar, Pontianak, Semarang, Surabaya, Tangerang, and Yogyakarta. Data were gathered via an online questionnaire.

The data was analyzed using Structural Equation Modeling (SEM), which allowed for the simultaneous application of confirmatory factor analysis and multiple regression. The evaluation of measurement and structural models was conducted using AMOS 24 software (Hair et al., 2021). The model fit was assessed using various indices, such as the Tucker Lewis Index (TLI), Incremental Fit Index (IFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness of Fit Index (GFI), Root Mean Squared Residual (RMR), Root Mean Square Error of Approximation (RMSEA), Chi-square (χ^2), and CMIN/DF. The Standardized Loading Factor (SLF), with a minimum threshold of 0.50, was used to determine validity. Construct Reliability (CR) and Average Variance Extracted (AVE), which have minimum values of 0.7 and 0.5, respectively, were used to evaluate construct reliability (Hair et al., 2021). Hypotheses were tested using SEM, with acceptance or rejection based on the t-value of each coefficient, where a t-value of 1.96 or higher at a significance level of $\alpha = 0.05$ indicated a causal correlation. Finally, the Sobel test was used to examine the indirect effects of mediating variables.

RESULT

Table 1
Characteristics of Respondents

Demography	Category	Frequency	Percentage (%)
Gender	Male	129	64.5
	Female	71	36.5
	Total	200	100
Age	<25	87	43.5
	25-35	64	32
	36-45	30	15
	>45	19	9.5
	Total	200	100
Company	BNI	56	28
	BRI	53	26.5
	BTN	27	13.5
	Mandiri	64	32
	Total	200	100
Office Location	Bandung	30	15
	Batam	14	7
	Bekasi	23	11.5
	Jakarta	40	20
	Makassar	21	10.5
	Pontianak	9	4.5

Education	Semarang	16	8
	Surabaya	15	7.5
	Tangerang	20	10
	Yogyakarta	12	6
	Total	200	100
	High School	28	14
	Diploma	47	23.5
	Undergraduate	93	46.5
	Master	24	12
	PhD	8	4
Position	Total	200	100
	Ordinary Employee	151	75.5
	Manager	49	24.5
	Total	200	100

source: processed data

Table 2
Measurement Model Results

Variable	Item	SLF	AVE	CR
Employee Performance	I believe my work consistently meets and often surpasses established standards.	0.903	0.793	0.977
	I consistently strive to ensure my work is completed accurately and to a high standard.	0.915		
	I am capable of efficiently completing multiple tasks within a short timeframe.	0.921		
	The amount of work I complete each day meets the company's expectations.	0.924		
	I always meet deadlines.	0.872		
	Deadlines are never an issue for me.	0.844		
	The work I consistently perform makes a meaningful contribution to team or organizational objectives.	0.852		
Artificial Intelligence	AI helps me retrieve lost data.	0.682	0.687	0.985
	AI delivers precise and reliable data and information.	0.785		
	AI assists me in completing my work.	0.799		
	AI facilitates the display of hard-to-measure data.	0.880		
	AI safeguards my colleagues' and my privacy.	0.887		
	AI assists me in completing my work.	0.855		
	AI makes auditing easier for management.	0.896		
Knowledge Sharing	I consistently share information and knowledge with my colleagues.	0.853	0.686	0.975
	The knowledge I share is meaningful and valuable.	0.892		
	The information I share is reliable and current.	0.715		
	The knowledge I provide helps my colleagues perform their tasks efficiently.	0.867		
	I actively participate in workplace knowledge-sharing initiatives.	0.782		
	Social interaction at work facilitates the knowledge-sharing process.	0.848		
	Positive relationships among colleagues foster effective knowledge exchange.	0.828		
Employee Engagement	I align with my colleagues on shared work values.	0.815	0.793	0.987
	I align with my colleagues on shared work goals.	0.770		
	I share a similar work attitude with my colleagues.	0.875		
	I stay focused on my tasks.	0.894		
	I dedicate my attention to my work.	0.943		
	I devote significant attention to my work.	0.956		
	I have a positive outlook on my job.	0.932		
	I feel motivated at work.	0.887		
	I have a strong passion for my work.	0.930		

source: processed data

As shown in Table 2, the Standardized Loading Factor (SLF) for all indicators in the full model exceeded 0.50, confirming their validity in measuring the constructs of the four variables. Furthermore, the reliability analysis yielded positive outcomes. The constructed model demonstrated reliability, consistently capturing the intended variables. This result was supported by Average Variance Extracted (AVE) values above 0.50 and Construct Reliability (CR) values above 0.70.

Table 3
Goodness of Fit Index

Goodness of Fit Index	Cut-off Value	Results
CMIN/DF	≤ 3.00	2.692
RMR	≤ 0.05	0.042
IFI	≥ 0.90	0.910
TLI	≥ 0.90	0.901
CFI	≥ 0.90	0.909

source: processed data

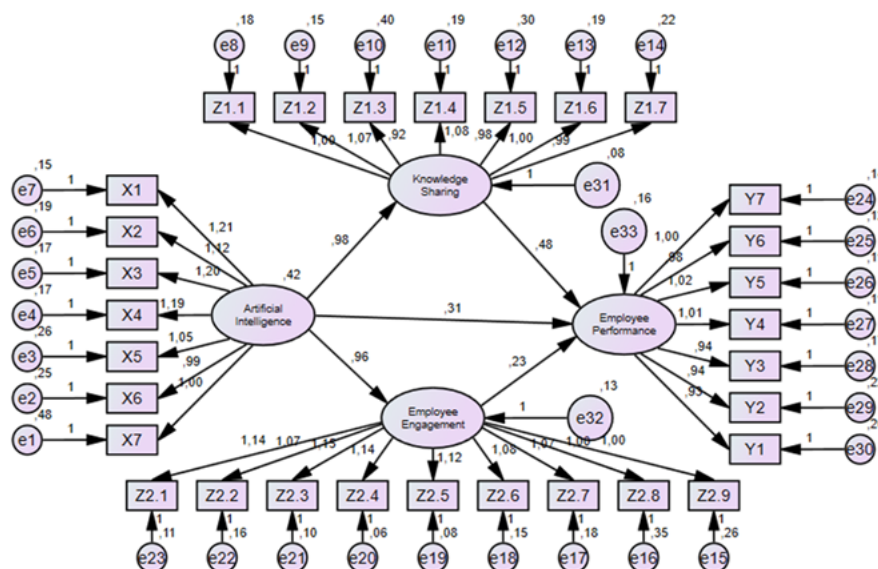
As shown in Table 3, the Goodness of Fit (GOF) measurements demonstrated that the model could meet the fit criteria. The results revealed that five indicators fell within the good fit category. Specifically, the CMIN/DF value was 2.692 (≤ 3.00), and the RMR value was 0.042 (≤ 0.05), affirming the model's adequacy. Additionally, the IFI, TLI, and CFI values, at 0.910, 0.901, and 0.909, respectively, all exceeded the threshold of 0.90, further confirming that the model was both well-fitting and acceptable.

Tabel 4
Hypotheses Testing

Hypotheses	Path	Estimate	S.E.	C.R.	P	Description
H ₁	Knowledge Sharing $\leftarrow$ Artificial Intelligence	0.984	0.094	10.431	***	Accepted
H ₂	Employee Engagement $\leftarrow$ Artificial Intelligence	0.955	0.098	9.713	***	Accepted
H ₃	Employee Performance $\leftarrow$ Artificial Intelligence	0.312	0.154	2.022	0.043	Accepted
H ₄	Employee Performance $\leftarrow$ Knowledge Sharing	0.482	0.149	3.228	0.001	Accepted
H ₅	Employee Performance $\leftarrow$ Employee Engagement	0.234	0.102	2.292	0.022	Accepted

source: processed data

Table 4 depicts the statistical results for the tested hypotheses. The t-score for the effect of AI on employee performance was 2.022, above the t-table value of 1.96, and the p-value was less than 0.05. These findings supported the first hypothesis, indicating that AI positively and significantly affected employee performance. For the second hypothesis, the effect of AI on knowledge sharing yielded a t-score of 10.431 and a p-value below 0.001, confirming a positive and significant correlation. Similarly, the third hypothesis, examining AI's effect on employee engagement, yielded a t-score of 9.713 with a p-value below 0.001, signifying a significant positive correlation. The fourth hypothesis, assessing the effect of knowledge sharing on employee performance, reported a t-score of 3.228 and a p-value below 0.001, validating its significant positive effect. Lastly, the fifth hypothesis, exploring the effect of employee engagement on employee performance, revealed a t-score of 2.292, exceeding the t-table value, with a p-value below 0.001, confirming a positive and significant effect.



source: processed data

Figure 1
Full Model Structural Test
Table 5

Sobel Test - Significance of Mediation

Pathway	Sobel Test Statistic	Two-Tailed Probability
Artificial Intelligence → Knowledge Sharing → Employee Performance	3.09	0.001
Artificial Intelligence → Employee Engagement → Employee Performance	2.23	0.025

source: processed data

The Sobel test analysis, detailed in Table 5, showed a test statistic of 3.09 for the pathway Artificial Intelligence → Knowledge Sharing → Employee Performance, with a p-value of 0.001. This result exceeded the critical value of 1.96 and had a p-value below the 0.05 threshold ($\alpha = 0.05$), confirming a significant indirect effect of AI on employee performance via knowledge sharing. Similarly, for the pathway Artificial Intelligence → Employee Engagement → Employee Performance, the test statistic was 2.23, greater than the critical value of 1.96, with a p-value of 0.025, which was also below 0.05. This indicated that AI significantly affected employee performance indirectly through employee engagement.

Artificial intelligence (AI) positively and significantly affected employee performance in four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri. By enhancing performance, AI contributed to greater efficiency and effectiveness in human resource management, streamlining various managerial processes to be quicker and more accurate. These findings were consistent with prior research (Johan, 2021; Malik et al., 2022; Park et al., 2021; Sahay & Kaur, 2021; Tong et al., 2021), which similarly emphasized the effect of AI on enhancing employee performance, especially in the context of these banks.

AI also positively affected knowledge sharing in the same banks, reflected in two key areas. First, its implementation enabled effective knowledge exchange among employees and between employees and management, fostering creativity and innovation across the organization. Second, it facilitated active participation in knowledge-sharing processes within the banking sector. These findings were consistent with prior research emphasizing AI's role in enhancing knowledge sharing (DiVaio et al., 2020; Olan et al., 2023; Vrontis et al., 2022).

Additionally, AI significantly improved employee engagement in these banks by creating opportunities for workplace interaction, such as through social media platforms. This enhanced collaboration among employees, strengthening their sense of engagement. Employee engagement driven by artificial intelligence became a valuable intangible asset, providing a competitive edge. These findings supported earlier research demonstrating the significant positive correlation between AI and employee engagement (Sahoo & Sahu, 2020; Wijayati et al., 2022; Zhang et al., 2019).

Specifically in the banking industry, AI identified opportunities for employee development, training, and improvement, fostering greater workplace involvement.

Lastly, knowledge sharing positively and significantly affected employee performance in these four banks. This process involved exchanging experiences, task-related information, and feedback on organizational operations and products. The present study corroborated earlier findings that knowledge sharing significantly enhances employee performance (Abbas et al., 2019; Delshab et al., 2022; Zaim et al., 2019). By engaging in knowledge-sharing activities, employees in these banks could enhance their professional expertise and job-related skills, leading to better individual performance.

Employee engagement significantly affected employee performance in Indonesia's four state-owned banks—BNI, BRI, BTN, and Mandiri. Engaged employees demonstrated heightened awareness of their responsibilities in meeting organizational objectives and motivated their peers to collectively achieve targets. Consequently, employee engagement is essential for cultivating a productive work environment and serves as a critical competitive advantage, positively affecting job satisfaction and the achievement of performance goals. These findings aligned with earlier studies, which also corroborated the positive and significant correlation between employee engagement and performance (Ismail et al., 2019; Ohemeng et al., 2019; Panda et al., 2021; Sannagy et al., 2023).

Knowledge sharing served as a mediator in the correlation between AI and employee performance within the four state-owned banks. This finding aligned with previous studies emphasizing the essential function of knowledge sharing. Earlier research demonstrated that knowledge sharing could mediate the connection between information and communication technology (ICT) and employee performance (Sannagy et al., 2023) and between AI and employee performance (Olan et al., 2023). The integration of AI into workplace operations enhanced efficiency, while AI-focused training improved employee skills and awareness, facilitating the effective use of the technology in their roles.

Employee engagement served as a mediator in the correlation between AI and employee performance within these banks. Actively involving employees in AI-driven initiatives boosted performance by streamlining routine tasks, allowing staff to contribute more time to strategic and innovative responsibilities. Furthermore, employees' understanding of AI's capabilities and limitations facilitated its smooth integration into their workflows, resulting in enhanced overall performance. These findings were consistent with earlier studies that highlighted the mediating role of employee engagement in the link between AI and employee performance (Chowdhury et al., 2023; Kazim et al., 2024; Maity, 2019).

CONCLUSION

In conclusion, this study aimed to examine the effect of artificial intelligence (AI) on employee performance, mediated by knowledge sharing and employee engagement, among employees of four state-owned banks in Indonesia—BNI, BRI, BTN, and Mandiri. The findings confirmed that AI had a positive and significant direct effect on employee performance, knowledge sharing, and employee engagement. Furthermore, knowledge sharing and employee engagement each positively and significantly influenced employee performance. Additionally, both knowledge sharing and employee engagement were confirmed as significant mediators in the relationship between AI and employee performance. These results underscore the critical importance of leveraging AI-driven knowledge sharing and fostering employee engagement as strategic mechanisms for enhancing workforce performance in Indonesia's state-owned banking sector.

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