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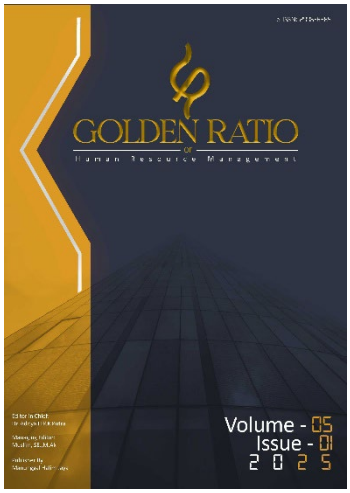

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*Corresponding author: T. Heriansyah, Department of Master of Management, Faculty of Economics and Business, Riau University, Pekanbaru, Indonesia

E-mail: t.heriansyah7020@grad.unri.ac.id

HUMAN RESOURCE MANAGEMENT | RESEARCH ARTICLE

The Influence of Digital Leadership, Digital Innovation and Organizational Learning on Digital Maturity to Improve Organizational Performance: Empirical Study from PT. Perkebunan Nusantara IV Regional III, Indonesia

T. Heriansyah *[1], Z. Zulfadil[2], Yusni Maulida[3]

[1,2,3] Department of Master of Management, Faculty of Economics and Business, Universitas Riau, Pekanbaru, Indonesia. Email: t.heriansyah7020@grad.unri.ac.id, zulfadil@lecturer.unri.ac.id, yusni.maulida@lecturer.unri.ac.id

Abstract: The study was conducted at PT. Perkebunan Nusantara IV Regional III. The aim was to determine the direct influence of digital leadership, digital innovation, and organizational learning on digital maturity to improve organizational performance. The study took a sample of 207 employees. The variables used were digital leadership, digital innovation and organizational learning, digital maturity, and organizational performance. The data were analyzed using SEM (Structural Equation Modeling) analysis operated through the Smart PLS 4.0 program. The results of the study indicate that digital leadership, digital innovation, and organizational learning have a significant influence on digital maturity. Digital maturity itself has been proven to have a significant influence on improving organizational performance. In addition, the influence of digital leadership, digital innovation, and organizational learning on organizational performance is also strengthened through the mediation of digital maturity. Thus, digital maturity plays an important role as a liaison that optimizes the impact of independent variables on organizational performance.

Keywords: Digital Leadership, Digital Innovation, Organizational Learning, Digital Maturity, Organizational Performance.

JEL Classification Code: E44, F31, F37, G15

1. INTRODUCTION

Organizational performance is the ability of an entity to achieve its stated goals. According to Ramadhani et al. (2023), organizational performance reflects the collective results obtained through the behavior of organizational members, including efficiency and success in achieving targets. Daft (2015) states that efficiency in the use of resources is one indicator of the long-term sustainability of an organization. In the industrial context, organizational performance is a benchmark for success in competing in a dynamic market.

PT. Perkebunan Nusantara IV Regional III, as one of the companies in the palm oil industry in Indonesia, has a strategic role in supporting the national economy. However, performance data in recent years shows significant challenges, such as a decline in the growth of fresh fruit bunches (FFB) and crude palm oil (CPO) production, as well as a mismatch between the company's work plan and budget (RKAP) and realization. These performance fluctuations reflect problems in operational stability and efficiency. In the era of digitalization, a company's ability to adopt digital technology is a key factor in maintaining competitiveness and improving performance. Digital maturity refers to how an organization can integrate digital technology into its business operations and strategies (Nahotko, 2023). This aligns with the Technology Acceptance Model (TAM) framework that Davis

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(1989) developed, emphasizing the importance of perceptions of technology's usefulness and ease of use in driving technology adoption.

PT. Perkebunan Nusantara IV Regional III has started a digital transformation by preparing a digitalization roadmap that includes implementing Industry 4.0-based technology. However, the Indonesia Industry 4.0 Readiness Index (INDI 4.0) assessment shows that the company's level of digital transformation readiness is still moderate. This shows that the digitalization efforts are not optimal and require strengthening in various aspects, including digital leadership, digital innovation, and organizational learning. Previous studies have revealed that digital leadership, innovation, and organizational learning are key elements that can drive digital maturity, ultimately improving organizational performance (de Araujo et al., 2021; Di Vaio et al., 2021). However, in the context of the plantation industry, in-depth studies related to this relationship are still minimal. Therefore, this study aims to explore the influence of digital leadership, digital innovation, and organizational learning on digital maturity and the influence of digital leadership, digital innovation, and organizational learning on the organizational performance of PT. Perkebunan Nusantara IV Regional III through digital maturity. Based on the description, the research title is The Influence of Digital Leadership, Digital Innovation and Organizational Learning on Digital Maturity to Improve the Organizational Performance of PT. Perkebunan Nusantara IV Regional III.

2. LITERATURE REVIEW

2.1. Digital Leadership

Leadership is the capacity to guide a company toward achieving its goals and building sustainable competitive advantage. To maintain sustainable competitive advantage, a company must have technical products and systems that accelerate and enable production, communication, and cost reduction, as well as the ability to use these products and systems optimally according to Kane et al., (2019) Digital leadership is a combination of digital culture and digital competence. The study of digital leadership is part of the study of leadership discourse based on the upper-echelon theory developed by Sheninger, (2019) Where the character of a manager can predict the results, digital leadership is a leadership style that focuses on implementing digital transformation in an organization. This leadership model allows companies and organizations to digitize their work environment and culture. According to Sağbaş & Erdoğan, (2022) Digital leaders are visionaries, motivators of change, able to combine ideas within the business for projects and build connections by creating new opportunities for partnerships, joint ventures, outsourcing, and other forms of collaboration.

2.2. Digital Innovation

Shakeel et al., (2020)Consider digital innovation as companies' efforts to use technology and information to develop, produce, and market new products for the industry. In other words, innovation is modifying or discovering ideas for continuous improvement and development to increase productivity. Benitez et al., (2020)Explains that corporate innovation can produce R&D (Research and Development), production, and marketing approaches and ultimately lead to the commercialization of the innovation. In other words, innovation is the process of realizing new ideas that are different from the past using production or by making them real, where innovation includes evaluation, new concepts, and implementation. To meet or exceed company targets, new and different methods and technology must be used to improve quality or lower costs.

2.3. Organizational Learning

Akwaowo & Kalio, (2021). It defines organizational learning as a process organizations can use to maintain or improve performance through changes or modifications to information, processes, or mental models. Therefore, organizational learning is a process that creates different ways of seeing or understanding the concept of knowledge in an organization. (2017) and Haider et al.Reported positive results and allowed for the influence of organizational learning on innovation. Similarities

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between innovation and organizational learning support this view; innovation will typically utilize tools such as experimentation or prototyping as part of the learning process. Using the prototype as a resource to gain new learning enables a faster learning process. The learning approach is a continuous cycle that allows people to learn how to be more efficient and effective. The shorter this cycle, the faster and more effective learning becomes. Wallo et al. (2022) argued that inadequate knowledge sharing is a barrier to implementing an innovation culture. Learning creates a foundation for innovation, increasing the organization's capacity to innovate while improving overall performance. It can be said that there is a positive correlation and interdependence between organizational learning and innovation, where innovation builds on existing learning in the organization and, through the process, creates new learning or knowledge for the organization.

2.4. Digital Maturity

Digital maturity is how organizations systematically prepare themselves to adapt to ongoing digital change consistently. Digital maturity refers to the psychological definition of "maturity," which refers to the learned ability to respond to challenges and opportunities in the external environment appropriately, effectively, and sustainably. With a high level of digital maturity, an organization can be more agile, innovative, and competitive in the dynamic digital era, according toAslanova & Kulichkina, (2020). Digital maturity refers to how organizations can adapt, integrate, and leverage digital technologies in their operations and strategies. This concept covers a wide range of aspects, from the use of technology to changes in organizational structure and business processes. According toIfenthaler & Egloffstein, (2020)Digital maturity results from a successful digital transformation, where technology is adopted and holistically integrated into business operations. They emphasize that digital maturity is not just about the technology itself but also how the organization changes in the digital era.

2.5. Organizational Performance

According toAkpa et al., (2021) Organizational performance is a level that shows the extent to which the implementation of tasks that have been received can be completed by the organization's mission. According toSuwarno & Bramantyo, (2019)Performance shows a level of achievement in implementing an activity, be it a program or policy, to realize the organization's goals, objectives, mission, and vision through its strategic planning. According toTaylor, (2015)The term performance is a translation of performance, which scholars often interpret as "appearance," "performance," or "achievement." Meanwhile, according to Prawirosentono & Primasari, (2019)Defines organizational performance as a performance organization, namely showing the work results achieved by an institution or an organization in achieving the desired goals according to the duties and authorities in order to achieve the organizational goals that have been legally determined, do not violate the law and are by the morals and ethics that have been determined.

2.6. Research Framework

Based on the framework of thought obtained, the researcher has compiled the following research framework in Figure 1.

2.7. Hypothesis

a. Digital Leadership has a positive and significant effect on Digital Maturity.
b. Digital Innovation has a positive and significant effect on Digital Maturity.
c. Organizational Learning has a positive and significant effect on Digital Maturity.
d. Digital Maturity has a positive and significant effect on Organizational Performance.
e. Digital Leadership positively and significantly affects Organizational Performance through Digital Maturity.
f. Digital Innovation positively and significantly affects Organizational Performance through Digital Maturity.

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g. Organizational Learning positively and significantly affects Organizational Performance through Digital Maturity.

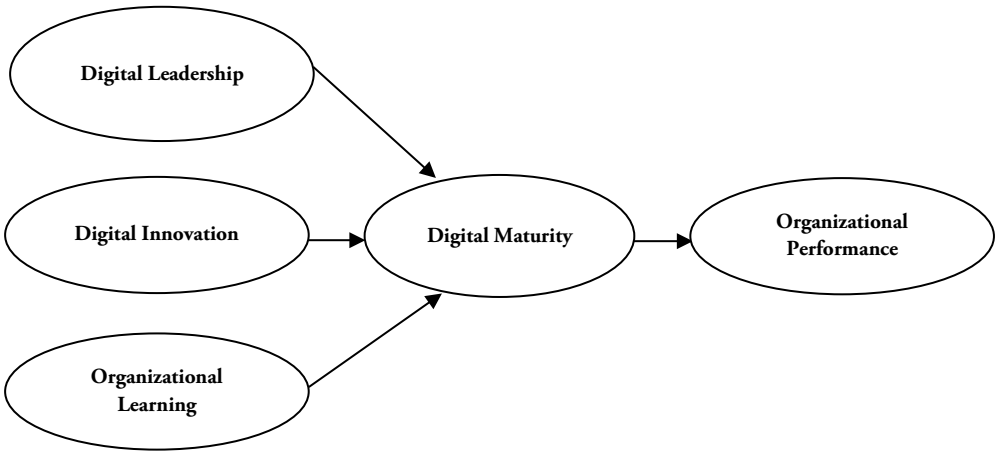

Figure 1. Conceptual Framework

3. RESEARCH METHOD AND MATERIALS

This type of research can be classified as confirmatory and explanatory research. Confirmatory research and explanatory research are "research that highlights the relationship between research variables and tests previously stated hypotheses. This research was conducted in the PTPN IV Regional III work environment. This study's population consisted of all PTPN IV Regional III employees, totaling 207 people, who would be the object of research and sample determination. The census method determined the number of samples, so the sample used was all 207 employees. Data analysis in this study used inferential statistics measured by SEM-PLS through the SmartPLS 4.0 program.

4. RESULTS AND DISCUSSION

4.1. Statistical Result

a. Convergent Validity Test Results

The results of the convergent validity test by looking at the indicator loading or factor loading values of each indicator on each variable construct in this study can be seen as follows:

Table 1. Results of Convergent Validity Test of Research Variables

Variables	Indicator	Loading	AVE
Digital Leadership	Thinking	0.920	0.763
	Creative	0.835	
	Visionary	0.901	
	Curiosity	0.911	
	Profound Leader	0.794	
Digital Innovation	Relative Advantage	0.801	0.762
	Compatibility	0.828	
	Complexity	0.906	
	Ability Tested	0.913	
	Ability to Observe	0.911	
Organizational Learning	System Thinking	0.756	0.685
	Personal Mastery	0.920	
	Mental Models	0.806	
	Building Shared Vision	0.768	
	Team Learning	0.875	

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Variables	Indicator	Loading	AVE
Digital Maturity	Initiating	0.935	0.814
	Emerging	0.940	
	Performing	0.864	
	Advancing	0.945	
	Leading	0.821	
Organizational Performance	Productivity	1,000	-

b. Reliability Test Results

There are 2 (two) criteria for measuring or evaluating reliability. The results of the reliability test with the reliability indicator criteria can be seen in the following Cronbach's alpha table 2:

Table 2. Results of Cronbach's Alpha Test of Research Variable Constructs

Variables	Cronbach's Alpha	Size	Decision
Digital Leadership	0.922	0.7	Reliable
Digital Innovation	0.921	0.7	Reliable
Organizational Learning	0.884	0.7	Reliable
Digital Maturity	0.942	0.7	Reliable

In Table 2, it can be seen that all values of Cronbach's alpha of the research construct variables are above 0.70. This explains that all construct variables meet the reliability requirements. The results of the reliability test with the internal consistency reliability criteria can be seen in the following composite reliability table:

Table 3. Results of Composite Reliability Test of Research Variable Constructs

Variables	Composite Reliability	Size	Decision
Digital Leadership	0.941	0.7	Reliable
Digital Innovation	0.941	0.7	Reliable
Organizational Learning	0.915	0.7	Reliable
Digital Maturity	0.956	0.7	Reliable

Table 3 shows that all values of the composite reliability of the research variable construct variables are above 0.70. This explains that all construct variables meet the reliability requirements.

c. Coefficient of Determination Test

The results of the Adjusted R-squared value can be seen as follows:

Table 4. Results of the Determination Coefficient Test

Structure	R Square	R Square Adjusted
Digital Maturity	0.579	0.572
Organizational Performance	0.555	0.553

Table 4 shows that the Adjusted R-Square value of the digital maturity variable can be obtained at 0.572. Digital leadership, innovation, and organizational learning influence 57.2% of digital maturity. Then, the R Square value of the organizational performance variable is obtained at 0.555. This means that 55.5% of organizational performance is influenced by digital maturity.

d. Hypothesis Test Results

The test results using bootstrapping from PLS analysis can be seen as follows:

Table 5. Hypothesis Testing Results

Hypothesis	Path Coefficients	T Statistics	P Values
Direct			

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Hypothesis	Path Coefficients	T Statistics	P Values
Digital Leadership -> Digital Maturity	0.197	3,046	0.002
Digital Innovation -> Digital Maturity	0.292	5,314	0,000
Organizational Learning -> Digital Maturity	0.402	6,334	0,000
Digital Maturity -> Organizational Performance	0.745	29,120	0,000
Indirect			
Digital Leadership -> Digital Maturity -> Organizational Performance	0.147	3,013	0.003
Digital Innovation -> Digital Maturity -> Organizational Performance	0.217	5,264	0,000
Organizational Learning -> Digital Maturity -> Organizational Performance	0.300	6,179	0,000

From Table 5, the results of the hypothesis testing can be seen as follows:

a) Digital Leadership -> Digital Maturity

The path coefficient value is obtained at 0.197 with a t statistics value of 3.046 and a P value of 0.002. These results indicate that t statistics (3.046) > 1.96 or P value (0.002) < 0.05, which means that digital leadership has a significant effect on digital maturity. Then, the path coefficient value is obtained at 0.197, which means that every 1 unit increase in digital leadership will increase digital maturity by 0.197 and vice versa, assuming other variables remain constant.

b) Digital Innovation -> Digital Maturity

The path coefficient value is at 0.292 with a t statistics value of 5.314 and a P value 0.000. These results indicate that t statistics (5.314) > 1.96 or P value (0.000) < 0.05, which means that digital innovation has a significant effect on digital maturity. Then, the path coefficient value is obtained at 0.292, which means that every 1 unit increase in digital innovation will increase digital maturity by 0.292 and vice versa, assuming other variables remain constant.

c) Organizational Learning -> Digital Maturity

The path coefficient value is obtained at 0.402 with a t statistics value of 6.334 and a P value 0.000. These results indicate that t statistics (6.334) > 1.96 or P value (0.000) < 0.05, which means that organizational learning has a significant effect on digital maturity. Then, the path coefficient value is obtained at 0.402, which means that every 1 unit increase in organizational learning will increase digital maturity by 0.402 and vice versa, assuming other variables remain constant.

d) Digital Maturity -> Organizational Performance

The path coefficient value is 0.745, with a t statistics value of 29.120 and a P value 0.000. These results indicate that t statistics (29.120) > 1.96 or P value (0.000) < 0.05, which means that digital maturity has a significant effect on organizational performance. Then, the path coefficient value is obtained at 0.745, which means that every 1 unit increase in digital maturity will increase organizational performance by 0.745 and vice versa, assuming other variables remain constant.

e) Digital Leadership -> Digital Maturity -> Organizational Performance

The path coefficient value is obtained at 0.147 with a t statistics value of 3.013 and a P value of 0.003. These results indicate that t statistics (3.013) > 1.96 or P value (0.003) < 0.05, which means that digital leadership has a significant effect on organizational performance through digital maturity. Then, the path coefficient value is obtained at 0.147, which means that every increase in digital leadership through digital maturity by 1 unit will increase organizational performance by 0.147 and vice versa, assuming other variables remain constant.

f) Digital Innovation -> Digital Maturity -> Organizational Performance

The path coefficient value is at 0.217 with a t statistics value of 5.264 and a P value 0.000. These results indicate that t statistics (5.264) > 1.96 or P value (0.000) < 0.05, which means that digital

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innovation has a significant effect on organizational performance through digital maturity. Then, the path coefficient value is obtained at 0.217, which means that every increase in digital innovation through digital maturity by 1 unit will increase organizational performance by 0.217 and vice versa, assuming other variables remain constant.

g) Organizational Learning -> Digital Maturity -> Organizational Performance

The path coefficient value is obtained at 0.300 with a t statistics value of 6.179 and a P value of 0.000. These results indicate that t statistics (6.179) > 1.96 or P value (0.000) < 0.05, which means that organizational learning has a significant effect on organizational performance through digital maturity. Then, the path coefficient value is obtained at 0.300, which means that every increase in organizational learning through digital maturity by 1 unit will increase organizational performance by 0.300 and vice versa, assuming other variables remain constant.

4.2. Discussion

a. The Influence of Digital Leadership on Digital Maturity

Digital leadership has a significant influence on the digital maturity of an organization. Leadership with a clear digital vision encourages the identification of technological opportunities and the consistent implementation of innovation. With a path coefficient value of 0.197, this study proves that strong digital leadership can increase an organization's digital maturity. Important indicators that need to be improved include the leader's ability to find new ways to utilize technology and a deep understanding of the application of the technology. The proposed strategies include Changing the approach to implementing digital technology from participatory to mandatory, supported by a reward and punishment system. Adjusting training based on user profiles, such as field practice-based training for millennials and conventional training for other groups. These results align with research by Liu et al. (2023), which shows that digital leadership increases work engagement and technological innovation, driving organizations toward digital maturity.

b. The Influence of Digital Innovation on Digital Maturity

Digital innovation significantly increases an organization's digital maturity with a path coefficient value 0.292. Structured and easy-to-adopt innovation allows organizations to increase operational efficiency, improve business processes, and ensure that the results of technology implementation can be measured. This study also found that the success of digital innovation is highly dependent on comprehensive early implementation, such as pilot projects in specific operational units. Recommended strategies include improving operational efficiency through digital innovation that is compatible with business needs and strengthening the pre-implementation stage with pilot projects to align management and operational needs; this study supports the view of Khaw et al. (2022), who emphasize the importance of digital innovation in increasing organizational responsiveness to market changes and accelerating the achievement of digital maturity.

c. The Influence of Organizational Learning on Digital Maturity

Organizational learning strongly influences digital maturity, with a path coefficient of 0.402. Continuous organizational learning supports skills development, knowledge sharing, and adaptation to technological change. A deep understanding of the interactions between organizational parts and openness to new ideas are key elements in achieving digital maturity. Strategies that can be implemented include establishing a Project Management Office (PMO) to oversee the implementation of digitalization until digital maturity is achieved. Creating interactive media to share experiences related to the implementation of digital technology. Team building training to improve collaboration and unity of team vision in implementing digital technology. This study aligns with Khaw et al. (2022), who stated that organizational learning increases dynamic capabilities, enabling companies to adapt quickly to technological changes.

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d. The Influence of Digital Maturity on Organizational Performance

Digital maturity significantly affects organizational performance. A high level of digital maturity allows companies to optimally utilize technology to improve operational efficiency, productivity, and innovation. Digitally mature companies can automate business processes, reduce manual errors, and increase competitiveness through relevant innovation. Digital maturity provides better access to integrated data for data-driven decision-making so companies can respond to market changes more quickly. In addition, collaboration between employees and departments has become more effective through the consistent implementation of digital technology. This study's path coefficient value of 0.745 indicates a significant influence between digital maturity and organizational performance. The proposed strategy to improve organizational performance, especially in plantation productivity, includes the implementation of a management dashboard to monitor production data in real-time. This approach will help companies identify constraints and improve target achievement sustainably.

e. The Influence of Digital Leadership on Organizational Performance through Digital Maturity

Digital leadership indirectly affects organizational performance through digital maturity. Visionary leaders in digital transformation can build a digital culture in the organization, drive innovation, and ensure the effective adoption of new technologies. Effective digital leaders also direct data-based decision-making, increase efficiency, and create an ecosystem that supports digitalization. The study results showed that the path coefficient value of 0.147 indicated a significant influence between digital leadership through digital maturity and organizational performance, although with a relatively small impact. Companies must build a digital culture as the organization's core value to optimize this influence. Internalization of this digital culture is expected to make every individual in the company understand the importance of digital technology in increasing work efficiency and achieving company targets.

f. The Influence of Digital Innovation on Organizational Performance through Digital Maturity

Digital innovation is important in improving organizational performance through accelerating digital maturity. Digital innovation that suits business needs allows organizations to automate processes, improve operational efficiency, and quickly respond to market changes. This innovation includes testing technology before full implementation, measuring innovation results, and ease of use of new technologies. The study results showed a path coefficient value of 0.217, indicating a significant influence of digital innovation through digital maturity on organizational performance. To achieve higher performance, the proposed strategy includes simplifying digital applications to be easily accessible and used by users. Integrated mapping of information and data structures is also important to avoid data duplication so that digital technology can function more efficiently in one integrated platform.

g. The Influence of Organizational Learning on Organizational Performance through Digital Maturity

Organizational learning plays a vital role in improving organizational performance through digital maturity. The learning process within an organization accelerates the adoption of digital technologies and increases the company's digital maturity. This learning helps employees and leaders understand and implement digital technologies effectively, ultimately impacting the organization's performance. Organizational learning accelerates digital maturity by strengthening digital skills and knowledge across the organization, increasing efficiency and innovation. Effective organizational learning accelerates the adoption of digital technologies by strengthening team member skills. This learning is critical because it helps employees understand how different parts of the organization are interconnected and influence the implementation of digitalization. This understanding accelerates the integration of digital technologies across departments as organizations reach digital maturity, efficiency, and coordination across departments increase, which directly contributes to improving the organization's overall performance.

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5. CONCLUSION

From the results of the study, it can be concluded that digital leadership has a significant influence on digital maturity, digital innovation has a significant influence on digital maturity, organizational learning has a significant influence on digital maturity, and digital maturity influences organizational performance. In addition, it is concluded that digital maturity has a significant influence on digital leadership and organizational performance, digital innovation and organizational performance, and organizational learning on organizational performance. To support the success of digital transformation to improve organizational performance and realize excellent digital leadership, companies need to change how to internalize digital technology from participatory to mandatory by applying rewards and punishments. In addition, it is necessary to add to the job responsibilities to be willing to apply every digital platform in the company with accurate data that can be accounted for in its input. To improve understanding of digital technology, the implementation of training should be differentiated based on user profiles. In realizing digital innovation, companies need to strengthen and sharpen the pre-implementation stage by creating pilot projects in the minor operational units to find common ground between management needs and the availability of information in the field so that appropriate digital innovations are obtained to obtain more effective and efficient output. Furthermore, in supporting organizational learning, companies need to form an organizational structure for implementing digitalization at the Project Management Office (PMO) level to oversee the implementation of digitalization, hold interaction spaces through social media or special learning applications so that information related to digital implementation is obtained and create team building training in implementing digitalization so that a unified vision is obtained in the team to be able to collaborate and communicate effectively in implementing digitalization. To realize excellent digital maturity in the company, optimize the Management Dashboard to find production data in real time and accurately and use it as a single data evaluation in performance evaluation and decision-making steps. Improving performance through digital maturity to increase the influence of digital leadership, the company can do this by forming a Digital Culture as the company's core values; increasing the influence of digital innovation can be done by simplifying digital applications to be more appropriate and effective, and increasing organizational learning can be done by the company by implementing a digital implementation compliance assessment index in all work units. For further research, other variables can be developed that can influence digital maturity and make the maturity variable a mediator in other variables to determine the extent of its influence on organizational performance.

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