

Exploring the role of e-learning, digital leadership and digital innovation behavior on schools' performance during society 5.0 era

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ABSTRACT

In this digital era, all human activities have moved towards digital. The digital era has provided significant changes in all aspects of life, one of which is the educational aspect. Digital technology has opened up new education opportunities but also presents challenges that must be faced. Almost all sectors, including education in the industry 5.0 era, have digitized, namely by utilizing sophisticated information technology. Era Society 5.0, is an era that will make it easier for human life to interact and transition to the digital era. Thus, the use of digital technology for every aspect of life, especially the education sector, is very necessary since it will reflect the level of competitiveness of a country. This research aims to analyze the relationship between e-learning and performance, digital leadership and performance, and the relationship between digital innovation and performance. This type of research uses quantitative research methods. The population in this research is all high school teachers who have used e-learning platforms and have carried out digital innovation. The sampling technique used in this research was a simple random sampling technique and the total sample of respondents from this research was 489 teachers. The type of data used in this research is primary data and the data search tool used is an online questionnaire using a Likert scale. The data analysis is to use structural equation modelling. The results show that e-learning had a positive and significant relationship with performance, digital leadership had a positive and significant relationship with performance and digital innovation had a positive and significant relationship with performance.

1. Introduction

In this digital era, many organizations are improving operations, and developing new products and services by investing in information technology and artificial intelligence (Obadimeji & Oredein, 2022a). Currently, all human activities have moved towards digital. The digital era has provided significant changes in all aspects of life, one of which is the educational aspect. Digital technology has opened up new education opportunities but also presents challenges that must be faced (Pribadi et al., 2024). Almost all sectors, including education in the industry 5.0 era, have digitized, namely by utilizing sophisticated information technology. Era Society 5.0, an era which is the 5th form of industrial development will make it easier for human life to interact and transition to the digital era. Thus, the use of digital technology for every aspect of life, especially the education

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sector, is very necessary because it will reflect the level of competitiveness of a country. In this case, the role of teachers, school leaders or administrators of educational institutions will play an important role in efforts to realize the digitalization of education in Indonesia. According to Jiang et al. (2022) The rapid development of digital technology today must be used as momentum to be used to improve the quality of education. Digitalization that accompanies human life will continue to experience very rapid development. This change will occur in various sectors, starting from the industrial sector, livestock, and agriculture to the education sector. Education as one of the main factors in improving human resources must follow the dynamic development of the digital world. Nowadays, many educational programs are developing and growing through digital media, either through social media or educational platforms that are easily accessible to educators and students. School leaders are expected to be able to create collaborations or collaborate with other schools that have complete digital learning facilities and facilities or with other companies that have good resources. This is in the school's efforts to be able to optimize facilities and infrastructure that have digital facilities which aim to increase teacher capacity in the learning process by utilizing digital technology.

According to Kurniawan (2022), the school digitalization program launched by the Ministry of Education and Culture will not eliminate the face-to-face learning process. Face-to-face learning between teachers and students in the classroom remains important and irreplaceable and will be enriched with digital content. The school digitalization program will be supported and followed up by increasing teacher competency, especially in the field of mastery of information and communication technology (ICT). This is because teachers are the spearhead and determinant of the success of the school digitalization program to accelerate the creation of superior Indonesian human resources. The concept of school digitalization is the process of using digital technology to improve the quality of education, starting from the learning process, school administration, and interactions between students, teachers, parents and school staff, to school management. This concept involves a complete transformation from conventional teaching methods to a more interactive, responsive and technology-oriented model. According to Mohammadyari and Singh (2015), the digitalization of schools was also adopted as a program by the Ministry of Education, Culture, Research and Technology to prepare schools to enter the era of Industrial Revolution 4.0. The school digitalization program launched by the Ministry of Education and Culture, Research and Technology, will not eliminate the face-to-face learning process because face-to-face learning is still important and irreplaceable. The implementation of school digitalization will focus more on enriching learning with sophisticated digital content that attracts students' interest (Elfaki et al., 2019). School digitalization aims to increase the effectiveness, efficiency and overall quality of education following increasingly advanced technological developments. By implementing digital technology in schools, the learning process can become more interactive, interesting and easily accessible to all students equally. Apart from that, school administration and management activities have also become more integrated (Purwanto et al., 2023).

In the digital era that continues to develop, digitalization has brought significant changes in various sectors of life, including education. School digitalization is the process of adopting information and communication technology in the educational environment to improve efficiency, accessibility and quality of learning. According to Mozie et al. (2022) Digital leadership, closely related to the term digital leader or leader in the digital era, is a leadership style that combines previous operational processes with technological sophistication, for example, online platforms and automation. Then, a digital leader will supervise and assist the performance of his team members so that they can adapt to the digital transformation to achieve company goals. Digital leadership refers to effective leadership to drive digital transformation, improve team performance and simplify operations. According to Musneh and Roslin (2021), Digital leadership will encourage innovation, increase productivity and increase competitiveness. A good digital leader and other leaders are knowledgeable, especially about the digital world. Because technology and online media will always develop rapidly, a good leader in the digital era must be able to understand the basic concepts and how to use them appropriately to achieve business goals. In this way, they can pass on this knowledge to their team members. This digital era makes communication with team members much faster and real-time (Prayuda, 2019). However, still respect their privacy by, for example, not contacting them outside of working hours unless it is urgent. A good leader in the digital era is someone who knows his vision and how to achieve it. Of course, they will also think long-term and creatively to do so. For example, by realizing the potential of team members that no one else knows about and taking advantage of innovation opportunities that may not yet be popular with many people. Because the field of technology and online media is always developing rapidly, a good digital leader must be able to keep up with the flow of these developments. They realize that the only constant thing in life is change, so they must be able to adapt to this so that the business can continue to grow (Praditya & Purwanto, 2024). To face the era of digital transformation in the business world, being a good leader is not enough. You also need other things such as broad insight, supportive soft skills, and much more. A digital leader can inspire his members to always innovate and find and maintain ideas, and organizations must have the readiness to adapt to welcome digital transformation.

According to Nedungadi and Raman (2012), innovative behavior is demonstrated by an individual's capability to implement new ideas more effectively and efficiently, with innovative behavior helping organizational members to increase productivity and competitiveness. In the digital era that continues to develop, digital business innovation is an important factor in creating excellence. competitive. Companies that can adapt to technological changes and develop innovative solutions have a greater chance of succeeding in an increasingly competitive market. In this article, we will discuss the importance of digital business innovation in building competitive advantage, implementation strategies, and the benefits that companies can obtain. A culture of innovation is the main key to sustainable business growth in an era of rapidly growing digital growth. Companies that can adapt quickly, deal with market changes, and create new solutions will have a significant competitive advantage. One way to

encourage innovation within a company is to implement a strong innovation culture. Innovation culture refers to a work environment that encourages creativity, experimentation and collaboration among employees. This involves opening up space for new ideas, thinking outside the box, and trying new things without fear of failure (Galy et al., 2011). A strong culture of innovation creates an atmosphere where employees feel supported and allowed to contribute with their creative ideas. Implementing a culture of innovation in a company is not an easy task and requires commitment from all lines of business. To make it easier for you to implement an innovation culture, here are several steps you can take to encourage a strong innovation culture in your company (Rakic et al., 2020).

2. Literature Review

2.1 E-learning

E-learning is a learning process that uses Internet technology to facilitate, deliver and enable the distance learning process. E-learning or electronic learning is a learning method that uses electronic tools online (Hasim et al., 2022). E-learning allows the teaching and learning process to be carried out by anyone, anytime and anywhere. E-learning is an internet-based learning method that will make it easier for teachers and students to learn anytime and anywhere. This E-learning learning model is considered more modern and interesting compared to conventional learning methods (Hughes et al., 2018). E-learning can reach a wide geographical area and is not limited to certain areas because it can be accessed throughout the world. Learners will be more independent because they are active and diligent in opening e-learning themselves so that they gain more knowledge or insight. Through e-learning, students (students and university students) can continue learning even if they are physically absent or unable to attend lecture activities in the classroom. Some of the benefits of e-learning are the flexibility of learning activities, both in the sense of student interaction with learning material/materials, as well as student interaction with lecturers/teachers/instructors, as well as interaction between fellow students to discuss learning material. E-learning is a learning system that utilizes electronic media as a tool to assist learning activities (Hussain et al., 2016). The current implementation of e-learning varies greatly, but all of it is based on the principle or concept that e-learning is an effort to distribute learning materials via electronic media or the Internet.

2.2 Digital Leadership

According to Baso (2022), Digital leadership is a process where leaders can direct and become navigators in implementing digital transformation programs so that they can run successfully and achieve the expected targets. According to Benitez (2022), a digital leader must be able to understand business data and information well and make decisions based on careful analysis. This involves the ability to collect, analyze, and interpret data accurately. The industry needs digital leadership that is oriented towards innovation and creativity to remain competitive. Digital leadership is very necessary to ensure that the digital transformation program currently underway can provide optimal results, be able to overcome all the problems and challenges faced and create new opportunities. According to Aboobaker (2021), Digital leadership includes the ability to assess and analyze information critically. Students as digitally-led millennials can identify trustworthy sources of information, understand the impact of technology on society, and develop critical thinking. In other words, digital leadership can use technology as a tool for independent learning. They can search for information independently, access online learning resources, and develop new skills with the help of technology. understanding of digital security. Students who have digital leadership understand the importance of digital security. They can protect their privacy, recognize potential online risks, and act wisely in using technology (Prayuda, 2019). Digital leadership includes ethical awareness in the use of technology. According to Santoso et al. (2019) Thus, digital acts ethically in online interactions respect privacy rights and avoid harmful online behaviour. According to Alemany et al. (2021), Digitalization of education is the use of technology as an aspect of the learning system, starting from learning methods, curriculum and even including educational administration systems. Nowadays, technological developments have a huge influence on innovation in the world of education. Equal distribution of education in outermost, disadvantaged and remote areas is helped by the digitalization of education.

2.3 Digital innovation

According to Ćukušić et al. (2010), Digital innovation is the use of digital technology during the innovation process", and states that the resulting digital innovation has radically changed the way services and products are created and structured, thereby enabling new ways of creating value and appropriation. Digital business innovation is the use of digital technology to develop new and more efficient products, services, processes and business models. And with the progress of the Industrial Revolution 4.0 where the technological era is increasingly rapid, innovation through digital business can help business actors to adapt to market changes, create additional value, increase operational efficiency, and provide unique customer experiences (Hidayati et al., 2022). Digital innovation is the application of new digital technology to solve problems faced by humans. Digital innovation is a process that must be carried out continuously so that the problems faced get solutions. According to Chen (2009), digital innovation is not only carried out by individuals. However, it is also carried out by large organizations such as companies to develop their business activities (Hasim et al., 2022). So, digital innovation can find more creative business activity solutions, creativity and better product quality. As a result, a business activity that involves digital innovation can produce products more easily, quickly and cheaply. According to De Jong (2007), the work culture of digital society is to carry out almost all activities using digital devices. Collaboration in Teams, Team collaboration is collaboration carried out

in work teams, with each team member having tasks, time limits and clearly stated goals. According to Ebisin et al. (2017), Digital innovation can also be interpreted as the process of creating or creating new ways of doing something. In a business context, digital innovation can be related to modifying business models and adapting to changes to create better products or services (Galy et al., 2011).

2.4 The relationship between e-learning and performance

According to Zhu et al. (2014), E-Learning learning is very effective for students to use at any time. Teachers and students can communicate during learning via Gmail, WhatsApp, Telegram or other learning media such as Google Classroom. Teachers can help students in delivering material (Galy et al, 2011). According to Alenezi (2020), some of the benefits of e-Learning are the flexibility of learning activities, both in the sense of interaction between students and learning material, as well as the interaction between students and instructors, as well as the interaction between fellow students to discuss learning material. The positive impacts of using E-Learning include: Students can learn easily and efficiently. Students can understand all the learning material easily and according to what the students want. Students can keep up with technological developments that are growing increasingly rapidly. According to Antonopoulou et al. (2020), E-learning enables a continuous learning process. E-learning supports students to be more active in the learning process (Galy et al., 2011). Discussion activities can be carried out at any time through portals or forums on the internet between teachers and students. Based on previous research studies, the following hypothesis is formulated

H₁: *e-learning has a positive and significant relationship with performance.*

2.5 The relationship between digital leadership and performance

According to Asbari et al. (2023) and Asbari (2024), Digital Leadership aims to train students to face the challenges of the digital 4.0 era such as rapid technological changes, demands for new technological skills, and changes in digital management. The importance of digital leadership is to increase efficiency and productivity, enable greater work flexibility, reduce the digital gap between generations, and accelerate innovation and adaptation. The advantage of digital leadership in the digital era is that digital leaders can use technology to increase operational efficiency and speed up response times to customers. They can also collect and analyze data to make better business decisions (Hughes et al., 2018). According to Baharuddin et al. (2019), digital leadership can be a competitive advantage in the ability of individual leaders who influence their organization to improve performance. The positive impact of digital leadership is ease of access to information. Digital technology has made access to information easier and faster. With the internet, information from all over the world can be accessed with just a few clicks. It supports learning, research, and access to current news. Advances in Communication. The development of social media, instant messaging, and video calls has streamlined long-distance communication (Elfaki et al., 2019). Digital leadership can communicate with friends, family or colleagues around the world easily, overcoming barriers of time and space. Increased efficiency, automation and digitalization systems enable business processes and work to become more efficient. This saves time and money and minimizes the risk of errors. Based on previous research studies, the following hypothesis is formulated

H₂: *Digital leadership has a positive and significant relationship with performance.*

2.6 The relationship between digital innovation and performance

According to Siswanto et al. (2023), Digital business innovation is the key to building competitive advantage in an ever-evolving digital era. By identifying innovation opportunities, implementing the right innovation strategy, building a strong innovation culture, and leveraging disruptive technologies, companies can create additional value, increase operational efficiency, and provide unique customer experiences. Digital business innovation is not just about technology but also involves creativity, collaboration, and a company's ability to adapt to market changes. Through digital innovation, companies can overcome consumer, product and management problems, thus increasing profits and speeding up product distribution to consumers. If the company's productivity is slow, it will incur more costs (Prayuda, 2019). The role of innovation in digital is very important because innovation can help companies find new and effective ways to increase productivity, product or service quality, and profits. According to Wang, et al. (2010) To overcome this, we can take advantage of digital innovation and speed up business activities. Thus, reducing the human workload and saving more on production costs. Technological innovation, especially in terms of promotion, plays a key role in creating new opportunities, increasing efficiency and driving sustainable economic development. Technological innovation in promotions allows companies to reach a wider target market in a more effective way (Praditya & Purwanto, 2024). Based on previous research studies, the following hypothesis is formulated

H₃: *Digital innovation has a positive and significant relationship with performance.*

3. Method

This type of research uses quantitative research methods. The population in this research is all high school teachers who have used e-learning platforms and have carried out digital innovations. The sampling technique used in this research was a simple

random sampling technique and the total sample of respondents from this research was 489 teachers. The type of data used in this research is primary data and the data search tool used is an online questionnaire using a Likert scale with a scale of 5, namely Scale 1 for strongly disagree answer choices, Scale 2 for disagree answer choices, Scale 3 for neutral answer choices, Scale 4 is for the answer choice agree, Scale 5 is for the answer choice strongly agree. The data analysis method that will be used in this research is to use structural equation modelling. The path analysis that will be used in this research is partial least squares (PLS), using Smart PLS 3.0 software. In the PLS evaluation model, there are stages of the Measurement Model or outer model, namely Convergent Validity, Discriminant Validity and Composite Validity the inner model starts by looking at the R-square value for each dependent latent variable, then the hypothesis test or t-test, which is to test significance. Constants and independent variables influence the value of the dependent variable, if the calculated t value < t table, then the null hypothesis is rejected, the regression coefficient is significant, and the alternative hypothesis stated in this study is accepted at a significance level of 5% (five per cent).

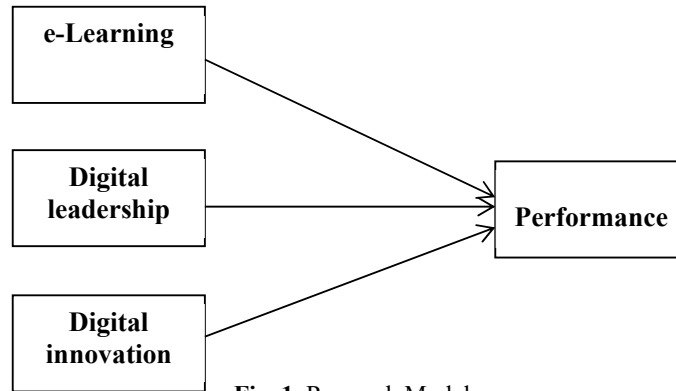


Fig. 1. Research Model

4. Result and Discussion

4.1 Measurement Model

The initial stage of data analysis is to develop a PLS-SEM model, the independent variables of this research are e-learning, digital leadership and digital innovation. The dependent variable is school performance. The PLS-SEM model is structured as in Fig. 2 below:

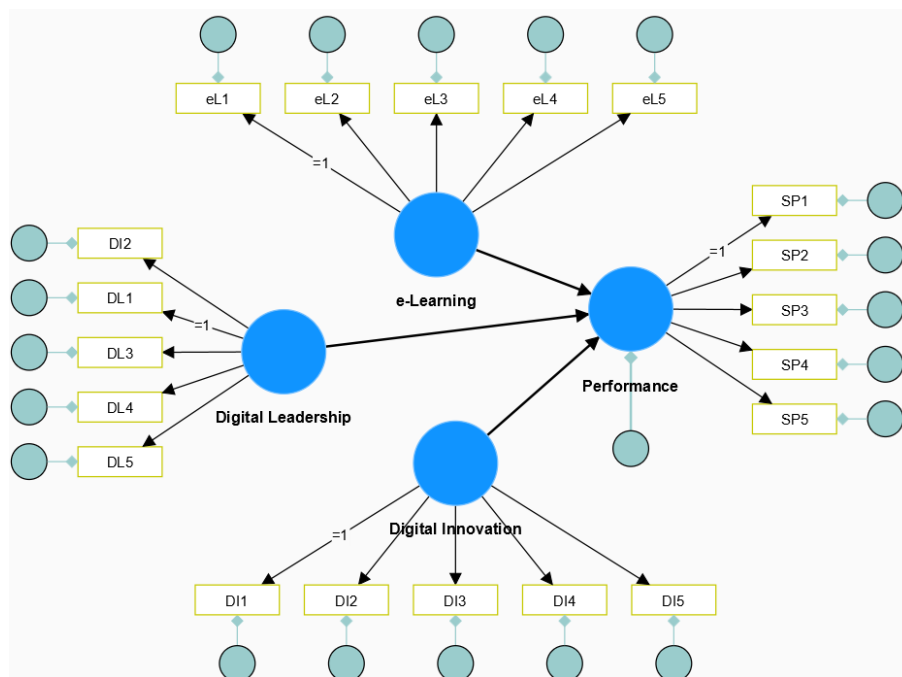


Fig. 2. Measurement Model

4.2 Validity and Reliability

Table 1 presents the results of Composite Reliability (CR), Cronbach alpha and Average Variance Extracted (AVE) for all variables in the model. All variables show satisfactory reliability with Cronbach Alpha greater than > 0.80 Composite Reliability (CR) greater than 0.80 and Average Variance Extracted (AVE) value greater than 0.60.

Table 1
Composite Reliability (CR), Cronbach Alpha and Average Variance Extracted (AVE)

Variables	Cronbach's Alpha	CR	AVE
e-Learning	0.812	0.834	0.673
Digital Leadership	0.834	0.806	0.620
Digital Innovation	0.809	0.807	0.637
Performance	0.813	0.804	0.610

4.3 Discriminant Validity (HTMT)

To further assess discriminant validity, Table 2 shows the Heterotrait-Monotrait (HTMT) correlation ratio values. The values in the table show that all variables have discriminant validity because the correlation between different constructs is lower than the correlation within the same construct.

Table 2
Discriminant Validity (HTMT)

	eL	DL	DI	P
e-Learning	0.835			
Digital Leadership	0.745	0.835		
Digital Innovation	0.734	0.709	0.832	
Performance	0.674	0.673	0.732	0.893

4.4 Structural Equation Modeling

Structural equation modelling (SEM) to explain the relationship between a group of independent variables and the dependent variable. The direct relationship analysis investigates the relationship between e-learning and performance, digital leadership and performance, and digital innovation and performance. The results of the relationship show that the p-value is less than 0.050 and the t-value is greater than 1.96, so it is concluded that there is a significant relationship.

Table 3
Direct Relation

		T Statistics	P Values	Decision
Hypothesis 1	EI→P	6.345	0.000	Supported
Hypothesis 2	DL→P	7.432	0.000	Supported
Hypothesis 3	DI→P	6.098	0.000	Supported

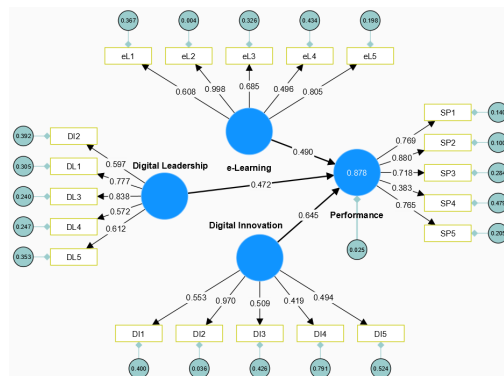


Fig. 3. Hypothesis Testing Model

4.5 The relationship of e-learning to performance

Based on the results of data analysis, it was obtained that the p-value was $0.000 < 0.050$, so it was concluded that e-learning had a positive and significant relationship with performance. The positive impacts of using E-Learning include: Students can

learn easily and efficiently. Students can understand all the learning material easily and according to what the students want. Students can keep up with technological developments that are growing increasingly rapidly. E-learning allows educational institutions to reduce the costs of teaching staff, classroom equipment, online training site rentals, and book printing. Educational institutions do not need to provide different teaching staff for each class, print hundreds of books, and renovate classrooms. E-learning allows the teaching and learning process to be carried out by anyone, anytime and anywhere. Like the principles of other online activities, distance and time are no longer barriers to carrying out activities, including in this case learning.

According to Utomo et al. (2023) Implementing the concept of school digitalization can bring significant benefits to education in Indonesia. The benefits of school digitalization include: School digitalization allows for easier accessibility to educational resources. Students and teachers can access various resources from anywhere and at any time via digital devices equipped with an internet connection. With interactive learning methods, such as the use of educational applications and Learning Management System platforms such as Jelajah Ilmu, students can be more actively involved in the learning process compared to traditional learning methods, where students only passively listen to explanations from the teacher. As discussed at the beginning, the school digitalization process is not only applied to learning but also to school administration. With digitalization, school administration management such as student data management, assessment, and reporting can be carried out automatically using an integrated system so that it is more efficient. The existence of a digital platform can facilitate collaboration between teachers so that they can share ideas, educational resources, and plans for more effective learning methods. One important aspect of education is the involvement of students' parents. Parents of students must monitor their child's educational progress during the learning period.

With digitalization, parents can be more actively involved and access information regarding their children's academic development and behavior in real time (Obadimeji & Oredein, 2022b). By understanding the concept of school digitalization well, teachers and school principals can improve the overall quality of education. The daily learning process can become more effective and efficient so that students can get the best learning results. With the high need for knowledge of all educational instruments, with digitalization, access to new knowledge can be obtained from anywhere, not only from within the country but also from abroad in a very easy way. This is in line with the large number of people who do not hesitate to share knowledge in cyberspace, which of course they do by digitizing it through books or online scientific journals. Third, increasing competitiveness with other countries (Prayuda, 2019). With digitalization in the world of education, we can also equalize the quality of domestic graduates with foreign ones, because we can also learn the same things as them thanks to internet access.

According to Yang et al. (2020), Digitalization of schools opens the door to wider educational accessibility. With the adoption of technology, students can access learning materials from anywhere and at any time. This is especially beneficial for students who live in remote areas or have physical limitations to physically attend school. Technology allows the development of more interactive learning approaches. With learning videos, simulations and other multimedia content, students can be actively involved in the learning process and understand the material better. Through online learning applications and platforms, students can interact with teachers and fellow students. It encourages collaboration, discussion, and exchange of ideas beyond the confines of the physical classroom. Teachers can also provide real-time feedback to students, facilitating a more effective learning process. School digitalization allows for more efficient management of educational data (Osime et al., 2012). Technology-based learning management systems enable easier collection, storage, and analysis of student data. This information can be used to monitor student progress, identify individual needs, and develop better learning strategies. Entering the digital era, technological developments are now increasingly rapid, which has a positive impact, especially on the world of education. The positive impacts of technological developments on the world of education include: (1) Making it easier to find information that is needed, (2) The information needed will be faster and more easily accessible for educational purposes. (3) Learning innovation is increasingly developing with the existence of e-learning innovation which can simplify the educational process and create virtual or teleconference-based classes where educators and students do not have to be in the same room, (4) The emergence of various communities on the internet to build new relationships between teachers and students, (5) The emergence of new learning methods that facilitate the learning process for students and teachers. As technology advances, new ways are created to help students understand abstract material. Because these materials can be abstracted using technology. (6) Improving the quality of human resources through the development and use of information and communication technology. (7) Can be used as a decision support system in education, teachers develop their skills in various fields of science and the profile of this institution is well-known by the government

4.6 The relationship of digital leadership to performance

Based on the results of data analysis, it was obtained that the p-value was $0.000 < 0.050$, so it was concluded that digital leadership had a positive and significant relationship with performance. Digital leadership is one of the key elements that must be integrated into education. Digital leadership starts with strong digital literacy, digital leadership has a deep understanding of technology, the ability to use digital devices and applications efficiently, and an awareness of online ethics. Of course, these things must receive maximum attention. Digital leadership involves the ability to think innovatively and creatively in solving problems. The character of students who have digital leadership can present fresh ideas, creative solutions, and meaningful contributions in the learning context. According to Aboobaker (2021), Digital leadership includes the ability to assess and analyze information critically. Students as digitally-led millennials can identify trustworthy sources of information,

understand the impact of technology on society, and develop critical thinking. In other words, digital leadership can use technology as a tool for independent learning. They can search for information independently, access online learning resources, and develop new skills with the help of technology. understanding of digital security. Students who have digital leadership understand the importance of digital security. They can protect their privacy, recognize potential online risks, and act wisely in using technology (Prayuda, 2019). Digital leadership includes ethical awareness in the use of technology. According to Santoso et al. (2019) Thus, digital acts ethically in online interactions respect privacy rights and avoid harmful online behaviour. According to Alemany et al. (2021), Digitalization of education is the use of technology as an aspect of the learning system, starting from learning methods, curriculum and even including educational administration systems. Nowadays, technological developments have a huge influence on innovation in the world of education. Equal distribution of education in outermost, disadvantaged and remote areas is helped by the digitalization of education. To produce progress in terms of national education, digitalization of education is expected to be able to assist education actors in continuing the teaching and learning process evenly and optimally. Keeping up with the times, the digitalization of education is presented and implemented with the aim that education can still produce learning that is in line with its direction and objectives. According to Said and Kamel (2023), Digital leadership provides several benefits. It facilitates better decision-making by leveraging data-driven insights. Leaders can make choices based on real-time analysis, enabling rapid responses to market shifts. Additionally, it improves organizational flexibility by simplifying processes and systems, facilitating flexibility to adapt to changing customer demands. This, in turn, cultivates a culture of innovation and creativity, empowering teams to think out of the box and contribute with new ideas. Additionally, digital leadership plays an important role in strengthening relationships with customers. By leveraging technology, leaders can personalize interactions, better understand customer needs, and increase overall engagement (Perbadi et al., 2024).

4.7 The relationship between digital innovation and performance

Based on the results of data analysis, it was obtained that the p-value was $0.000 < 0.050$, so it was concluded that digital innovation had a positive and significant relationship with performance. There are 3 main things in developing the application of innovation in the digital business sector, namely developing new products or services that utilize digital technology to provide additional value to customers. Automating or optimizing business processes using digital technology to increase efficiency and productivity. According to Baso (2022) Building new business models or changing existing business models by utilizing digital technology to create new sources of income or increase existing income. Digital business innovation provides competitive advantages that differentiate companies from competitors. Digital business innovation enables companies to improve operational efficiency, reduce costs, and increase productivity. Digital business innovation enables companies to provide better customer experiences through personalization, convenience, and better interactions.

A culture of innovation must start from the top. Company leaders must provide full support and be a good example of innovation. Leaders must encourage employees to look for new solutions and provide space for creative ideas (Prayuda, 2019). This support and commitment will be a strong foundation for building a work environment that encourages creativity, experimentation and collaboration. Technological innovation, especially in terms of promotion, plays a key role in creating new opportunities, increasing efficiency and driving sustainable economic development. Technological innovation in promotions allows companies to reach a wider target market more effectively. According to Cruz et al. (2009), A successful innovation culture is supported by active employee participation in decision-making. This includes providing opportunities for employees to provide input, ideas and suggestions regarding projects, changes or policies in the company. Involving employees in the decision-making process provides a sense of ownership and responsibility, thereby increasing their commitment to the decision. Employees also feel valued and cared for, which can increase their motivation and involvement in finding innovative solutions. According to De Jong (2007) To create a culture of innovation, companies need to provide training and development to employees. This training can focus on technical skills and competencies relevant to their job, but can also include innovative skills, such as creativity, critical thinking, and problem-solving. This training and development helps employees improve their capabilities, so they are better prepared and confident in finding innovative solutions and facing complex business challenges (Obadimeji & Oredein, 2022a,b).

4.8 Managerial Implications

The first step that needs to be taken to implement the concept of school digitalization is to analyze the school's needs. Teachers and principals can identify areas in the school that can be improved through digitalization. Apart from that, in-depth analysis is also needed to understand the various needs of students, teachers and administrative staff at schools. Based on the results of the needs analysis that has been carried out, schools can choose what kind of technology is most appropriate to the school's needs. The choice of technology also needs to be adjusted to the school's financial capabilities. Before implementing digital technology, teachers and school staff need to receive training first regarding the use of the technology that will be implemented. That way, they can better understand and be better prepared to use the technology as best as possible. The factors that influence digitalization in the world of education, the first is the increasingly limited availability of space. Digitalization makes it possible to save space for storing scientific archives, both books and student assignment papers which usually have to be stored in a used cupboard, now this is not necessary, because it is enough to store them on a flash disk in units of megabytes to terabytes or even enough. entrusted to Google Drive which has unlimited storage space. Schools and all related parties must be quick in responding to the digital transformation of the education sector, this could be in the form of providing information

technology-based education system facilities and infrastructure and increasing human resource capabilities in terms of digital literacy to be able to use available information technology. This must be done immediately so as not to be left behind by competitors, and so that there are no ongoing effects in the form of a decline in the quality of education. Human resources, especially teaching staff, must be ready for the digitization process in the world of education, which ultimately means that the mandatory competencies that teaching staff must have increase from pedagogical, professional, social, and personality competencies plus digital literacy. Without sufficient digital literacy, the quality of the teaching staff's performance will be questioned, and it is feared that this will have an impact on the learning outcomes of the students they teach.

The government has prepared and discussed the system that will be used, for example, the curriculum and qualifications required. Along with teachers and students who are undoubtedly quite familiar with digital technology. The main issue is the supporting infrastructure needed to be able to carry out comprehensive digitalization of education. Examples are computer labs and school information systems. Limitations in quantity, and quality of devices that are still far from standards that can support educational technology, as well as limitations in building a good information system so that it can be accessed smoothly by teachers, students and parents. One of the main challenges is ensuring that all schools have adequate technology infrastructure and accessibility. Especially in rural areas or areas with limited resources, significant investment may be required to build a reliable internet network and provide adequate technological devices. Teachers need to receive adequate training to adopt and utilize technology in learning. Improving teachers' digital skills is an important factor in carrying out school digitalization effectively. In adopting technology, it is important to ensure the security and privacy of student data. Personal data protection and clear policy settings need to be implemented to protect student information from security threats. A culture of innovation and collaboration is a concept that emphasizes the importance of creating an environment that supports creativity, experimentation, and the exchange of ideas in an organization. It involves values, attitudes, and practices that encourage people to think beyond existing boundaries, seek new solutions, and work together to achieve common goals. Encouraging Innovation in Organizations: Building a culture of innovation that encourages creativity, experimentation and controlled risk-taking. Collaboration with External Partners: Collaborate with startups, universities, or other external partners to access additional expertise and resources in developing innovation.

5. Conclusion

The results of this research based on data analysis show that e-learning has a positive and significant relationship to performance, digital leadership has a positive and significant relationship to performance and digital innovation has a positive and significant relationship to performance. Before implementing digital technology, teachers and school staff need to receive prior training regarding the use of the technology to be implemented. That way, they can better understand and be better prepared to use the technology as best as possible. Digitalization in education will provide greater space for students to be able to think critically, which ultimately increases their ability to design ideas for solving problems. This will certainly further increase the number of innovations and grow new young scientists or experts who are qualified in their respective fields. The next positive thing is increasing competitiveness at the global level. Country territorial restrictions will no longer apply in full. Digitalization makes learning an activity without limits in terms of space and time which becomes more flexible. Digitalization makes students become individuals who want or even have to become someone who is always filled with great curiosity. On the other hand, the teacher must be someone who can act as an innovative facilitator so that he can help students apply the knowledge they have gained. The digitalization of education has the potential to produce digital skills so that they can meet the expectations of employers in an economic-business climate that is increasingly based on digital knowledge and technology. The digitalization of the world of education changes the old way of learning into something new using technology and learning applications. Learning can be carried out anytime, anywhere, not limited by space and time, and does not have to be face-to-face. This raises new issues about the ambiguity of human interaction with the digital environment and its impact on cognitive abilities, attention, and other aspects of human life. According to several experts, the implementation of digitalization in education can have both positive and negative influences. The digitalization of schools brings significant changes in education. With the adoption of information and communication technology, accessibility, interactivity and learning efficiency can be improved. However, challenges such as infrastructure, teacher training and data security need to be addressed. By involving all stakeholders, such as governments, educational institutions and teachers, successful school digitalization can be realized, bringing great benefits to students and the educational process as a whole. Technology has several aspects ranging from a very strong impact on education. Student control at home and parental control at school have many benefits that help educators carry out teaching and learning activities and communication processes. However, technology also has many negative effects. Educators and parents can manage and supervise their students to ensure that they are not affected by the negative impacts of technological developments. And hopefully, with the digitalization of education in this modern era, education will continue to move forward and always transform to be better than before. Digital leadership capabilities are critical to developing the capabilities needed to lead organizations in every sector, including digitizing education, which tends to be slower to develop advanced digital maturity than organizations in some other industries. Digital leadership provides several benefits. It facilitates better decision-making by leveraging data-driven insights. Leaders can make choices based on real-time analysis, enabling rapid response to market shifts. Additionally, it improves organizational flexibility by simplifying processes and systems, facilitating flexibility to adapt to changing customer demands. This, in turn, cultivates a culture of innovation and creativity, empowering the team to think out of the box and contribute with new ideas. Apart from that, digital leadership plays an important role in strengthening relationships with customers. By leveraging technology, leaders can personalize interactions, better understand customer needs, and improve overall engagement. Digital business innovation is the key to

building competitive advantage in an ever-evolving digital era. By identifying innovation opportunities, implementing the right innovation strategy, building a strong innovation culture, and leveraging disruptive technologies, companies can create additional value, increase operational efficiency, and provide unique customer experiences.

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