CENDEKIA, Vol. 17, No. 2, Oktober 2023
p-ISSN: 1978-2098; e-ISSN: 2407-8557
Https://soloclcs.org; Email: oslocendekia@gmail.com
Center of Language and Cultural Studies, Surakarta, Indonesia

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***Cendekia* (2023), 17(2): 204-222**. DOI 10.30957/cendekia.v17i2.865

THE INFLUENCE OF KNOWLEDGE-ORIENTED LEADERSHIP AND UTILIZATION OF DIGITAL ISSUES ON INNOVATION PERFORMANCE IMPLICATIONS FOR ADOPTING METAVERSE TECHNOLOGY IN SERANG REGENCY PRIVATE HIGH SCHOOL

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ABSTRACT

This research is entitled The Influence of Knowledge-Oriented Leadership and the Use of Digital Issues on Innovation Performance Implications on Adopting Metaverse Technology in Serang Regency Private High School. The purpose of this study is to get an overview of knowledge-oriented leadership, issue utilization, innovation performance and adopting metaverse technology, knowing the influence of knowledge-oriented leadership on adopting metaverse technology, knowing the influence of using digital issues on adopting metaverse technology , knowing the influence of knowledge-oriented leadership on innovation performance, knowing the influence of using digital issues on innovation performance, knowing the influence of adopting metaverse technology on innovation performance, knowing knowledge-oriented leadership towards adopting metaverse technology through innovation performance as an intervening variable, and knowing the influence of using digital issues on adopting metaverse technology through innovation performance as an intervening variable at Serang Regency Private High School. The research method used is a quantitative descriptive analysis method with a Structural Equation Modeling (SEM-PLS) model using SmartPLS. Based on the results of the study shows that the influence of knowledge-oriented leadership on adopting metaverse technology is positive and significant and the hypothesis is accepted, the influence of the use of digital issues on adopting metaverse technology is positive and significant and the hypothesis is accepted, the influence of knowledge-oriented leadership on innovation performance is positive and significant and The hypothesis is accepted, the influence of adopting metaverse technology on positive and significant innovation performance and the hypothesis is accepted, the influence of knowledge-oriented leadership on adopting metaverse technology through innovation performance as a positive and significant intervening variable and the hypothesis is accepted, the influence of using digital issues on adopting metaverse technology through innovation performance as a positive and significant intervening variable and the hypothesis is accepted.

Keywords: Knowledge-oriented leadership, Utilization of digital issues, Performance of innovation, Adoption of metaverse technology

I. INTRODUCTION

Understanding the rapid changes in the digital ecosystem, leadership roles based on knowledge and understanding of digital issues are becoming increasingly crucial (Hikmah, Muslimah & Budi, Achadi, 2020). This has been proven to be a factor that can influence the innovative performance of an institution or organization. In the educational context, especially in Serang Regency Private Vocational Schools, adopting metaverse technology is not just a choice, but a necessity to prepare students to face the digital dynamics of the future (Hidayatul, 2023). In discussing the influence of knowledge-oriented leadership and the use of digital issues on innovation performance, it is important to realize that high school is not just a place of learning, but also a place for character formation and readiness to face changes that are occurring globally (Amalia et al., 2023).

Leadership that understands digital issues in depth can be the main driver in exploring innovative potential in the Serang Regency Private High School environment. This is not only

limited to understanding technology, but also how this technology can be applied effectively in the learning process. Proactive leadership in facilitating the understanding and application of digital technologies, such as the metaverse, can create an environment that stimulates creativity and innovation among students and teaching staff (Abbydzar, Muhammad, Nur & Soerjati, Enni, 2023).

The high level of innovative performance in Serang Regency Private High Schools is not the result of chance, but rather the result of planned and led efforts with a clear vision regarding the potential of technology (Endarwati et al., 2022). The awareness of changes in learning paradigms and the importance of following technological developments has a positive impact on students' ability to adopt metaverse technology. In this context, leadership that is able to articulate the need for digital knowledge is key in facilitating the transition to more effective use of metaverse technologies (Endarto & Martadi, 2022).

However, the influence of leadership is not only limited to technical aspects. Leadership that is inclusive, empowering, and encourages collaboration between stakeholders in the Serang Regency Private High School environment is an important foundation for sustainable innovative performance. A deep understanding of digital issues is not an end goal, but is a tool to create an environment that is inclusive and open to new ideas from various groups (Aspi, 2022).

It needs to be acknowledged that the adoption of metaverse technology in an educational context is not an easy process. However, leadership that has a long-term vision, patience, and commitment in bridging the gap between technology and learning needs can be the main catalyst in accelerating the adoption of metaverse technology in Serang Regency Private High Schools (Wijayanto, 2022). With a holistic approach, educational leaders can guide not only students and teachers, but also other stakeholders in understanding, embracing, and utilizing the potential of metaverse technology to improve the quality of learning (Fadia, Siti, Nurul, 2021).

In the midst of the rapid development of technology, adaptive leadership is an inevitable key. This is not only limited to the ability to follow the latest technological trends, but also the ability to integrate this technology into a curriculum that is relevant and appropriate to student needs. Leadership that is adaptive and responsive to environmental changes will provide a strong foundation for the appropriate and effective adoption of metaverse technology (Hazna, 2020).

It cannot be denied that the innovative performance and adoption of metaverse technology in Serang Regency Private Vocational Schools is also influenced by the readiness of the infrastructure and available resources. Therefore, proactive leadership in building cooperation with related parties, both government and the private sector, is very necessary. This collaboration not only focuses on providing infrastructure, but also on capacity building and training for all parties involved in the learning process with metaverse technology (Dwiki et al., 2019).

The changes occurring in the world of education not only require the adoption of the latest technology, but also change the learning paradigm as a whole. Therefore, leadership that is able to drive this transformation needs to have a broad vision and the ability to communicate and encourage the entire educational community at Serang Regency Private High Schools to adapt to these changes (Haw, 2023). However, leadership influence is not an instant process. In facing the complexity of changing technology and learning paradigms, leadership requires patience and perseverance to fight for sustainable transformation. This process requires awareness of the

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challenges faced and a strong commitment to continue improving the quality of education by adopting metaverse technology as an important component in Serang Regency Private High Schools (Indriyani, 2019).

Despite the existing challenges, it is important to recognize that leadership that promotes an innovative vision and technology as a tool to improve the quality of education will have a significant long-term impact. The active involvement of leaders in building a learning ecosystem that is adaptive, inclusive and responsive to technological developments will bring Serang Regency Private Vocational Schools towards success in adopting metaverse technology by maximizing its potential (Nursyam, 2019).

The influence of knowledge-oriented leadership and the use of digital issues on innovation performance, as well as its implications for the adoption of metaverse technology in Serang Regency Private High Schools, is not just about technical aspects. More than that, this involves managing change holistically, focusing on character formation, and a willingness to continue learning and developing in facing future dynamics. In this context, leadership at Serang Regency Private High School is the main key in directing sustainable change towards the use of metaverse technology to support better quality education.

II. THEORETICAL BASIS

2.1 Knowledge-Oriented Leadership

Knowledge-oriented leadership is a leadership model that focuses on the acquisition of relevant knowledge and deep understanding of issues related to a particular work environment or context. In the context of educational organizations or institutions such as Serang Regency Private High School, this kind of leadership places knowledge as one of the main aspects that shapes policy, directs strategy, and inspires action in the educational environment (Alzghoul et al., 2023). Knowledge-oriented leaders understand that in this information age, the greatest resource that can bring about change is knowledge. Therefore, they encourage staff and team members to continuously learn, develop new skills, and maintain freshness in knowledge. At Serang Regency Private High School, this kind of leadership seeks to form a culture of sustainable learning, where all parties in the school environment feel encouraged to continue to develop and hone their skills (Abdukhoshimov & Durmus, 2020).

Knowledge-focused leadership also plays an important role in managing information and turning it into useful knowledge. They not only collect data and information, but also pay attention to how that information can be translated into knowledge that can be applied in an educational context (Lee et al., 2020). At Serang Regency Private High School, this kind of leadership seeks to bridge the gap between information and policy, ensuring that any information collected has value in the development of the institution. Additionally, knowledge-oriented leaders facilitate effective collaboration among team members. They understand the power of synergy that results from sharing knowledge and experience. At Serang Regency Private High School, this kind of leadership promotes proactive teamwork, supports the exchange of ideas, and facilitates a platform for sharing knowledge, thereby creating a creative and inclusive environment (Pellegrini et al., 2020).

Not only focused on existing knowledge, knowledge-oriented leadership also encourages innovation. They understand that using ever-evolving knowledge can spark new ideas and creative

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solutions to the challenges they face (Shamim et al., 2019). At Serang Regency Private High School, this kind of leadership encourages students and staff to think outside the box and design innovative solutions in the context of metaverse technology and learning (Zia, 2020). Apart from that, leaders who focus on knowledge also have good abilities in managing risks and making the right decisions. They utilize the knowledge and information they have to evaluate risks carefully before taking steps forward. At the Serang Regency Private Vocational School, this kind of leadership is at the forefront in evaluating the consequences of every decision taken, especially in the context of adopting metaverse technology (Liu et al., 2022).

Indicators of knowledge-oriented leadership based on experts can be grouped into two dimensions, namely: leader and organization.

2.2 Utilization of Digital Issues

Utilization of digital issues refers to efforts to optimize the potential and benefits of the development of information and communication technology in various aspects of life. In the context of education at Serang Regency Private High Schools, the use of digital issues covers various aspects that create significant opportunities and transformations in the learning process and institutional development. First of all, the use of digital issues in education at Serang Regency Private High School focuses on the integration of technology as a tool to improve the quality of learning. The use of software, applications and online learning platforms allows students and teachers to access a wider and more varied range of educational resources. This creates a learning environment that is more dynamic and open to various learning styles (Rohman et al., 2024).

The use of digital issues also plays a role in facilitating better collaboration and communication between students, teachers and other parties involved in education. Through online platforms, online discussions, and other digital collaboration tools, cooperation between individuals and groups can be enhanced, allowing for a more intensive exchange of ideas and the development of social skills. The use of digital information also allows for personalization of learning. By adopting the right technology, educators at Serang Regency Private High Schools can monitor individual student development in more depth. This allows teachers to adapt the curriculum, materials, and learning methods according to each student's needs and learning pace (Fajriyani et al., 2023).

The use of digital information also allows for experimentation and innovation in the learning process. The use of simulations, educational games, or virtual reality technology can enrich students' learning experiences with a more interactive approach. This also provides an opportunity for teachers to try new methods that may be more effective. The use of digital issues not only influences the learning process, but also influences school administration and management. Adoption of information technology in school management can increase efficiency in data management, internal communication, and more accurate and timely decision making in Serang Regency Private High Schools (Adiawaty, 2019).

The use of digital media allows the creation of an inclusive learning environment. Technology can be a tool to overcome gaps in access to education by providing access to learning materials for students from diverse backgrounds and conditions. It supports the principle of equality in education. Utilizing digital issues also allows for the development of skills relevant to

the digital era. By introducing students to the latest technology such as metaverse technology at Serang Regency Private High School, they can develop the skills needed to adapt and succeed in an environment increasingly dominated by technology (Mardikanto & Rahardjo, 2018).

Indicators of Digital Issue Utilization according to experts can be grouped into three dimensions, namely: the dimension of understanding digital issues, the dimension of utilizing digital issues and the dimension of challenges in utilizing digital issues.

2.3 Innovation Performance

Innovation performance refers to an organization's ability to create, adopt and implement new ideas that bring added value, whether in the form of products, services, processes or implemented strategies (Hardani et al., 2023). In an educational environment such as Serang Regency Private High School, innovation performance is crucial in facing dynamic changes and demands for better and more relevant updates. First of all, the innovation performance at Serang Regency Private High School emphasizes the importance of efforts to stimulate creativity and new ideas in the learning process. It involves an approach that encourages students and staff to think outside the box, explore new concepts, and develop solutions that have never been considered before (Ali et al., 2023).

Innovation performance also requires a supportive environment for the development of new ideas. At Serang Regency Private High School, efforts to create a culture that facilitates experimentation, controlled risk-taking, and the knowledge that failure is part of the learning process are important steps in improving innovation performance. Innovation performance also requires investment in the development of creative and analytical skills among students and staff. Innovation often emerges from a combination of critical thinking, the ability to solve problems, and the ability to think laterally. At Serang Regency Private High School, building these skills is a priority in improving innovative performance (Xie et al., 2023).

Innovation performance also involves a deep understanding of stakeholder needs and expectations. At Serang Regency Private High School, innovation-based education takes into account input from students, parents and industry to develop solutions that suit existing needs and support sustainability. Innovation performance also involves the use of technology as a tool to facilitate and accelerate the innovation process. At Serang Regency Private High School, the adoption of technology such as digital learning platforms, metaverse technology, or applications that support creativity is an important part in improving innovation performance (Robertson et al., 2023).

Innovation performance involves understanding the competitive advantages and differentiation that may be created through innovation. At Serang Regency Private High School, innovation is carried out with the aim of providing unique added value in learning and developing skills that are relevant to the future. Innovation performance also requires continuous learning from failure and success. At Serang Regency Private High School, an attitude that values learning from every failure, as well as the ability to analyze and understand what is successful or not successful in the innovation process is emphasized (Gao et al., 2023).

According to experts, indicators of innovation performance can be grouped into three, namely: innovation, innovation performance and innovation challenges.

2.4 Adopting Metaverse Technology

The adoption of metaverse technology is becoming an increasingly relevant topic in educational contexts such as in Serang Regency Private High Schools. The adoption of metaverse technology, which creates virtual worlds where users can interact in immersive digital environments, has great potential to change the way learning and interactions are conducted in schools. First of all, the adoption of metaverse technology in Serang Regency Private High School brings the potential to create a more interesting and interactive learning environment for students. In the metaverse, students can participate in more realistic learning experiences, for example, with 3D simulation exploration that displays lesson concepts visually and practically (Shwedeh, 2024).

The adoption of metaverse technology also allows for more adaptive and personalized learning. With the ability to modify the learning experience according to individual needs, metaverse can adjust the curriculum and material delivery based on the level of understanding or learning style of each student at Serang Regency Private High School. The adoption of metaverse technology also opens the door to inclusivity in learning. Accessibility-enabled metaverse platforms can help students with special needs engage in learning more easily. This encourages equal access to education (Waqar et al., 2023).

The adoption of metaverse technology at Serang Regency Private High School also creates opportunities for collaborative learning experiences. Students can work together in a virtual environment that allows for discussions, joint projects, and team-based creativity in the digital world. The adoption of metaverse technology also presents the potential for the development of skills relevant to the digital era. Students can become skilled at navigation, virtual teamwork, and adapting to an increasingly digitally connected environment, preparing them for the changing job market (Salloum et al., 2023).

In addition, the adoption of metaverse technology also creates space for the exploration of concepts that are difficult to understand traditionally. In an immersive virtual environment, abstract concepts or complex processes can be explained and understood better by students at Serang Regency Private High School. The adoption of metaverse technology also brings the potential to make virtual visits to places or situations that are impossible to access physically. Through realistic simulations, students can explore certain areas that support their learning, even if this is not physically possible (Abumalloh et al., 2023).

However, keep in mind that the adoption of metaverse technology also brings a number of challenges. One of them is the need for adequate technological infrastructure. At Serang Regency Private High School, adopting metaverse technology requires stable access and supporting devices, which may be an obstacle for some students. Additionally, metaverse technology also raises ethical and security questions. Data protection, privacy security, and content monitoring are important things that must be considered when using this technology in an educational context (Al-Sharafi et al., 2023).

Metaverse technology also requires good training for educators. Effective use of this technology requires a deep understanding of how to integrate it into the curriculum and provide an optimal learning experience for students. Metaverse technology also requires sustainability and adaptation to constantly changing technological developments. Education at Serang Regency Private High Schools must be ready to continue to follow technological developments so that they

remain relevant and effective in supporting the learning process. However, the positive potential of metaverse technology cannot be ignored. A more interactive, personalized and adaptive learning experience can improve the quality of education at Serang Regency Private High Schools, preparing students for the challenges of an increasingly connected and digital world (Ning et al., 2023).

According to experts, indicators for Adopting Metaverse Technology can be grouped into three, namely: metaverse, metaverse adoption, metaverse adoption challenges.

Hypothesis

H1 : Knowledge Oriented Leadership has a direct and significant positive effect on Adopting Metaverse Technology in Serang Regency Private High Schools.

H2 : The use of digital issues has a direct and significant positive effect on the adoption of Metaverse Technology in Serang Regency Private High Schools.

H3 : Knowledge Oriented Leadership has a direct and significant positive effect on Innovation Performance in Serang Regency Private High Schools.

H4 : The use of digital issues has a direct and significant positive effect on innovation performance in private high schools in Serang Regency.

H5 : Adopting Metaverse Technology has a direct, significant positive effect on Innovation Performance in Serang Regency Private High Schools.

H6 : Knowledge Oriented Leadership has a significant positive indirect effect on Adopting Metaverse Technology through Innovation Performance as an Intervening Variable.

H7 : Utilization of Digital Issues has a Significant Positive Indirect Influence on Adopting Metaverse Technology through Innovation Performance as an Intervening Variable.

III. RESEARCH METHODS

This study uses a causal type of quantitative method. Descriptive research, according to, is a type of research that aims to describe a symptom, event or occurrence that is currently occurring (Waruwu, 2023). In this research, researchers tried to photograph the most prominent events and happenings and then describe them as they really were (Yuliani & Supriatna, 2023).

Population and Sample

Population is all members of the unit of analysis which form one unit. Population is a generalization area consisting of objects or subjects that have certain qualities and characteristics determined by the researcher to study and then draw conclusions (Swarjana & SKM, 2022). The population in this study was private high schools in Serang Regency. Data for the 2023/2024 semester is odd, the number of private high schools in Serang Regency recorded in the Dapodikdasmen is 54. For teacher data it is 583 and principals are 54.

The sample is part of the population that is the source of data in research, where the population is part of the number of characteristics possessed by the population(Kamaruddin et al., 2023).To determine the number of samples from the population in this study, use a formula(Isaac & Michael, 1995),The formula for determining the sample is as follows:

$$s = \frac{\lambda^2.N.P.Q}{d^2.(N-1).\lambda^2.P.Q}$$

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$$s = \frac{(3{,}841.637.0{,}5.0{,}5)}{(0{,}05)^2.(637-1)) + 3{,}841.0{,}5.0{,}5} = 261$$

So for a population of 637 with an error rate of 5% the sample size is261.In this research, a sampling technique was carried out using simple random sampling, the selection of respondents was carried out randomly by the author among the respondents, regardless of certain conditions and requirements. Randomization was carried out using the Microsoft Excel application to generate random numbers according to the number of respondents. This was done because members of the population, namely teachers and high school principals in Serang Regency, had the same opportunity to be selected as samples. The researcher determined a sample of 261 people who were considered to be a sample that could represent (representative) members of the population.

Table 1.1 Sample

No	Subdistrict	School Data	Teacher Data	Tendic Data
1	Cikande	4	26	4
2	Cinangka	5	58	5
3	Ciruas	4	33	4
4	Kramatwatu	3	22	3
5	Kragilan	2	15	2
6	Pontang	2	25	2
7	Waringinkurung	2	14	2
8	Tunjung Teja	1	12	1
9	Tirtayasa	1	13	1
10	Tanara	2	17	2
Amount		26	235	26
Total			261	

Validity test

According to (Sugiyono, 2022)Validity test is the accuracy or accuracy of an instrument in measuring what it wants to measure. In this research, the validity test measures the extent to which the questionnaire is able to measure compensation, employee performance and job satisfaction. In determining whether or not a question item is suitable to be used, a significant correlation coefficient test is usually carried out at a significance level of 0.05, meaning that an item is considered valid if it correlates significantly with the total score.

Reliability Test

The reliability test in this research used the help of the smart pls computer program. The criteria for reliability testing are:

a. If the reliability coefficient value is > 0.6 then the instrument being tested has good reliability.
b. If the reliability coefficient value is < 0.6 then the instrument being tested is not reliable.

SmartPLS SEM Data Analysis Method

In statistical analysis of data using the SEM PLS method. The following are the PLS method analysis techniques:

1. Outer model analysis
   According to Hussein (Sugiyono, 2012)Outer model analysis is carried out to ensure that the measurements used are suitable for measurement (valid and reliable).
2. Inner model analysis This model analysis is to test the relationship between latent constructs.

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IV. RESULTS AND DISCUSSION

Results

Knowledge-Oriented Leadership

Respondents' perceptions of the Knowledge-Oriented Leadership variable with the majority of respondents' perceptions strongly agree that respondents feel that their leaders and organizations support knowledge sharing and respondents feel that the organization has a culture that values and encourages continuous learning. While respondents strongly disagreed with the response, they felt that leaders in the organization still needed to more frequently seek and consider input from employees regarding new ideas and process improvements and respondents felt that the organization still needed to regularly measure and evaluate the effectiveness of knowledge sharing efforts. This means that organizations need to regularly measure and evaluate the effectiveness of knowledge sharing efforts.

Utilization of Digital Issues

In the Digital Issues dimension, the organizations surveyed indicated that digital issues were important to consider in decision making. This shows that the organization is aware of the importance of digital issues and has taken steps to respond to them. In the Utilization of Digital Issues dimension, the organizations surveyed indicated that they had utilized digital issues to increase operational efficiency and effectiveness. This shows that the organization has realized the benefits of digital issues and has taken steps to utilize them to improve its performance. In the Challenges of Utilizing Digital Issues dimension, the organizations surveyed indicated that they face challenges in understanding and monitoring developments in digital issues. This shows that organizations still need to improve their ability to understand and manage digital issues.

Innovation Performance

In the Innovation Performance dimension, the organizations surveyed showed that they generate innovative new ideas. This can be seen from the statement that the organization produces new ideas that are different from existing ones and have the potential to provide benefits to the organization. Apart from that, the organization also succeeded in implementing its innovative ideas. This can be seen from the statement that the organization has the ability to implement innovative ideas effectively and efficiently. In the Innovation Challenges dimension, surveyed organizations indicated that they face challenges in measuring and evaluating the impact of innovation. This can be seen from the statement that it is difficult for organizations to measure and evaluate the impact of innovation on organizational performance. In addition, organizations also face challenges in getting support from employees to innovate. This can be seen from the statement that employees still do not fully understand the importance of innovation and do not fully support the organization's innovation efforts.

Adopting Metaverse Technology

On the Metaverse dimension, surveyed organizations indicated that they recognize the potential of metaverse technology to improve their performance. This can be seen from the statement that the organization understands that metaverse technology can be used to increase efficiency, effectiveness and customer satisfaction. Additionally, organizations have also indicated that they have begun adopting metaverse technology. This can be seen from the statement that organizations have implemented metaverse technology in several areas, such as training, marketing, and customer service. On the Metaverse Adoption dimension, the surveyed

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organizations indicated that the adoption of metaverse technology in their organizations had support from employees. This can be seen from the statement that employees understand the benefits of metaverse technology and support the organization's efforts to adopt it. Additionally, organizations also have the necessary resources to adopt metaverse technology. This can be seen from the statement that the organization has sufficient budget and skilled human resources to adopt metaverse technology. On the Metaverse Adoption Challenges dimension, surveyed organizations indicated that they face challenges in developing the skills and competencies required to adopt metaverse technologies. This can be seen from the statement that employees still do not have the skills and competencies needed to use metaverse technology. Additionally, organizations also face challenges in addressing security and privacy risks associated with metaverse technology. This can be seen from the statement that the organization does not yet have adequate policies and procedures to protect the security and privacy of data in the metaverse.

Measurement Model

The measurement model is one of the evaluation models of Partial Least Square to test the validity and reliability of a research instrument. Evaluation of this research model uses the SmartPLS 3.2.9 program. The following are the results of the validity and reliability tests.

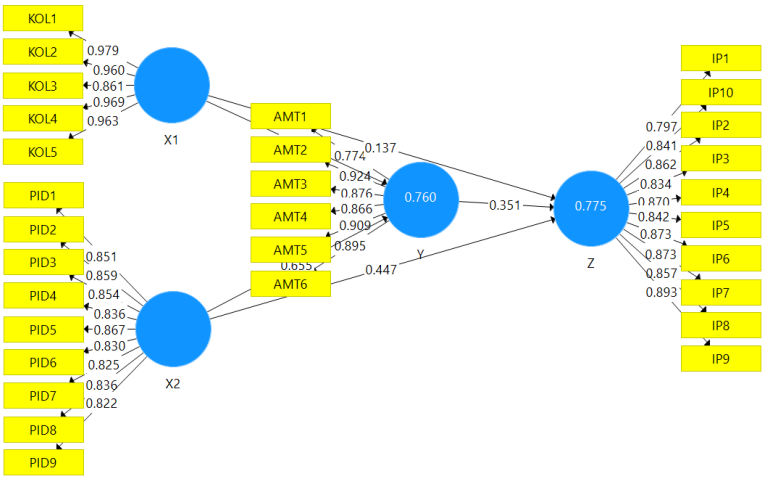

Figure 1.1 Inner Model and Outer Model

Validity test

Validity tests are carried out to ensure that the measuring instrument used is truly suitable for use as a measuring instrument. The principle of convergent validity says that construct measures should be highly correlated. For convergent validity, the Rule of Thumb is Average Extracted Variance (AVE) more than 0.05 and Outer Loading more than 0.7. However, external loads between 0.05 and 0.06 are considered sufficient. A questionnaire is said to be valid if the statement can reveal what it measures. Convergent and discriminant validity are two categories of partial least squares validity tests.

Convergent Validity

In convergent validity, the indicators of each latent variable must be highly correlated with the latent variable. The Rule of Thumb of convergent validity is seen through Average Variance Extracted (AVE) > 0.05 and Outer Loading 0.05.

Based on Figure 1 above, it shows that each variable has an Average Variance Extracted (AVE) value > 0.5. To be precise, 0.897 for the knowledge-oriented leadership variable, 0.710 for the utilization of digital issues variable, 0.766 for the adoption metaverse technology variable and 0.730 for the innovation performance variable. So it can be said that the indicators of each latent variable have a high correlation with the latent variable and are said to be valid. Apart from that, convergent validity can also be seen through the Outer Loading value of each latent variable item. The following are the Outer Loading values in this research:

Based on the calculation results, it can be seen that the outer loading value for each item is >0.7. So it can be said that the items from each latent variable have a high correlation with the latent variable and are said to be valid.

Discriminant Validity

Based on the calculations, it can be seen that the items for each variable have a cross loading value for each item that is greater than the latent variable and it can be said that the indicators are not highly correlated with other latent variables, so these items are said to be valid.

Reliability Test

Reliability testing in PLS can be carried out using two methods, namely Cronbach's alpha and composite reliability(Winarni, 2021).Reliability testing shows the accuracy and consistency of a measuring instrument in making measurements, where reliability refers to whether the instrument is good. Instruments that can be trusted or reliable will produce data that can also be trusted(Azhari et al., 2023).

(Heriyanto, 2023)It is more recommended to test the reliability of a group using composite reliability, this is done because using Ceonbach's alpha to test the reliability of the construct will give a low or under estimate value. Reliability testing was carried out to measure respondents' consistency in answering the statement items on the instrument. The rule of thumb for reliability testing is that the composite reliability value is > 0.7. Based on calculations, it shows that the variables knowledge-oriented leadership, use of digital issues, innovation performance, and adoption of metaverse technology each have a composite reliability value above 0.7. The following is a table of reliability test results:

Table 1.2 reliability test results

Cronbach's Alpha	Composite Reliability
0.971	**0.978**
0.949	**0.956**
0.938	**0.951**
0.959	**0.964**

Inner Model Evaluation

Evaluation of the inner model is carried out using a bootstrapping test which produces R-Square, Q Square and Hypothesis Testing Coefficient values. The results of the inner model evaluation are explained as follows.

-Square

Structural model using R2 or R-Square for the dependent construct. The R-Square value is to measure the level of variation in changes in the independent variable towards the dependent variable. The higher the R-Square value means the better the prediction model of a research model.

CENDEKIA, Vol. 17, No. 2, Oktober 2023
p-ISSN: 1978-2098; e-ISSN: 2407-8557
Https://soloclcs.org; Email: oslocendekia@gmail.com
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Mukti, Trisna, Kiki, Umamah, yuyun, Hajar, Siti, Naibaho, BR, Yunika, Basrowi (2023). **The Influence of Knowledge-Oriented Leadership and Utilization of Digital Issues on Innovation Performance Implications For Adopting Metaverse Technology in Serang Regency Private High School**
***Cendekia* (2023), 17(2): 204-222**. DOI 10.30957/cendekia.v17i2.865

The following is a table of the R-Square values for this research model.

Table 1.3 R-Square Value

Variable	R Square
Adopting Metaverse Technology	0.760
Innovation Performance	0.775

Based on table 1.3 above, it is known that the R-Square value of the adopting metaverse technology variable is 0.760 or 7.60% and the innovation performance variable is 0.775 or 7.75%. This shows that the influence of knowledge-oriented leadership and the use of digital issues on adopting metaverse technology is 76.0%, while the remaining 24.0% is influenced by other variables not included in this research, then the influence of adopting metaverse technology on innovation performance is 77. 5%.

Q-Square

A model is considered to have relevant predictive value if the Q-Square value is (>0). The predictive relevance value is obtained by the formula:

Q2 = 1 – (1-R2)
Q2 = 1 – (1-0.7602)
Q2 = 1 – 0.5776
Q2 = 0.4224

The Q-Square calculation result is 0.4224 or 42.24%, this means that the model in this study is feasible in explaining the dependent variable.

Q2 = 1 – (1-R2)
Q2 = 1 – (1-0.7752)
Q2 = 1 – (1-0.600625)
Q2 = 0.39933745

The Q-Square calculation result is 0.3993745 or 39.93%, this means that the model in this study is feasible in explaining the dependent variable.

Hypothesis testing

The basis used in hypothesis testing is the value contained in the output path coefficient. The output path coefficient test is used to show the level of significance in hypothesis testing which can be seen through the t-statistic value.

In partial least squares statistical testing of each hypothesized relationship is carried out using simulation. In this case, it will be done by bootstrapping the sample. Bootstrap testing is intended to minimize the problem of non-normality of research data.

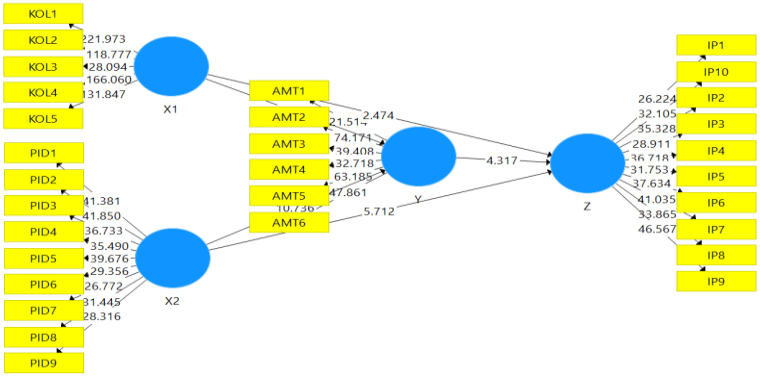

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Figure 1.2 Path Coefficient Test

Table 1.4 Path Coefficient Value

Variable	*Original samples*	*T-Statistics*	*P-Values*	Hypothesis
Knowledge Oriented Leadership - Adopting Metaverse Technology	0.265	4,243	0,000	**Accepted**
Utilizing Digital Issues - Adopting Metaverse Technology	0.317	2,506	0.013	**Accepted**
Knowledge Oriented Leadership - Innovation Performance	0.655	10,944	0,000	**Accepted**
Utilization of Digital Issues - Innovation Performance	0.447	5,318	0,000	**Accepted**
Adopting Metaverse Technology - Innovation Performance	0.351	4,145	0,000	**Accepted**
Knowledge Oriented Leadership - Adopting Metaverse Technology - Innovation Performance	0.093	2,584	0.010	**Accepted**
Utilization of Digital Issues - Adopting Metaverse Technology - Innovation Performance	0.230	3,921	0,000	**Accepted**

Based on table 1.4, all relationships between hypothesized variables are accepted because they meet the assumptions >1.96 and p-value <0.05.

Discussion

The Influence of Knowledge Oriented Leadership on Adopting Metaverse Technology

The influence of knowledge-oriented leadership on adopting metaverse technology produces a T-Statistic of 4.243 > T-Table 1.96 and a P-Value of 0.000 < 0.05. Based on the results of statistical analysis, the influence of knowledge-oriented leadership on adopting metaverse technology is significant and the hypothesis is accepted. These results are in line with research (Banmairuroy et al., 2022)The results of this research indicate that knowledge-oriented leadership directly influences sustainable competitive advantage.

The Influence of Using Digital Issues on Adopting Metaverse Technology

The influence of utilizing digital issues on adopting metaverse technology produces a T-Statistic of 2.506 > T-Table 1.96 and P-Value 0.013 < 0.05. Based on the results of statistical analysis, the influence of the use of digital issues on the adoption of metaverse technology is significant and the hypothesis is accepted. These results are in line with research (Sediyaningsih et al., 2023)The results of this research indicate that user intentions to use metaverse technology in digital library systems are influenced by user perceptions of system use, perceived interaction, perceived usefulness, and perceived ease of use. It is important to note that these influences vary depending on the user's intended task. These findings provide valuable insight into the factors influencing the adoption and use intentions of metaverse technologies in the context of digital library services at higher education institutions.

The Influence of Knowledge Oriented Leadership on Innovation Performance

The influence of knowledge-oriented leadership on innovation performance produces a T-Statistic of 10.944 > T-Table 1.96 and a P-Value of 0.000 < 0.05. Based on the results of statistical analysis, the influence of knowledge-oriented leadership on innovation performance is significant and the hypothesis is accepted. This result is in line with (Donate & Sanchez de Pablo, 2015) results also confirm the direct effect of knowledge-oriented leadership on a company's innovation results through knowledge management initiatives (H7). The effect is strong = 0.318, p < 0.001) and accounts for 44.2% of the explained. Further research from (Shamim et al., 2019) The results of this research show that knowledge-oriented leadership (KOL) has a positive impact on knowledge management behavior (KM) at the individual level. In addition, this research also found that employee work attitudes, including affective commitment, creative self-efficacy, and work engagement, mediate the relationship between KOL and knowledge management behavior. Furthermore, there is also a direct positive effect of employee affective commitment, creative self-efficacy, and work engagement on knowledge management behavior. This research contributes to the understanding of KOL and its relationship with work attitudes and knowledge management behavior among employees in the hotel industry sector.

The Influence of Utilizing Digital Issues on Innovation Performance

The influence of the use of digital issues on innovation performance produces a T-Statistic of 5.318 > T-Table 1.96 and a P-Value of 0.000 < 0.05. Based on the results of statistical analysis, the influence of the use of digital issues on innovation performance is significant and the hypothesis is accepted. These results are in line with research (Kurnia, Noerma et al., 2022) research result has a positive and significant effect on marketing performance, media use has a

positive and significant effect on competitive advantage and competitive advantage has a positive and significant effect on marketing performance.

The Influence of Adopting Metaverse Technology on Innovation Performance

The influence of adopting metaverse technology on innovation performance produces a T-Statistic of 5.145 > T-Table 1.96 and a P-Value of 0.000 < 0.05. Based on the results of statistical analysis, the influence of adopting metaverse technology on innovation performance is significant and the hypothesis is accepted. These results are in line with research (Shwedeh, 2024) the results of this research There is a significant relationship between the digital divide and effective metaverse adoption, although this relationship is negative. This means that the greater the digital divide, the worse the impact on metaverse adoption.

The Influence of Knowledge Oriented Leadership on Adopting Metaverse Technology through Innovation Performance as an Intervening Variable

The influence of knowledge-oriented leadership on adopting metaverse technology which is mediated by innovation performance produces a T-Statistic of 2.584 > T-Table 1.96 and a P-Value of 0.010 < 0.05. Based on the results of statistical analysis, the influence of adopting metaverse technology on innovation performance is significant and the hypothesis is accepted. This result is in line with (Malik et al., 2023) shows that KOL supervisors have a positive influence on knowledge worker performance both directly and through KM involvement.

The Influence of Utilizing Digital Issues on Adopting Metaverse Technology through Innovation Performance as an Intervening Variable

The influence of the use of digital issues on the adoption of metaverse technology mediated by innovation performance produces a T-Statistic of 3.921 > T-Table 1.96 and a P-Value of 0.000 < 0.05. Based on the results of statistical analysis, the influence of adopting metaverse technology on innovation performance is significant and the hypothesis is accepted. This result is in line with (Kamasak, 2015) The results of this research indicate that the factors that contribute to innovation performance in companies are innovation strategy and technological capabilities. This research finds that innovation strategy and technological capabilities make a greater contribution to innovation performance. However, the research results also found a significant and negative relationship between formal organizational structure and innovation performance, which is contrary to the proposition of innovation literature which indicates a positive and significant relationship between formal organizational structure and innovation performance. The implication is that firms tend to improve their innovation performance as they increasingly configure their resources in terms of strategy development and technology investment.

CONCLUSION

1. The influence of knowledge-oriented leadership has a significant positive direct effect on the adoption of metaverse technology in private high schools in Serang district. Produces a T-Statistic of 4.243 > T-Table 1.96 and P-Value 0.000 < 0.05.
2. The influence of the use of digital issues has a direct and significant positive effect on the adoption of metaverse technology in private high schools in Serang district. Produces a T-Statistic of 2.506 > T-Table 1.96 and P-Value 0.013 < 0.05.

3. The influence of knowledge-oriented leadership has a significant positive direct effect on innovation performance in private high schools in Serang district. Produces a T-Statistic of 10.944 > T-Table 1.96 and P-Value 0.000 < 0.05.
4. The influence of the use of digital issues has a direct and significant positive effect on innovation performance in private high schools in Serang district. Produces a T-Statistic of 5.318 > T-Table 1.96 and P-Value 0.000 < 0.05.
5. The influence of adopting metaverse technology has a significant positive direct effect on innovation performance in private high schools in Serang district. Produces a T-Statistic of 5.145 > T-Table 1.96 and a P-Value of 0.000 < 0.05.
6. The influence of knowledge-oriented leadership has a significant positive indirect effect on metaverse technology adoption through innovation performance as an intervening variable. Produces a T-Statistic of 2.584 > T-Table 1.96 and P-Value 0.010 < 0.05.
7. The influence of the use of digital issues has a significant positive indirect effect on the adoption of metaverse technology through innovation performance as an intervening variable. Produces a T-Statistic of 3.921 > T-Table 1.96 and P-Value 0.000 < 0.05.

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