

# Determining Factors of the Relationship of Knowledge Management and Human Capital on Innovation Performance of Digital School

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## Abstract:

This research aims to analyze the influence of knowledge management and human capital on digital school innovation performance and identify the impact of knowledge management on digital school innovation performance through human capital. This research used an ex post facto approach with 165 teachers from digital schools in Medan City as the research sample. Data was collected through a validated and reliable questionnaire. The data that has been collected is then analyzed using the Partial Least Square (PLS) approach with the help of Smart PLS software. The research results prove that knowledge management positively and significantly affects human capital, with a path coefficient value of 0.220, a statistical t-value of 2.595, and a p-value of 0.009. Knowledge management has a positive and significant effect on digital school innovation performance with a path coefficient value of 0.176, a t statistic of 2.203, and a p-value of 0.0208; human capital has a positive and significant effect on digital school innovation performance with a path coefficient value of 0.409, a t statistic value of 5.604 and a p-value 0.000 and knowledge management has a positive and significant effect on digital school innovation performance through human capital. Increasing knowledge management practices in schools can be an effective strategy for improving teacher innovation performance in the context of digital education.

**Keywords:** *Knowledge Management, Human Capital, Innovation Performance, Digital School*

## Abstrak:

Penelitian ini bertujuan untuk menganalisis pengaruh knowledge management dan human capital terhadap kinerja inovasi sekolah digital, serta mengidentifikasi dampak knowledge management terhadap kinerja inovasi sekolah digital melalui human capital. Penelitian ini menggunakan pendekatan ex post facto dengan 165 guru dari sekolah digital di Kota Medan sebagai sampel penelitian. Data dikumpulkan melalui kuesioner yang telah divalidasi dan direliabilitasi. Data yang telah dikumpulkan selanjutnya dianalisis menggunakan pendekatan Partial Least Square (PLS) dengan bantuan software Smart PLS. Hasil penelitian membuktikan bahwa knowledge management berpengaruh positif dan signifikan terhadap human capital dengan nilai koefisien jalur sebesar 0.220 dengan nilai t statistik 2.595 dan p value 0.009. Knowledge management berpengaruh positif dan signifikan terhadap kinerja inovasi sekolah digital dengan nilai koefisien jalur sebesar 0.176 dengan t statistik 2.203 dan p value 0.0208, human capital berpengaruh positif dan signifikan terhadap kinerja inovasi sekolah digital dengan nilai koefisien jalur sebesar 0.409 nilai t statistik 5.604 dan p value 0.000 dan knowledge

management berpengaruh positif dan signifikan terhadap kinerja inovasi sekolah digital melalui human capital. Penelitian ini memberikan implikasi bahwa pentingnya peningkatan praktik knowledge management di sekolah dapat menjadi strategi efektif untuk meningkatkan kinerja inovasi guru dalam konteks pendidikan digital.

**Kata Kunci:** *Knowledge Management, Human Capital, Kinerja Inovasi, Sekolah Digital*

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## INTRODUCTION

Schools will be successful if teachers and other organizational members carry out their main tasks and are willing to carry out other (extra) tasks, such as providing better services to service users (students, parents, teachers, community, etc.), want help, and work. Together, play an active role in school activities, provide suggestions and participate in making improvements (Jainiyah et al., 2023). Schools that want success need teachers ready to do more than just their formal duties, not just stick to the tasks listed in their job description (Arafa & Supriyanto, 2021). A successful school needs good personalities, namely teachers who like to help others, are friendly, and can be role models for their students and colleagues (Nur & Mardiah, 2020; Azhari et al., 2021). A successful school requires a principal who can empower human resources and provide motivation that inspires teachers so that they voluntarily want to do something outside of their formal obligations (Firdaus et al., 2023; Marginingsih, 2016).

The main task of a teacher is to educate, teach, guide, direct, train, assess and evaluate students (Arafa & Supriyanto, 2021; Rusdi et al., 2022; Diana, 2023). At the same time, teachers must also play a role as class managers and school organizations (Baharun et al., 2021; Rozi et al., 2022). The role of teachers in managing school organizations is needed to improve school performance as an education-implementing organization (Arifin & Sanjani, 2024). The teacher's role includes trying to be on time for work, always being ready when asked to carry out school assignments, regularly making notes and reports by school rules, trying to keep the school conducive, never complaining about various school limitations, and establishing good communication with parents and all school residents (Mardhiyah et al., 2021; Wijaya & Khoir, 2022; Chuanchen, 2023).

Teachers who perform well will demonstrate behaviour as good citizens of the school organization, which is known as Organization Citizenship Behavior (OCB) (Anwar, 2021). The characteristics of teachers with good OCB (Amelia et al., 2023) show various positive behaviours such as helping other teachers without having to be asked (own initiative), voluntarily carrying out additional activities outside working hours, avoiding conflicts with fellow school members, maintaining and protecting school assets, obeying every school rules, never complain about various school limitations, provide constructive suggestions, and be effective in using time while on duty at school (Amelia et al., 2023; Anwar, 2021; Norman c& Paramansyah, 2024). OCB is the positive behaviour of people in an organization (Anwar, 2021). This behaviour is expressed in the form of a conscious and voluntary willingness to work and contribute to the organization more than what is formally required by the organization (extra-role) and is not related to the

rewards given to it. Teachers show OCB as part of their service, which is believed to be able to help the organization progress (Wang et al., 2023). This dedication is carried out by making additional efforts for the improvement and progress of the organization (Haider et al., 2022). Therefore, teachers who have OCB do not seek rewards from the organization for the extra behaviour they show. If a school organization has teachers with good OCB, it is believed that the school organization will perform well. If the performance of the school organization is good, so will the goals of education at that school will be achieved. Thus, a good teacher's OCB can achieve the educational goals of a school organization.

Through the Ministry of Research, Technology and Higher Education, the government is currently making efforts to improve the quality of teachers in Indonesia by implementing the Teacher Mobilization Program. This voluntary program requires teachers to give more time to learn, develop themselves, and share with other teachers. According to data from Korwilcambidik, Cisaat District, Sukabumi Regency, in 2022, of the 140 Islamic Private Elementary School teachers with GTY status, only 3 people participated in the Teacher Mobilization Program. This proves that the OCB of Islamic Private Elementary School teachers with GTY status in Cisaat District, Sukabumi Regency, still needs to be higher. Other evidence in the field found that many teachers had problems with OCB. These findings are based on a preliminary survey of teachers OCB conducted in February 2022 on 30 teachers in Cisaat District, Sukabumi Regency. The OCB indicators used in the preliminary survey are (1) courtesy, preventing problems at work and obeying rules; (2) altruism, helping colleagues who are relevant to the organization; (3) sportsmanship, maintaining good relationships, and tolerance towards things bad things Situation. It is only ideal with complaining; (4) thoroughness, exceeding minimum work standards; (5) citizenship, responsibility, and active participation in building the organization.

Preliminary survey data shows (1) courtesy, showing 58% of teachers have not fully complied with regulations; (2) altruism, showing 63.5% of teachers still need to volunteer to help others fully; (3) sportsmanship, indicating that 41.5% of teachers have not fully maintained good relations with other people; (4) citizenship, indicating that 63.5% of teachers have not been fully active in building organizations; (5) prudence, indicating that 66.5% of teachers have not fully performed beyond standards. The behaviors mentioned above show that many teachers still have low OCB, which needs to be improved further. Teacher OCB is a very important factor in school organizations. However, from the preliminary survey results, there is a gap between the empirical facts of teacher OCB and the expected teacher OCB. If this condition continues, it will cause problems with school performance. Therefore, it is necessary to research teacher OCB and the factors that influence it. Several reasons can be stated regarding the importance of conducting this research, including: (1) The number of private Islamic elementary schools in Cisaat Sukabumi is smaller than in other areas. (2) Teacher recruitment at private Islamic elementary schools has different variations according to the policies of education organizing foundations; (3) The Cisaat area is a sub-district that is expected to be a barometer for other schools. The novelty of the research includes producing a constellation model of the influence between variables in

improving Organizational Citizenship Behavior, new strategies and ways to increase OCB, which are produced through strengthening other variables found empirically in the field and producing optimal solutions for increasing OCB through strengthening. These variables Others found empirically in the field.

The research objectives refer to research on OCB, which has been studied, among others, by (Al-Shami et al., 2023; Amelia et al., 2023; Anwar, 2021; Bogler & Somech, 2023; Dhali, Al Masud, Hossain, Lipy, & Charity, 2023; Hermanto, Srimulyani, & Pitoyo, 2024; C. et al., 2024; Kaur & Kang, 2021; Rahman & Karim, 2022; Wang et al., 2023; Mai, Do, & Phan, 2022) which found a positive relationship between the variables studied. Therefore, this research aims to produce ways and strategies to increase OCB by analyzing the influence of empowerment and trust variables. Judging from the research that has been conducted, no one has specifically examined OCB with empowerment and trust. On this basis, conducting research on OCB about empowerment and trust is necessary.

## RESEARCH METHODS

Methodologically, this research is an ex post facto and inferential research to examine the relationship of KM to human capital, KM to innovation performance, and the relationship of human capital to innovation performance. The subjects of this study were teachers at digital schools in Medan, totalling 165 people. The sampling technique used is a saturated sample. The research variables consist of KM as an independent variable, human capital as an intervening variable and innovation performance as the dependent variable. By the theory (Stachera-Włodarczyk, 2019; Uyan et al., 2022), Indicators of KM are knowledge creation, knowledge sharing and knowledge utilization. At the same time, human capital indicators include knowledge, skills, experience, and ability (Alhamad et al., 2019; Wijaya et al., 2022; Kucharčíková, 2011). Innovation performance indicators are measured by innovation potential, processes, and innovation activities' results (Maulidah et al., 2023). The relationship between research variables is a research model shown in Figure 1. They are collecting research data using a questionnaire that has fulfilled the validity and instrument reliability tests. Data analysis uses structural equation models (SEM) using partial least squares with SmartPLS statistical tools.

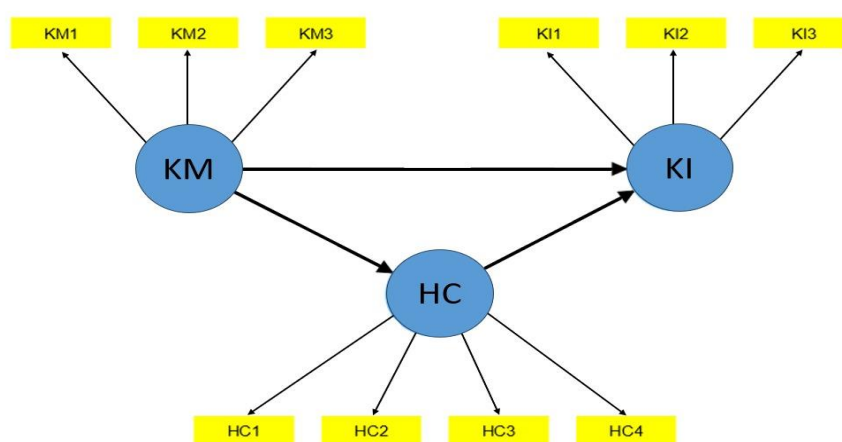


Figure 1. Research Models

## RESULTS AND DISCUSSIONS

The author conducted validity and reliability tests on the instrument to determine the instrument's validity. From the results of instrument testing, all instruments used in this study have been declared valid and reliable. The instrument's validity was tested based on the measurement of discriminant validity using the Fornell-Larcker criteria and crossloadings. The measure of discriminant validity according to the Fornell-Larcker method and Average Variance Extracted (AVE) criteria is that the AVE value of each latent variable must be greater than the highest  $r$  value with other latent variable values, and the 'loading' for each indicator is expected to be higher than its respective cross-loading. If the root of the AVE value is greater than the correlation between latent variables, then the indicators used fulfil discriminant validity. Indicators are valid if the factor loading value exceeds the cross-loading value. The validity test results are shown in Table 1, that the AVE value for each construct is higher than the correlation between the construct and other constructs. Therefore, the indicators used have met the validity. At the same time, The results of the analysis using cross-loading are shown in Table 2. KM, HC, and KI are latent variables. KM1, KM2, and KM3 are indicators of the KM latent variable, each with a loading value of 0.834, 0.560, and 0.760, more significant than the cross-loading value. HC1, HC2, and HC3 have loading values of 0.480, 0.765, 0.614, and 0.78,2, which are more significant than the cross-loading values. KI1, KI2, and KI3 have loading values of 0.792, 0.804, and 0.789 which are greater than the cross-loading value.

**Table 1. Discriminant Validity of the Fornell-Larcker Method**

Discriminant validity - Fornell-Lacker Criterion			
	HC	KI	KM
HC	0.665		
KI	0.448	0.793	
KM	0.220	0.266	0.728

**Table 2. Cross Loading**

Discriminant validity - Cross Loadings			
	HC	KI	KM
HC1	0.480	0.155	0.162
HC2	0.765	0.349	0.174
HCS	0.614	0.245	0.172
HC4	0.762	0.388	0.103
KI1	0.324	0.792	0.189
K12	0.401	0.804	0.239
KIE	0.332	0.786	0.200
KM1	0.183	0.253	0.834
KM2	0.129	0.110	0.560
KM3	0.164	0.189	0,760

All indicators are declared valid and can measure their latent variables based on the validity test results. At the same time, the reliability test uses the Composite Reliability (CR) method, with criteria  $> 0.7$ . The calculation results are shown in Table 3. The instrument used is reliable, with a CR value  $> 0.7$ .

**Table 3. Composite Reliability**

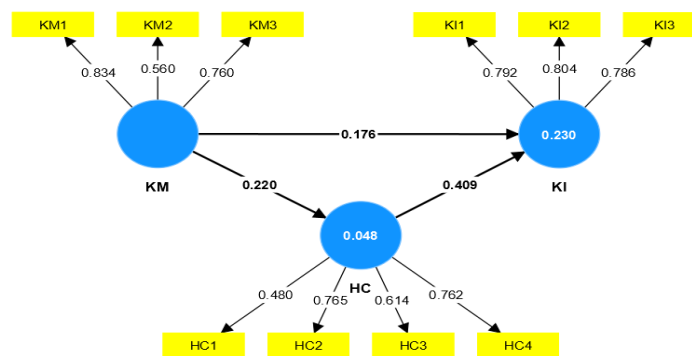
Construct reliability and validity - Overview				
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
HC	0.573	0.615	0.755	0.443
KI	0.709	0.715	0.836	0.630
KM	0.557	0.611	0.767	0.529

The significance of the influence between the research variables and the influence weight of each variable is tested to test the hypothesis. The calculation results are shown in Table 4 and Figure 2.

**Table 4. Hypothesis Testing**

Path coefficients – Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standar deviation (STDEV)	T statistics ( O/STDEV)	P Values
HC	0.409	0.416	0.073	5.604	0.000
KI	0.220	0.243	0.085	2.595	0.000
KM	0.176	0.180	0.080	2.203	0.000



**Figure 2. Path Coefficient and P-value**

Table 4 shows the results of the data analysis to test the hypothesis. The path coefficient value between HC and KI is 0.409, with a t-statistic value of 5.604 and a p-value of 0.000, more diminutive than 0.05. The path coefficient value of 0.409 is significant, meaning there is a positive and significant influence between HC and KI. The weight of influence between HC and KI is 40.9%.

The contribution of each HC indicator is as follows: knowledge of 0.480, skills of 0.765, experience of 0.614 and ability of 0.762. The findings of this study are consistent with previous research (Munjal et al., 2017; Lu et al., 2023). Referring to human capital theory, human capital is the driving force behind innovation. The critical role of human capital, including knowledge, skills, experience, and abilities in the digital school environment, drives innovation and results in superior performance. In addition, human capital plays an important role, which includes knowledge, skills, experience, and abilities in the digital school environment innovation and achieving superior performance results. An effective human capital management strategy can empower teachers and staff to embrace new technology, develop creativity, and foster a culture of innovation in a sustainable manner, thereby increasing innovation performance. The positive impact of

human capital on digital school innovation can be attributed to several key factors. Teachers who are well-trained, knowledgeable, and equipped with digital technology expertise are better positioned to integrate technology into instructional practices, enabling innovative approaches effectively. In addition, teachers with solid digital technology skills, problem-solving abilities, and creative thinking abilities can be actively involved in innovative developments to improve the quality of learning. Teachers must be encouraged to be highly motivated to accept new ideas, experiment with innovative approaches, and contribute to a culture of continuous learning and improvement. High human capital can help digital schools to increase creativity and innovation. Therefore, digital schools must create an open and collaborative work environment that encourages teachers to share ideas and collaborate.

The path coefficient value between KM and HC is 0.220, with a t-statistic value of 2.595 and a P-value of 0.009, which is smaller than 0.05. These results indicate that KM has a positive and significant effect on HC. The path coefficient value of 0.220 is substantial, meaning KM influences hHC by 22.0%. The coefficient value of each indicator in the KM variable is as follows: knowledge creation is 0.834, knowledge sharing is 0.560 and knowledge utilization is 0.760. This research supports previous research that KM positively and significantly affects HC (Mirzaie et al., 2019; Riauwati et al., 2022). KM can help digital schools to improve the quality of their human resources. According to KM theory, digital schools must develop a knowledge-sharing culture among teachers to increase their competence.

Employees can more easily develop new ideas with high competence and diverse knowledge. KM encompasses the processes, tools, and strategies for creating, capturing, sharing, and using organizational knowledge. It aims to enhance organizational performance by leveraging the collective knowledge of its employees. KM's vivacious and significant effect on HC implies that effective KM practices can lead to a more knowledgeable, skilled, and capable workforce. This, in turn, can contribute to enhanced organizational performance. The positive impact of KM on HC can be attributed to several mechanisms: KM facilitates the sharing and dissemination of knowledge within an organization, allowing employees to learn from each other and stay up-to-date on industry trends and best practices. This continuous learning fosters a more knowledgeable and adaptable workforce. KM promotes developing and applying new skills by providing employees access to relevant knowledge resources and opportunities for practical experience. This skill enhancement contributes to a more competent and versatile workforce. The positive and significant effect on HC highlights the crucial role of knowledge management in developing a high-performing workforce. By effectively managing knowledge, organizations can empower their employees, enhance their skills, and foster a culture of innovation, ultimately contributing to sustainable organizational success.

Meanwhile, the path coefficient value between KM and KI is 0.176 with a t-statistic value of 2.203 and a p-value of 0.0208; the p-value of this value is smaller than 0.05, so KM has a positive and significant effect on KI. The path coefficient value is 0.176, indicating that KM influences KI by 17.6%. Meanwhile, the indicator

coefficient weights of the innovation performance variable are innovation potential of 0.792, innovation processes of 0.804, and the results of innovation activities of 0.786. This research's findings align with previous research (Sofiyabadi et al., 2020; Bawa et al., 2023; Wikaningrum et al., 2023). This research shows that KM can help digital schools increase access to technology and resources needed for innovation. The implication for schools is that digital schools need to develop a knowledge management system that supports innovation. This knowledge management system must facilitate the process of knowledge sharing, collaboration, and the development of new ideas.

When implemented effectively, KM can empower teachers, enhance their skills, and foster a culture of innovation, leading to improved innovation performance. The positive impact of KM on innovation can be attributed to several vital mechanisms: KM facilitates the sharing and exchange of knowledge within an organization, breaking down silos and enabling employees to learn from each other's experiences and expertise. This cross-pollination of knowledge sparks new ideas, creative solutions, and innovative approaches. KM promotes creating and utilizing new knowledge by providing access to relevant information resources, encouraging experimentation, and supporting knowledge application in practice. This continuous knowledge generation fuels innovation by introducing novel concepts, methodologies, and technologies. KM cultivates a culture that values knowledge, encourages creativity, and rewards innovation. This supportive environment motivates employees to think outside the box, challenge assumptions, and explore new possibilities, driving continuous innovation. In essence, KM is a strategic enabler of innovation, providing the foundation for organizations to thrive in a dynamic and competitive landscape. By effectively managing knowledge, organizations can empower their workforce, generate new ideas, and translate knowledge into innovative solutions, ultimately achieving superior innovation performance. High human capital can help digital schools to improve creativity and innovation. Therefore, digital schools must create an open and collaborative work environment that encourages teachers to share ideas and collaborate. To test the indirect effect of KM on KI through HC, the results are shown in Table 5.

**Table 5. Indirect Effect Test**

Specific indirect effects - Mean, STDEV, T values, p values

	Original sample (O)	Sample mean (M)	Standar deviation (STDEV)	T statistics ( O/STDEV)	P Values
KM → HC → KI	0.090	0.101	0.040	2.269	0.023

The path coefficient value is 0.090 with a t statistic value of 2.269 and a P value of 0.023, more diminutive than 0.05. These results indicate that KM positively and significantly affects KI through HC. This means that by increasing HC, KM indirectly influences innovation performance. Teachers who are knowledgeable, skilled, motivated, and collaborative will be better prepared to generate new ideas, solve problems creatively, and translate knowledge into innovative solutions. By implementing knowledge management, digital schools



can improve the quality of human capital so they can produce innovation better. Knowledge management helps teachers and school staff acquire new knowledge and skills to create innovation. This can be done through various activities, such as training, seminars and workshops. KM facilitates the sharing and dissemination of knowledge within an organization, enabling employees to learn from each other and stay up-to-date on industry trends and best practices. This continuous learning fosters a more knowledgeable and adaptable workforce. KM promotes developing and applying new skills by providing employees access to relevant knowledge resources and opportunities for practical experience. This skill enhancement contributes to a more competent and versatile workforce. A knowledgeable and skilled workforce can effectively apply their expertise to identify problems, analyze situations, and develop innovative solutions. This problem-solving capability leads to the creation of new products, services, and processes. Workforce motivation and empowerment are more likely to think outside the box, challenge assumptions, and generate creative ideas. This fosters a culture of innovation and leads to the development of novel concepts and approaches. A competent and versatile workforce can collaborate effectively across different teams and disciplines. This cross-functional collaboration encourages the exchange of ideas, sparks creativity, and facilitates the integration of different perspectives, all contributing to innovation breakthroughs.

## CONCLUSION

Based on the data analysis results, this research shows that knowledge management positively and significantly affects human capital. The path coefficient value between KM and HC is 0.220, with a t-statistic value of 2.595 and a P-value of 0.009. This shows that knowledge management will improve teachers' digital competence through knowledge creation, sharing and utilization. The more practical knowledge management, the higher the human capital. The research results also show that knowledge management has a positive and significant effect on the innovation performance of digital schools with a path coefficient value between KM and KI of 0.176 with a t-statistic value of 2.203, and a p-value of 0.0208, a p-value of this value is smaller than 0.05. These results indicate that knowledge management helps digital schools increase access to the technology and resources needed for innovation.

Furthermore, the research results show that human capital has a positive and significant effect on digital school innovation performance, with a path coefficient value of 0.409, a t-statistic value of 5.604 and a p-value of 0.000. This proves that human capital is the driving force of innovation. High human capital can help digital schools to increase creativity and innovation. Finally, research shows that knowledge management positively and significantly affects digital school innovation performance through human capital, with a path coefficient value of 0.090, a t-statistic value of 2.269 and a P value of 0.023. Knowledge management helps teachers and school staff acquire new knowledge and skills to produce innovation.

The results of this study show that the weight of the relationship between the independent and dependent variables is still low and has yet to be maximized. This indicates that other factors influence human capital or the innovation

performance of digital schools. Therefore, using existing theories, further research must involve other more dominant variables, such as the innovation strategy and innovation culture variables.

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