



Transformational Leadership, Interpersonal Communication, Information and Communication Technology Literacy, and Knowledge Management

Muhammad Ali Ghufron¹, Didik Notosudjono², Eka Suhardi³

Sekolah Pascasarjana Universitas Pakuan, Bogor, Indonesia

E-mail: maghufron@gmail.com, didiknotosudjono@unpak.ac.id, ekasuhardi@unpak.ac.id

Corresponding Author: Muhammad Ali Ghufron

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Abstract

The purpose of this research is to identify strategies to enhance school effectiveness by strengthening transformational leadership, interpersonal communication, ICT literacy, and knowledge management. A quantitative method with path analysis was applied, and SITOREM analysis was used to optimize each indicator. The study involved 445 teachers from private vocational schools in Depok City, with a sample of 211 teachers. The findings reveal that school effectiveness can be improved by reinforcing transformational leadership, interpersonal communication, ICT literacy, and knowledge management. Key strategies include addressing weak indicators such as feedback, empathy, knowledge application, and access. Statistical tests show significant positive direct effects of: 1) transformational leadership on school effectiveness (Sig=0.032), 2) interpersonal communication on school effectiveness (Sig=0.000), 3) ICT literacy on school effectiveness (Sig=0.001), and 4) knowledge management on school effectiveness (Sig=0.001). Additionally, transformational leadership, interpersonal communication, and ICT literacy all positively affect knowledge management. Knowledge management serves as an effective mediator for the influence of transformational leadership (Sig=0.004) and interpersonal communication (Sig=0.001) on school effectiveness, but not for ICT literacy (Sig=0.356).



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1 Introduction

Indonesia is one of the most populous countries in the world, with a significant population and high levels of competence and productivity. This should be a major asset for Indonesia to achieve optimal economic growth and increase global competitiveness (Sulastri & Fitriani, 2021). In the era of globalization, the quality of human resources (HR) is a key factor for a country to compete internationally (Santoso et al., 2020). Therefore, adequate educational pathways are very important in producing competent workers. Indonesia's vision in

2025, which projects it to become a vocational-based country, is one of the strategic steps to support the achievement of this goal (Suharno et al., 2020).

Quantitatively, the number of Vocational High Schools (SMK) in Indonesia continues to grow, even surpassing the number of general high schools (SMA). However, data from the Central Statistics Agency (BPS) shows that SMK graduates are still the largest contributor to unemployment in Indonesia (BPS, 2022). In February 2022, the unemployment rate for SMK graduates reached 10.38%, higher than for SMA graduates and other levels of education (Suryani et al., 2021). In the city of Depok, 67% of the total unemployment rate consists of SMA and SMK graduates. This fact reflects the misalignment between graduate competencies and the needs of the workforce, which indicates the low effectiveness of vocational education (Yusuf et al., 2022).

Research by Setiawan (2020) shows that the principal's transformational leadership and school climate jointly contribute to school effectiveness. Another study by Wati, Hidayat, and Muharam (2022) highlighted the positive relationship between teacher self-efficacy, school climate, and school effectiveness. In addition, research by Nurhafifah, Djasmu, and Ambarita (2020) found that principal leadership, school culture, and teacher performance significantly influenced school effectiveness. These findings support the importance of the role of leadership and school environment in improving educational effectiveness (Hermawan et al., 2021).

The unemployment crisis faced by vocational high school graduates in Indonesia reflects the misalignment between the education system and the demands of the world of work (Harahap, 2020). The urgency of this research lies in the need to improve the effectiveness of schools, especially vocational schools, in order to produce graduates who are ready to work and in accordance with industry needs (Azis & Hermanto, 2019). The COVID-19 pandemic, which has worsened the education situation, especially in online learning, has further emphasized the importance of improving the education system (Sari et al., 2021).

This study offers a new approach by focusing on the influence of transformational leadership, interpersonal communication, information and communication technology (ICT) literacy, and teacher work motivation on school effectiveness (Rachman et al., 2022). This study aims to explore factors that can improve school effectiveness by strengthening these variables, especially in the context of vocational schools that have a strategic role in producing ready-to-use workers (Sugiyono et al., 2021).

The purpose of this study was to identify and analyze the influence of transformational leadership, interpersonal communication, ICT literacy, and teacher work motivation on school effectiveness in private vocational schools in Depok city (Mulyana & Suryani, 2022). This study also aims to provide recommendations related to efforts to improve the effectiveness of vocational schools in Indonesia (Rahmat & Putri, 2022).

This research is expected to contribute to the development of vocational education policies, especially in improving the suitability between vocational school graduates and industry needs (Wibowo et al., 2021). The results of this study can also be a reference for stakeholders in the field of education to improve the school management system, especially in the aspects of leadership, communication, and technological literacy (Sari et al., 2020).

The findings of this study are expected to help principals, teachers, and other related parties in improving school effectiveness through the implementation of transformational leadership strategies, strengthening interpersonal communication, and increasing technological literacy among educators (Nugroho & Santoso, 2020). Ultimately, this study will provide a basis for designing more effective vocational school management, which in turn can increase the absorption of vocational school graduates in the workforce (Fitriani & Sulastri, 2021).

2 Research Methods

The research method used in this study is a quantitative method. Quantitative research method is a scientific research method because it has met scientific principles, namely concrete/empirical, objective, measurable, rational, and systematic. This method is also a discovery method because the results of the hypothesis from the research can develop various new sciences. The use of quantitative is also intended so that existing data and variables are tested through numbers and analysis using statistics (Sugiyono, 2015:7).

The data analysis method used in this study involves path analysis techniques (Path Analysis) and SITOREM Analysis (Scientific Identification Theory to Conduct Operation Research in Education Management). The combination of these two techniques aims to strengthen the research results so that the benefits can be felt by the analysis unit.

This research was conducted at Private Vocational High Schools (SMKS) in Depok City, which have 123 schools spread across 11 sub-districts, namely Beji, Bojong Gede, Cilodong, Cinere, Cipayung, Limo, Sawangan, Sukmajaya, Tapos, Pancoran Mas, and Cimanggis. Vocational high school teachers were chosen as the target of the research where the learning process carried out in SMKS is the main actor in the education. The research was carried out from January 2024 to October 2024.

3 Research Results and Discussion

Hypothesis Testing

After the analysis is carried out with a structural model, the results of the calculations produced are used in conducting hypothesis testing in order to further determine the direct and indirect effects of each variable. The proposed hypothesis is then given a conclusion by calculating the path coefficient score and significance in each path of the study. The results of this action on all proposed hypotheses can be interpreted as follows.

1. First Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of transformational leadership (X_1) on school effectiveness (Y). To test that transformational leadership (X_1) has a direct positive and significant effect on school effectiveness (Y), the first statistical hypothesis tested is as follows.

$$H_0: \beta_{y1} \leq 0$$

$$H_1: \beta_{y1} > 0$$

To test the hypothesis that there is a direct influence of transformational leadership variables (X_1) on school effectiveness (Y), a significant test of the path coefficient is needed, namely by using the t-test. The test criteria are if $t_{\text{count}} > t_{\text{table}}$. From the calculation results, the path coefficient value is obtained with $\beta_{y1} = 0.133$. The results of the coefficient significance test obtained t_{count} of 2.159 and t_{table} ($dk = 208$, with $\alpha = 0.05$) of 1.97 and t_{table} ($dk = 208$, with $\alpha = 0.01$) of 2.59. The results of the analysis and direct influence test can be seen in Table 1.

Table 1. Results of Calculation of Direct Influence Test of Transformational Leadership Variable on School Effectiveness

Variables	N	dk	β_{y1}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_1 over Y	211	208	0,133	2,159	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 1, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is accepted and H_1 is rejected. Thus, it can be concluded that transformational leadership (X_1) has a direct positive and significant effect on school effectiveness (Y).

2. Second Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of interpersonal communication (X_2) on school effectiveness (Y). To test that interpersonal communication (X_2) has a direct positive and significant influence on school effectiveness (Y), the statistical hypothesis tested is as follows:

$$H_0: \beta_{y2} \leq 0$$

$$H_1: \beta_{y2} > 0$$

From the calculation results, the path coefficient value was obtained with $\beta_{y2} = 0.368$. The test results obtained a t_{count} of 5.560. and t_{table} ($dk = 208$, with $\alpha = 0.05$) is 1.97 and t_{table} ($dk = 208$, with $\alpha = 0.01$) is 2.59. The results of the analysis and test of the significance of the path coefficients can be seen in Table 2.

Table 2. Results of the Calculation of the Direct Influence Test of Interpersonal Communication Variables on School Effectiveness

Variables	N	dk	β_{y2}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_2 over Y	211	208	0,368	5,560	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 4.46, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is accepted and H_1 is rejected. Thus, it can be concluded that interpersonal communication (X_2) has a direct positive and significant effect on school effectiveness (Y).

3. Third Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of ICT literacy (X_3) on school effectiveness (Y). To test that ICT literacy (X_3) has a direct positive and significant influence on school effectiveness (Y), the statistical hypothesis tested is as follows:

$$H_0: \beta_{y3} \leq 0$$

$$H_1: \beta_{y3} > 0$$

From the calculation results, the path coefficient value is obtained with $\beta_{y3} = 0.179$. The test results obtained t_{count} of 3.460 and t_{table} (dk = 208, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 208, with $\alpha = 0.01$) of 2.59. The results of the analysis and test of the significance of the path coefficient can be seen in Table 4.47.

Table 3. Results of the Calculation of the Direct Influence Test of ICT Literacy Variables on School Effectiveness

Variables	N	dk	β_{y3}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_3 over Y	211	208	0,179	3,460	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 3, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is rejected and H_1 is accepted. Thus, it can be concluded that ICT literacy (X_3) has a direct positive and significant effect on school effectiveness (Y).

4. Fourth Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of knowledge management (X_4) on school effectiveness (Y). To test that knowledge management (X_4) has a direct positive and significant influence on school effectiveness (Y), the statistical hypothesis tested is as follows:

$$H_0: \beta_{y4} \leq 0$$

$$H_1: \beta_{y4} > 0$$

From the calculation results, the path coefficient value is obtained with $\beta_{y4} = 0.237$. The test results obtained t_{count} of 3.507 and t_{table} (dk = 208, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 208, with $\alpha = 0.01$) of 2.59. The results of the analysis and test of the significance of the path coefficient can be seen in Table 4.

Table 4. Results of Calculation of Direct Influence Test of Knowledge Management Variable on School Effectiveness

Variables	N	dk	β_{y4}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_4 over Y	211	208	0,237	3,507	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 4, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is rejected and H_1 is accepted. Thus, it can be concluded that ICT literacy (X_4) has a direct positive and significant effect on school effectiveness (Y).

5. Fifth Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of transformational leadership (X_1) on knowledge management (X_4). To test that transformational leadership (X_1) has a direct positive and significant influence on knowledge management (X_4), the statistical hypothesis tested is as follows:

$$H_0: \beta_{41} \leq 0$$

$$H_1: \beta_{41} > 0$$

From the calculation results, the path coefficient value is obtained with $\beta_{41} = 0.284$. The test results

obtained t_{count} of 4.726 and t_{table} (dk = 209, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 209, with $\alpha = 0.01$) of 2.59. The results of the analysis and test of the significance of the path coefficient can be seen in Table 5.

Table 5. Results of Calculation of Direct Influence Test of Transformational Leadership Variable on Knowledge Management

Variables	N	dk	β_{41}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_1 over X_4	211	209	0,284	4,726	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 5, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is rejected and H_1 is accepted. Thus, it can be concluded that transformational leadership (X_1) has a direct positive and significant effect on knowledge management (X_4).

6. Sixth Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of interpersonal communication (X_2) on knowledge management (X_4). To test that interpersonal communication (X_2) has a direct positive and significant influence on knowledge management (X_4), the statistical hypothesis tested is as follows:

$$H_0: \beta_{42} \leq 0$$

$$H_1: \beta_{42} > 0$$

From the calculation results, the path coefficient value is obtained with $\beta_{42} = 0.438$. The test results obtained t_{count} of 7.179 and t_{table} (dk = 209, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 209, with $\alpha = 0.01$) of 2.59. The results of the analysis and test of the significance of the path coefficient can be seen in Table 6.

Table 6. Results of Calculation of Direct Influence Test of Interpersonal Communication Variables on Knowledge Management

Variables	N	dk	β_{42}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_2 over X_4	211	209	0,438	7,179	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 6, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is rejected and H_1 is accepted. Thus, it can be concluded that interpersonal communication (X_2) has a direct positive and significant effect on knowledge management (X_4).

7. Seventh Hypothesis Testing

Hypothesis testing is carried out by testing the direct influence of ICT literacy (X_3) on knowledge management (X_4). To test that ICT literacy (X_3) has a direct positive and significant influence on knowledge management (X_4), the statistical hypothesis tested is as follows:

$$H_0: \beta_{43} \leq 0$$

$$H_1: \beta_{43} > 0$$

From the calculation results, the path coefficient value is obtained with $\beta_{43} = 0.154$. The test results obtained t_{count} of 2.959 and t_{table} (dk = 209, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 209, with $\alpha = 0.01$) of 2.59. The results of the analysis and test of the significance of the path coefficient can be seen in Table 7.

Table 7. Results of the Calculation of the Direct Influence Test of ICT Literacy Variables on Knowledge Management

Variables	N	dk	β_{43}	t_{count}	t_{table} $\alpha = 0.05$	t_{table} $\alpha = 0.01$
X_3 over X_4	211	209	0,154	2,959	1,97	2,59

Significant requirement: $t_{\text{count}} > t_{\text{table}}$

Based on the calculation results as seen in Table 7, it is obtained that $t_{\text{count}} > t_{\text{table}}$. So H_0 is rejected and H_1 is accepted. Thus, it can be concluded that ICT literacy (X_3) has a direct positive and significant effect

on knowledge management (X4).

8. Eighth hypothesis testing

Hypothesis testing is carried out by testing the indirect influence of transformational leadership (X1) on school effectiveness (Y) through knowledge management (X4). The statistical hypotheses tested are as follows.

$$H_0: \beta_{y41} \leq 0$$

$$H_1: \beta_{y41} > 0$$

The results of the hypothesis calculation are as follows.

$$\beta_{41} = 0.284 \quad S_{41} = 0.054$$

$$\beta_{y4} = 0.237 \quad S_{y4} = 0.069$$

$$\beta_{y41} = \beta_{41} \times \beta_{y4} = 0.284 \times 0.237 = 0.067$$

From the calculation results, the *two-tailed probability value* was obtained as $0.004 < 0.05$ and the *Sobel test statistic value* was 2.875 and the t_{table} (df = 208, with $\alpha = 0.05$) was 1.97 and the t_{table} (dk = 208, with $\alpha = 0.01$) is 2.59. Based on the calculation results as seen, the calculated t is obtained $> t_{table}$ at a significance level of 0.05. Based on this data, it can be concluded that there is an indirect influence. positive and significant transformational leadership on school effectiveness through knowledge management. This means that effective knowledge management is a mediator of the influence of transformational leadership on school effectiveness.

9. Testing the Ninth Hypothesis

Hypothesis testing is carried out by testing the indirect influence of interpersonal communication (X2) on school effectiveness (Y) through knowledge management (X4). The statistical hypotheses tested are as follows.

$$H_0: \beta_{y42} \leq 0$$

$$H_1: \beta_{y42} > 0$$

The results of the hypothesis calculation are as follows.

$$\beta_{42} = 0.438 \quad S_{42} = 0.054$$

$$\beta_{y4} = 0.237 \quad S_{y4} = 0.069$$

$$\beta_{y42} = \beta_{42} \times \beta_{y4} = 0.438 \times 0.237 = 0.104$$

From the calculation results, a *two-tailed value* was obtained probability of $0.001 < 0.05$ and the *Sobel value test statistic* of 3.162 and t_{table} (dk = 208, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 208, with $\alpha = 0.01$) is 2.59. Based on the calculation results as seen, the calculated t is obtained $> t_{table}$ at a significance level of 0.05. Based on this data, it can be concluded that there is an indirect influence. positive and significant interpersonal communication on school effectiveness through knowledge management. This means that effective knowledge management as a mediator of the influence of interpersonal communication on school effectiveness.

10. Tenth hypothesis testing

Hypothesis testing is carried out by testing the indirect effect of ICT literacy (X2) on school effectiveness (Y) through knowledge management (X4). The statistical hypotheses tested are as follows.

$$H_0: \beta_{y43} \leq 0$$

$$H_1: \beta_{y43} > 0$$

The results of the hypothesis calculation are as follows.

$$\beta_{43} = 0.154 \quad S_{43} = 0.161$$

$$\beta_{y4} = 0.237 \quad S_{y4} = 0.069$$

$$\beta_{y43} = \beta_{43} \times \beta_{y4} = 0.154 \times 0.237 = 0.036$$

From the calculation results, a *two-tailed value* was obtained probability of $0.356 > 0.05$ and the *Sobel value test statistic* of 0.921 and t_{table} (dk = 208, with $\alpha = 0.05$) of 1.97 and t_{table} (dk = 208, with $\alpha = 0.01$) is 2.59. Based on the calculation results as seen, the calculated t is obtained $< t_{table}$ at a significance level of 0.05. Based on this data, it can be concluded that there is an indirect influence. insignificant positive ICT iteration on school effectiveness through knowledge management. This means knowledge management not effective as a mediator of the influence of ICT literacy on school effectiveness. A summary of all hypothesis testing results is presented in table 7.

Table 7. Summary of Hypothesis Testing Results

No	Variables	Sig Value	t count	t table	Test results
1	X ₁ to Y	0.032	2,159	1.97	H ₀ is rejected, H ₁ is accepted. There is a direct positive and significant influence of transformational leadership on school effectiveness.
2	X ₂ against Y	0,000	5,560	1.97	H ₀ is rejected, H ₁ is accepted. There is a direct positive and significant influence of interpersonal communication on school effectiveness.
3	X ₃ to Y	0.001	3,460	1.97	H ₀ is rejected, H ₁ is accepted. There is a direct positive and significant influence of ICT literacy on school effectiveness.
4	X ₄ to Y	0.001	3,507	1.97	H ₀ is rejected, H ₁ is accepted. There is a direct positive and significant influence of knowledge management on school effectiveness.
5	X ₁ to X ₄	0,000	4,726	1.97	H ₀ is rejected, H ₁ is accepted. There is a positive and significant direct influence of transformational leadership on knowledge management.
6	X ₂ to X ₄	0,000	7,179	1.97	H ₀ is rejected, H ₁ is accepted. There is a positive and significant direct influence of interpersonal communication on knowledge management.
7	X ₃ to X ₄	0.003	2,959	1.97	H ₀ is rejected, H ₁ is accepted. There is a direct positive and significant influence of ICT literacy on knowledge management.
8	X ₁ against Y through X ₄	0.004	2,875	1.97	H ₀ is rejected, H ₁ is accepted. There is a positive and significant indirect influence of transformational leadership on school effectiveness through knowledge management.
9	X ₂ against Y through X ₄	0.001	3,162	1.97	H ₀ is rejected, H ₁ is accepted. There is a positive and significant indirect influence of interpersonal communication on school effectiveness through knowledge management.
10	X ₃ against Y through X ₄	0.356	0.921	1.97	H ₀ is rejected, H ₁ is accepted. There is an insignificant positive indirect effect of ICT literacy on school effectiveness through knowledge management.

Discussion

A. Direct Influence of Transformational Leadership (X1) on School Effectiveness (Y)

Based on the results of data analysis, transformational leadership (X1) has a direct and significant positive effect on school effectiveness (Y). The path coefficient value $\beta_{y1} = 0.133$ with t count $2.159 > t$ table 1.97 indicates that the stronger the transformational leadership, the higher the school effectiveness. This result is supported by research by Karsim et al. (2018), which also found a significant effect of transformational leadership on school effectiveness with a significance value of $0.02 < 0.05$, and Sukatin (2022), which stated that the contribution of transformational leadership to school effectiveness was 47.9%. Thus, transformational leadership plays an important role in increasing school effectiveness.

B. Direct Influence of Interpersonal Communication (X2) on School Effectiveness (Y)

The results of the study indicate that interpersonal communication (X2) has a direct positive and significant effect on school effectiveness (Y). The path coefficient value $\beta_{y2} = 0.368$ with tcount $5.560 > t$ table 1.97 indicates that the better the interpersonal communication carried out by the principal, the better the school effectiveness. This finding is consistent with the research of Thahir et al. (2018), which found a positive and significant relationship between interpersonal communication and teacher effectiveness with $r_{y12} = 0.379$ and $\rho < 0.05$, indicating the importance of interpersonal communication in influencing school effectiveness.

C. Direct Influence of ICT Literacy (X3) on School Effectiveness (Y)

ICT literacy (X3) also has a positive and significant direct effect on school effectiveness (Y), with a

path coefficient of $\beta_{y3} = 0.179$ and $t_{count} 3.460 > t_{table} 1.97$. This shows that the better the ICT literacy, the better the school effectiveness. This study is in line with Sunardi et al. (2019), who found that ICT literacy has a positive and significant effect on school effectiveness, indicating that ICT literacy can strengthen various aspects of school management.

D. Direct Influence of Knowledge Management (X4) on School Effectiveness (Y)

Knowledge management (X4) also has a direct positive and significant effect on school effectiveness (Y), with a path coefficient value of $\beta_{y4} = 0.237$ and $t_{count} 3.507 > t_{table} 1.97$. This means that the better the knowledge management in schools, the higher the effectiveness of the school. This study is in accordance with the findings of Novyanti et al. (2021), which also stated that there is a significant positive relationship between knowledge management and school effectiveness.

E. Direct Influence of Transformational Leadership (X1) on Knowledge Management (X4)

The results of the study indicate that transformational leadership (X1) has a direct positive and significant effect on knowledge management (X4), with a path coefficient of $\beta_{41} = 0.284$ and a Sig value of $0.004 < 0.05$ and $t_{count} 4.726 > t_{table} 1.97$. This shows that transformational leadership plays an important role in strengthening knowledge management, in line with Hardianto's research (2018), which also found a significant effect of transformational leadership on knowledge management.

F. Direct Influence of Interpersonal Communication (X2) on Knowledge Management (X4)

Interpersonal communication (X2) also has a direct positive and significant effect on knowledge management (X4), with a path coefficient of $\beta_{42} = 0.438$ and a Sig value of $0.033 < 0.05$ and $t_{count} 7.179 > t_{table} 1.97$. This indicates that effective interpersonal communication can strengthen the knowledge management process in schools, as found in Wahyuni's research (2016), which also states that interpersonal communication has a direct positive effect on knowledge management.

G. Direct Influence of ICT Literacy (X3) on Knowledge Management (X4)

ICT literacy (X3) also has a positive and significant direct influence on knowledge management (X4), with a coefficient value of $\beta_{43} = 0.154$ and $t_{count} 2.959 > t_{table} 1.97$. This shows that good ICT literacy can support effective knowledge management, consistent with Maufuryah's research (2015), which emphasizes the importance of ICT literacy in knowledge management.

H. Indirect Influence of Transformational Leadership (X1) on School Effectiveness (Y) Through Knowledge Management (X4)

This study shows that transformational leadership (X1) has a positive and significant indirect effect on school effectiveness (Y) through knowledge management (X4). This result is proven by the two-tailed probability value of $0.004 < 0.05$ and the Sobel test statistic value of $2.875 > t_{table} 1.97$. Transformational leadership creates a culture that supports knowledge management, which ultimately improves school effectiveness.

I. Indirect Influence of Interpersonal Communication (X2) on School Effectiveness (Y) Through Knowledge Management (X4)

Interpersonal communication (X2) also has a positive and significant indirect effect on school effectiveness (Y) through knowledge management (X4), with a two-tailed probability value of $0.001 < 0.05$ and a Sobel test statistic of $3.162 > t_{table} 1.97$. Effective interpersonal communication improves knowledge management, which in turn improves school effectiveness.

J. Indirect Influence of ICT Literacy (X3) on School Effectiveness (Y) Through Knowledge Management (X4)

The indirect effect of ICT literacy (X3) on school effectiveness (Y) through knowledge management (X4) is not significant, with a two-tailed probability value of $0.356 > 0.05$ and a Sobel test statistic of $0.921 < t_{table} 1.97$. This indicates that knowledge management is not effective as an intervening variable in the relationship between ICT literacy and school effectiveness.

4 Conclusion

Based on the results of the study and discussion, it can be concluded that the strategy to improve school effectiveness is to strengthen the variables of transformational leadership, interpersonal communication, ICT literacy, and knowledge management. Each variable shows a positive and significant direct effect on school effectiveness, which means that strengthening weak indicators can immediately improve overall school effectiveness. In detail, transformational leadership, interpersonal communication, and ICT literacy each have

a positive and significant direct effect on school effectiveness, as well as teacher knowledge management. In addition, knowledge management acts as an effective mediator in the relationship between transformational leadership and interpersonal communication on school effectiveness. However, knowledge management is not effective as a mediator of the influence of ICT literacy on school effectiveness, although ICT literacy still contributes directly to school effectiveness. This finding emphasizes the importance of strengthening these four variables to achieve significant improvements in school effectiveness.

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