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COMPETENCY DEVELOPMENT IN IMPROVING MINE INSPECTOR PERFORMANCE

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ABSTRACT

National mineral and coal mining is the most crucial part of supporting non-tax state revenue (PNBP) in Indonesia. Mining Inspectors (IT) in Indonesia play a very crucial role in ensuring proper and correct mining activities management. The position of Mining Inspector has Competency Standards, formal education, work experience, and attitudes that have been regulated by the government. So far, there has been no research conducted to answer the question of whether the competencies possessed by each Mining Inspector can improve the performance of supervision in mineral and coal mining engineering and environmental aspects. This research was conducted on all Mining Inspectors in Java and Sumatra using a saturated sample. The data was then processed using SmartPLS data processing software. It was revealed in this research that Formal Education, Work Experience, and Competency Development have a positive and significant influence on Organizational Performance. Competency Development can act as a mediator of the influence of the two exogenous variables on Organizational Performance. Through these findings, stakeholders are expected to design programs to improve formal education, work experience, and the competencies of Mining Inspectors.

Introduction

In accordance with the Regulation of the Minister of State Apparatus Empowerment and Bureaucratic Reform (Menpan-RB) Number 36 of 2017 concerning the Functional Position of Mine Inspectors, it is explained that Mine Inspectors (IT) have a very crucial role to ensure the proper and correct management of mining activities. National mineral and coal mining is the most important part in supporting non-tax state revenues (PNBP). Recorded in 2022 from Minerba One Data Indonesia (MODI), state revenue obtained from the mineral and coal mining sector amounted to 185.50 trillion Rupiah (Directorate General of Minerba, 2022). So that with this condition, it can be illustrated how much mineral and coal reserves are exploited to produce the PNBP in question. For this reason, it is necessary to do good management. One of the government's efforts in maintaining mineral and coal management can be carried out properly and correctly, is to supervise the engineering and environment of mineral and coal mining.

As mandated by Law Number 3 of 2020 concerning Amendments to Law Number 4 of 2009 concerning Mineral and Coal Mining, overall there are several contents and changes in the governance of mineral and coal mining, namely: 1) regulations related to the concept of mining areas, 2) mineral and coal management plans, 3) assignment of state research institutions, SOEs, BUMDs or business entities to conduct investigations

and research in the context of preparing the Area Mining Business (WIUP), 4) strengthening the role of SOEs, 5) re-regulating licensing in mineral and coal exploitation including new licensing conventions related to rock exploitation for certain types or for certain purposes, as well as permits for community mining, and 6) strengthening policies related to environmental management in mining business activities including reclamation and post-mining implementation.

Furthermore, in Article 141 paragraph 2, Law Number 3 of 2020, it is stated that Mine Inspectors carry out technical supervision of mining, conservation of mineral and coal resources, mining safety, environmental management, reclamation and post-mining, utilization of service goods, technology and domestic engineering and design capabilities in accordance with the provisions of laws and regulations. Through Law Number 3 of 2020, it also causes changes in the supervisory work mechanism, as well as an increased workload. Until now, the burden of engineering and environmental personnel for mineral and coal is 4,232 business licenses in 2023, with details as shown in the following table.

Table 1
Number of Mining Permits

NO	TYPES OF PERMISSIONS	2019	2020	2021	2022	2023
1	KK	31	31	31	31	31
2	PKP2B	67	66	66	60	60
3	IUP	3.161	5.395	5.290	4.050	4.050
4	IPR	16	14	99	82	82
5	IUPK	2	3	4	9	9

Mine Inspector is a certain functional position that has the following position levels: (1) First Expert Mine Inspector, (2) Young Expert Mine Inspector, (3) Associate Expert Mine Inspector, and (4) Main Expert Mine Inspector. In accordance with PAN-RB Ministerial Regulation Number 30 of 2022 concerning Competency Standards for Functional Positions of Mine Inspectors, it is stated that Mine Inspectors are career positions of civil servants, and are functional positions in the category of expertise, which in carrying out the duties of the position must meet the Competency Standards. Where at each level of position has its own competency standards. The competency standards that must be possessed by each Mine Inspector are in accordance with the position level as regulated by the Minister of PANRB Number 30 of 2022 concerning Competency Standards for Functional Positions of Mine Inspectors in the following table.

Table 2
Competency Standards for the Position of Mine Inspector

Competency Standards	Description
A. Manajerial	1. Integrity 2. Collaboration 3. Communication

	4. Orientation to results
	5. Public Service
	6. Development of self and others
	7. Managing Change
	8. Decision-Making
B. Social Cultural	Nation Adhesive
C. Technical	1. Mining Technical Inspection
	2. Mineral and Coal Conservation Inspection
	3. Mining Safety Inspection
	4. Environmental Management, Reclamation, and Post-mining Inspection
	5. Standardization Inspection and Mining Service Business
	6. Mining Case Investigation

The Functional Position of Mine Inspector in carrying out the duties of the position must meet the above Competency Standards, namely: (1) Technical Competence (2) Managerial Competence (3) Socio-Cultural Competence. In addition, the position of Functional Position of Mine Inspector requires certain levels of formal education as outlined in (PANRB Regulation No. 30/2022, 2022).

The dynamics of political and legal regulations regarding mineral and coal licensing authority have undergone significant changes. Originally the authority was given by law to local governments, now the authority is taken over by the central government (Rahayu &; Faisal, 2021). The number of mining permits in Indonesia is presented in the following table.

Table 3
Number of Mining Permits

NO	TYPES OF PERMISSIONS	2019	2020	2021	2022	2023
1	KK	31	31	31	31	31
2	PKP2B	67	66	66	60	60
3	IUP	3.161	5.395	5.290	4.050	4.050

With the condition of increasing task load and from the results of discussions and interviews conducted with the Director of Engineering and Environment of Mineral and Coal and the Head of General Section, data was obtained that to be able to carry out the task of Engineering and environmental supervision of Mineral and Coal, appropriate competencies are needed for Mine Inspectors so that they can carry out optimal engineering and environmental supervision tasks.

From the condition of the task load and also the competencies that must be possessed from each Mine Inspector, the author conducts research to: (1) Analyze and know the effect of formal education on competency development (2) Analyze and know the effect of work experience on competency development (3) Analyze and know the influence of competency development on organizational performance (4) Analyze and know the role of competency development as a relationship mediator between formal

education and organizational performance (5) Analyze and know the role of competency development as a mediator of the relationship between work experience and organizational performance.

Hypothesis Development

Researchers from Bali (Wirawan et al., 2019) concluded that there is a positive and significant influence between education and performance. Furthermore, researchers from North Sumatra (Husna &; Sinaga, 2022) concluded that the level of education has a positive and significant effect on competence, as well as the conclusions drawn by researchers from Jakarta who examined the level of education and competence (Sriyono &; Restoeningrum, 2019). From the literature and previous research results, the author proposed the following research hypothesis:

H1: Formal education has a positive and significant effect on the competence of Mine Inspectors

Work experience towards Competency Development

Several studies that have been conducted previously, namely in Norway (Bjørngaard et al., 2022), in Spain (Guillén-Gámez et al., 2022) and in Indonesia (Prasanti et al., 2019) with various industry backgrounds, draw conclusions that work experience can improve competence. From the literature and previous research results, the author proposed the following research hypothesis:

H2: Work experience has a positive and significant effect on the competency development of Mine Inspectors.

Competency development towards Organizational Performance

Simultaneously, employee competency variables have a positive and significant effect on employee performance, with influential competency variables being knowledge, skills, self-concept, self-characteristics and motivation (Fauzi, 2019). This result is in line with research conducted by researchers in Indonesia (Iskamto, 2022; Novita &; Prasetyo, 2022), namely competence can improve employee performance. From the literature and previous research results, the author proposed the following research hypothesis:

H3: There is an effect of the competence of the Mine Inspector on Organizational Performance

Competence as a Mediator variable

Several studies using competence as a mediator variable have been conducted, including research in Central Java (Raharjo et al., 2016; Rahmawaty et al., 2021) and research in Kalimantan (Setyadi et al., 2022). From the literature and previous research results, the author proposed the following research hypothesis:

H4: Competency Development is able to mediate the relationship between formal education and organizational performance

H5: Competency Development is able to mediate the relationship between work experience and organizational performance

From the exposure that has been presented, researchers propose a research framework as follows.

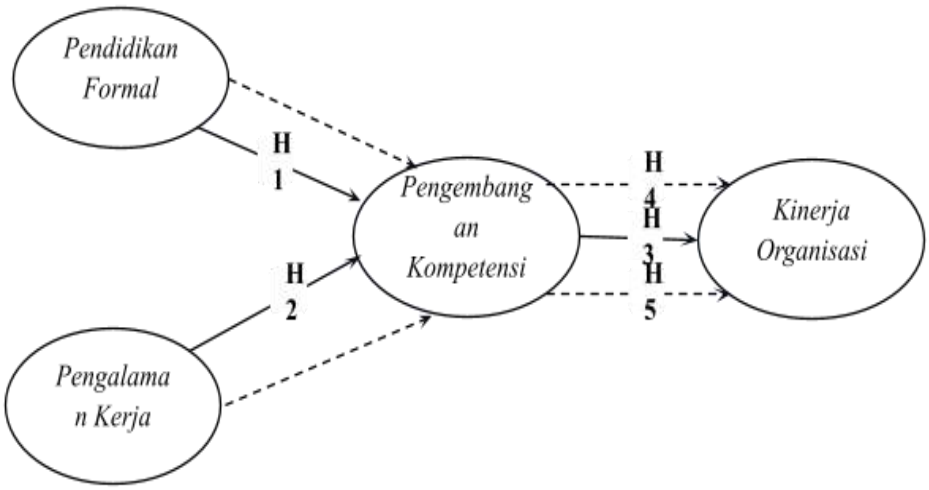

Figure 1. Research Model

Research Methods

This research was conducted in Jakarta by involving a number of respondents, namely employees with the position of Mine Inspector in Western Indonesia. The research time is scheduled for 2 (two) months, namely August 2023 to October 2023. The study was conducted using questionnaires through the internet network. The population in this study is all employees of Mine Inspectors in Java and Sumatra, with a total of 79 employees and all of them are the sample of this study.

This study uses 4 variables, namely: formal education, work experience, competency development, and organizational performance. The indicators used to measure each variable are compiled by referring to previous regulations and research. Formal education consists of 3 items, which refer to Law No. 20, 2023. Work experience refers to Wirawan et al. (2019) which consists of 6 dimensions with a total of 17 indicators. Competence is divided into 5 dimensions with a total of 24 indicators referring to Robbin & Judge (2015). Finally, for Organizational Performance refers to the indicators compiled by Widyaningrum (2020), which are divided into 2 dimensions with a total of 8 indicators.

The type of data used in this study is primary data and secondary data taken is data from questionnaire filling given to respondents, in the form of questionnaires, after filling out submitted by researchers for processing and several data sets obtained from organizations where respondents work. The research instrument in the form of a questionnaire used contains 4 (four) variables that are being studied, namely: (1) X1 Formal Education (2) X2 Work Experience (3) Y1 Competency Development and (4) Y2 Organizational Performance.

The data was analyzed using the Structural Equation Modeling (SEM) technique using Partial Least Square (PLS) with several steps as follows:

1. Test Measurement Model (Outer Model)

a. Convergent Validity Test

b. Discriminant Validity Test : Cross Loading
2. Uji Model Struktural (Inner Model)
a. Path Coefficients
b. Coefficient of Determination (R-Square or R2)
c. Predictive Relevance, Stone Geisser Value (Q2)
d. Effect Size (f 2)
3. Hypothesis Testing

Results and Discussion

Profile Responden

In this study, a survey was conducted on all respondents from the population of Mine Inspector employees in Java and Sumatra as many as 79 respondents with various backgrounds. Our respondents include various educational backgrounds, namely S2 education as many as 2 people and the rest are S1 graduates. The shortest work experience of respondents is above 3 years, and most of the respondents (67%) have work experience above 10 years. This means that respondents have been working in IT positions for quite a long time, so they really understand what is done in their positions. The majority of respondents have an educational background in Mining Engineering (54%) and all respondents do daily work related to mining, so that all respondents are competent and relevant personnel in the mining field and are able to answer questions from the questionnaire asked appropriately.

The first step used in model evaluation is the evaluation of the outer model (measurement model) known as the construct validity test, consisting of convergent validity and discriminant validity. The analysis has been carried out using the PLS algorithm based on the concepts that have been presented previously in the following Figure.

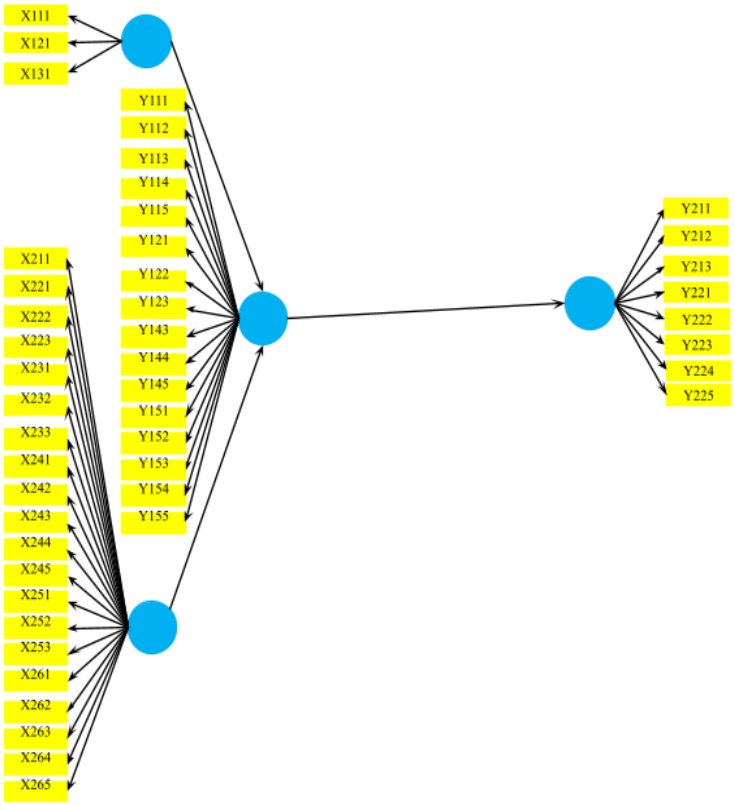

Figure 2 Research Indicators

The analysis that has been done using the PLS algorithm as shown above, produces outer loading as shown in the following table.

Table 8
Outer Loading

	X1	X2	Y1	Y2
X111	0.775			
X121	0.793			
X131	0.798			
X211		0.843		
X221		0.839		
X222		0.736		
X223		0.774		
X231		0.742		
X232		0.759		

X233	0.707	
X241	0.789	
X242	0.814	
X243	0.725	
X244	0.771	
X245	0.824	
X251	0.771	
X252	0.724	
X253	0.856	
X261	0.805	
X262	0.819	
X263	0.790	
X264	0.766	
X265	0.779	
Y111		0.701
Y112		0.754
Y113		0.735
Y114		0.753
Y115		0.770
Y121		0.842
Y122		0.705
Y123		0.858
Y124		0.841
Y125		0.823
Y131		0.819
Y132		0.835

Y133	0.746	
Y134	0.754	
Y141	0.737	
Y142	0.816	
Y143	0.744	
Y144	0.851	
Y145	0.733	
Y151	0.722	
Y152	0.830	
Y153	0.843	
Y154	0.796	
Y155	0.783	
Y211		0.842
Y212		0.814
Y213		0.783
Y221		0.727
Y222		0.701
Y223		0.750
Y224		0.794
Y225		0.841
X1-Pendidikan_Formal X2-Pengalaman_Kerja Y1-Pengembangan_Kompetensi Y2-Kinerja_Organisasi		

From the table above, it can be seen that all outer loading values have met the conditions, which are above 0.7 according to the conditions proposed by Hair et al. (2019). Another parameter to test the convergent validity generated by PLS software is AVE, which must be greater than 0.50 (Hamid &; Anwar, 2019). Convergent validity can also be seen from Cronbach's Alpha values such as the rule of thumb as follows (Garson, 2016):

1. Cronbach's Alpha value of > 0.6 reliability is sufficient for exploratory research
2. Cronbach's Alpha score of > 0.7 reliability is sufficient for confirmatory research
3. Cronbach's Alpha score of > 0.8 is good reliability for confirmatory research

The results of calculating AVE and Cronbach's Alpha using the PLS algorithm in this study are shown in the following table.

Table 9
Construct Reliability and Validity

Latent Variable	Cronbach's Alpha	rA	CR	(AVE)
X1-Pendidikan_Formal	0.808	0.766	0.745	0.778
X2-Pengalaman_Kerja	0.892	0.903	0.908	0.737
Y1-Pengembangan_Kompetensi	0.951	0.955	0.956	0.777
Y2-Kinerja_Organisasi	0.910	0.912	0.927	0.613

rA = rho_A; CR= Composite Reliability; AVE=Average Varian Extracted

From the table above it can be seen that all Cronbach's Alpha values are above 0.8 as required by Garson (2016). The table above also shows that the AVE value of all Variables used in the study > 0.5. As suggested by Hamid & Anwar (2019) that for convergent validity measurement, the AVE value must ≥ 0.5, so it can be said that all constructs used are valid. All indicators are declared valid and capable of being used to represent the latent variables built by each indicator.

Discriminant Validity Test: Cross Loading

Testing the validity of discriminants with reflective indicators using cross loading values with cross loading values for each variable must be above 0.70 (Hamid &; Anwar, 2019; Vinzi et al., 2010). The calculation results with PLS are presented in the following table.

Table 10
Cross Loading

Indikator	X1	X2	Y1	Y2
X111	0.740	0.154	0.464	0.232
X121	0.788	0.469	0.278	0.345
X131	0.703	0.209	0.467	0.271
X211	0.333	0.750	0.437	0.452
X221	0.152	0.786	0.448	0.312
X222	0.217	0.725	0.393	0.154
X223	0.222	0.759	0.319	0.448
X231	0.294	0.752	0.237	0.425
X232	0.118	0.729	0.386	0.225

X233	0.121	0.731	0.325	0.158
X241	0.136	0.705	0.226	0.393
X242	0.436	0.766	0.266	0.300
X243	0.294	0.772	0.148	0.425
X244	0.461	0.742	0.432	0.442
X245	0.302	0.745	0.199	0.420
X251	0.499	0.784	0.406	0.443
X252	0.436	0.764	0.189	0.492
X253	0.307	0.751	0.411	0.158
X261	0.437	0.744	0.340	0.368
X262	0.219	0.729	0.381	0.354
X263	0.231	0.744	0.133	0.323
X264	0.291	0.759	0.139	0.121
X265	0.469	0.720	0.179	0.349
Y111	0.452	0.377	0.795	0.468
Y112	0.456	0.274	0.800	0.244
Y113	0.220	0.227	0.748	0.416
Y114	0.153	0.162	0.727	0.218
Y115	0.434	0.253	0.718	0.437
Y121	0.274	0.392	0.717	0.467
Y122	0.178	0.338	0.759	0.224
Y123	0.482	0.233	0.781	0.196
Y124	0.322	0.353	0.774	0.466
Y125	0.430	0.447	0.760	0.271
Y131	0.365	0.402	0.740	0.323
Y132	0.240	0.308	0.782	0.480
Y133	0.332	0.265	0.760	0.456
Y134	0.304	0.326	0.794	0.323
Y141	0.128	0.292	0.773	0.497
Y142	0.169	0.139	0.793	0.119
Y143	0.167	0.241	0.782	0.260
Y144	0.454	0.322	0.775	0.238

Y145	0.137	0.256	0.789	0.335
Y151	0.172	0.181	0.770	0.157
Y152	0.299	0.259	0.758	0.450
Y153	0.333	0.257	0.753	0.203
Y154	0.190	0.130	0.748	0.229
Y155	0.402	0.103	0.750	0.117
Y211	0.407	0.137	0.298	0.788
Y212	0.448	0.228	0.337	0.703
Y213	0.436	0.387	0.374	0.787
Y221	0.171	0.169	0.323	0.727
Y222	0.463	0.162	0.288	0.759
Y223	0.254	0.389	0.271	0.768
Y224	0.126	0.418	0.435	0.746
Y225	0.391	0.460	0.241	0.750

Next, the HTMT (Heterotrait-Monotrait) ratio is used which is a statistical measurement in PLS to measure the discriminant validity of the construct or latent variable in this study. HTMT results are presented in the following table.

Table 11
HTMT (Heterotrait-Monotrait)

Variable	X1	X2	Y1	Y2
X1-Pendidikan_Formal				
X2-Pengalaman_Kerja	0.311			
Y1-Pengembangan_Kompetensi	0.178	0.776		
Y2-Kinerja_Organisasi	0.251	0.721	0.588	

If the HTMT value is less than 0.85, it means that the discriminant validity requirement has been met (Hair et al. 2019). In the table above, no HTMT value is found more than 0.85, so it can be said that the discriminant validity requirement has been met.

Uji Model struktural (Inner Model)

Test of structural models is a key stage in the analysis process with SmartPLS, especially in the context of path analysis or structural equation models. The structural model test (inner model) aims to test the extent to which the model that has been built reflects the relationship between variables that have been proposed previously.

Path Coefficient Value

The next calculation is used by PLS algorithm with Bootstrapping analysis to get the value of the path coefficient of each variable used in the study. The results of calculations with PLS for Path Coefficients are presented in the following figure.

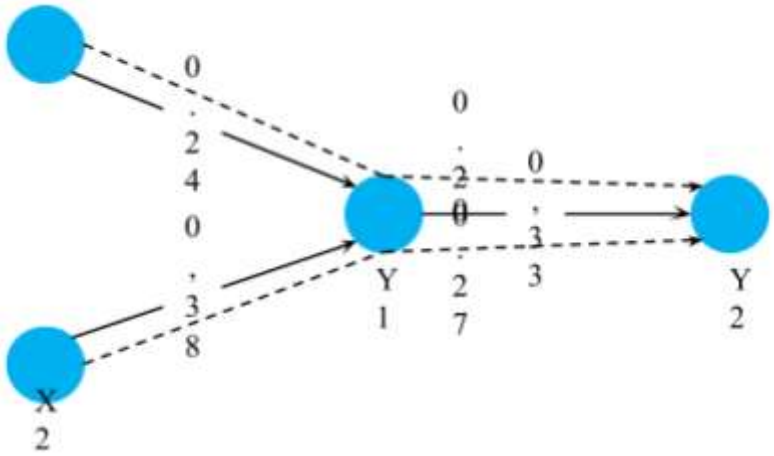

Figure 3 Path Coefficient

From the figure above, it can be seen that all values of the path coefficient > 0, or there is a influence of exogenous variables on each endogenous variable. Whether the above path coefficients are significant or not, will be tested by the bootstapping process in the hypothesis testing section.

Determination (R-Square or R2)

The interpretation of R2 used is as follows (Hair, Risher, et al., 2019; Hamid & Anwar, 2019): (1) An R2 value of 0.75 indicates a strong model (substantial) (2) An R2 value of 0.50 indicates a moderate model (3) An R2 value of 0.25 indicates a weak model. The value of R2 is a value that describes the magnitude of exogenous variables in influencing endogenous variables. The R2 value has a range between 0 (zero) to 1 (one) which indicates the magnitude of the combination of exogenous variables simultaneously (together) affecting endogenous variables. The R2 value is also used to assess the magnitude of the influence of exogenous latent variables on their endogenous latent variables (Hair et al., 2014). The R2 value of the calculation using the PLS algorithm in this study is presented in the following table.

Table 12
R-square

Variable	R Square	R Square Adjusted
Y1-Pengembangan_Kompetensi	0.561	0.548
Y2-Kinerja_Organisasi	0.525	0.515

The results shown in the R2 value table above, obtained for the Y1 variable have a value between 0.5 and 0.75, so it can be said to be included in the moderate category. Similarly, the Y2 variable has an R2 value between 0.5 and 0.75, so it can be said to be included in the weak category (moderate).

Predictive Relevance, Stone Geisser Value (Q2)

The calculation of Q2 in this study used the blindfolding step on SmartPLS and followed the categories given by Hair et al. (2017) is: Q2 values > 0 indicate that the model already has good predictive relevance, while if the Q2 value < 0 indicates that the model lacks predictive relevance. The calculation results in this study are as follows.

Table 13
Stone Geisser Value

Variable	SSO	SSE	Q^2 (=1-SSE/SSO)
X1-Pendidikan_Formal	207.000	207.000	
X2-Pengalaman_Kerja	1380.000	1380.000	
Y1-Pengembangan_Kompetensi	1656.000	1252.409	0.244
Y2-Kinerja_Organisasi	552.000	452.276	0.181

The Q2 value produced by the calculation process above, for both bound variables (Y1 and Y2) all values are above 0, so it can be said that the model built has good predictive relevance.

Hypothesis Testing

From the outer model and inner model testing that has been done, it can be seen that the model formed is robust, so hypothesis testing can be done through the bootstrapping process as follows.

Table 14
Hasil Bootstrapping

Line	(The)	(M)	(STDEV)	(|O/STDEV|)	(P)	Disconnection
H1: X1 Y1	0.240	0.004	0.075	4.515	0.007	Accepted
H2: X2 Y1	0.382	0.014	0.174	3.997	0.009	Accepted
H3: Y1 Y2	0.332	0.750	0.052	7.148	0.000	Accepted
H4: X1 Y1 Y2	0.201	0.596	0.132	4.468	0.001	Accepted
H5: X2 Y1 Y2	0.273	0.118	0.145	5.851	0.000	Accepted

Original Sample (O); Sample Mean (M); Standard Deviation (STDEV); T Statistics (|O/STDEV|); P Values (P)

From the table above it can be seen that from the alternative hypotheses (H1, H2, H3, H4 and H5) have a P value smaller than 0.05 so it can be decided that all alternative hypotheses are accepted.

Formal Education towards Competency Development

In this study, it was revealed that formal education has a positive and significant effect on the development of the competence of Mine Inspectors. The results of this study are in line with several studies that have been conducted previously (Husna &; Sinaga, 2022; Sriyono &; Restoeningrum, 2019; Wirawan et al., 2019). It can be said that the better the education of Mine Inspectors, the better the development of the competence of the employees concerned.

Work experience towards Competency Development

In this study, it was revealed that work experience has a positive and significant effect on the development of the competence of Mine Inspectors. The results of this study are in line with several studies that have been conducted previously (Bjørngaard et al., 2022; Guillén-Gámez et al., 2022; Prasanti et al., 2019). It can be said that the longer the Mine Inspector works in his position, the better the development of the competence of the employee concerned.

Competency development towards Performance

In this study, it was revealed that competency development has a positive and significant effect on the performance of Mine Inspectors. The results of this study are in line with several studies that have been conducted previously (Fauzi, 2019; Iskamto, 2022; Novita &; Prasetyo, 2022). It can be said that the better the development of the competence of the Mine Inspector, the better the performance of the employees concerned.

Competency Development as a Mediator variable

In this study, it was revealed that competency development can act as a mediator of the influence of formal education on the performance of Mine Inspectors. Similarly, competency development is able to act as a mediator of the influence of work experience on the performance of Mine Inspectors. The results of this study reinforce and are in line with several studies that have been conducted previously (Raharjo et al., 2016; Rahmawaty et al., 2021; Setyadi et al., 2022). Through competency development, the influence of formal education and the influence of work experience on the performance of Mine Inspectors can be stronger.

Conclusion

From the series of analyses conducted on the four variables in this study, the following conclusions can be drawn from this study that:

1. Formal education has a positive and significant effect on the competence of Mine Inspectors
2. Work experience has a positive and significant effect on the development of the competence of Mine Inspectors
3. There is an influence of Mine Inspector Competency Development on Organizational Performance
4. Competency Development is able to mediate the relationship between formal education and organizational performance

5. Competency Development is able to mediate the relationship between work experience and organizational performance

To improve organizational performance, it is recommended to stakeholders to consider improving formal education, work experience and competency development.

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