

## **A Mathematical Approach to Optimize Security Crisis Management and Strengthen National Defense in DKI Jakarta Province**

**Anatansyah Ayomi Anandari<sup>1)\*</sup>, Achmad Farid Wadjdi<sup>2)</sup>, Gentio Harsono<sup>3)</sup>**

<sup>1,3)</sup> Department of Sensing Technology, Faculty of Defense Science & Technology, Republic of Indonesia Defense University, Indonesia

<sup>2)</sup> National Research and Innovation Agency, Indonesia

\*Corresponding Author

Email: [ananayomiii@gmail.com](mailto:ananayomiii@gmail.com)

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### **Abstract**

*This research aims to apply military mathematical models in decision making for security crisis management in DKI Jakarta Province. This research departs from the urgent need to deal with crime problems and improve regional security. Regression model is used to analyze the relationship between independent variables (Pure Participation Rate, Unemployment, Gini Index, and GRDP) and dependent variable (Criminal Risk). Historical and current data on security, education, employment, income inequality, and the economy were collected for analysis. The results show that Net Enrolment Rate and Unemployment have a negative influence on Criminal Risk, while Gini Index and GRDP have a positive influence. These findings provide a deeper understanding of the factors that contribute to the security crisis in the region. Based on the analysis results, this study concludes that the application of military mathematical models can be an important reference for the government in addressing the crime problem and improving security in DKI Jakarta Province. The proposed recommendations are to improve access to education, reduce the unemployment rate, address income inequality, and strengthen the economic sector. The implementation of integrated policies between government agencies is also considered important to achieve optimal results in overcoming the security crisis.*

**Keywords:** *Crisis Management, Integrated Policy, DKI Jakarta, Military Mathematical, Security Crisis*

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## **INTRODUCTION**

Security issues in DKI Jakarta Province are complex and multifaceted. As the capital city of Indonesia and the center of political, economic and social activities, Jakarta faces various security challenges that must be addressed seriously (Wijarnoko et al., 2020). One of the main issues is the high crime rate and crime risk (Riswan et al., 2021). The data presented earlier shows a decrease in criminal risk from 2005 to 2019, but this issue remains a major concern due to its significant impact on the comfort and safety of residents (Muda, 2021). In addition, social tension is also an issue that needs to be addressed in Jakarta (I Gusti Ayu Ratih Charisma Dewi Atmika, 2020). A fairly stable level of economic inequality reflected in the Gini index indicates the existence of inequalities among the population. Social injustice, limited access to education and employment, and stark economic differences can trigger social tensions and conflicts (Subagyo et al., 2020). This issue requires a holistic approach and joint efforts from the government, community, and various related parties to create equality and social inclusion (Attawana, 2022).

Furthermore, Jakarta also faces challenges related to terrorism and radicalism. As a center of economic and political activity, the city is vulnerable to becoming a potential target for extremist groups seeking to create instability (Helmus et al., 2023). Prevention, monitoring, and intelligence co-operation are essential to prevent acts of terrorism and deal with these security threats (Herrington, 2019). In addition to these issues, Jakarta also faces challenges related to environmental resilience and natural disasters. Climate change, flooding, and air pollution are some of the environmental issues that can have a direct impact on the safety and health of citizens (Taha et al., 2022). Environmental protection and adaptation efforts to climate change

are very important in order to maintain the security and welfare of the people of Jakarta (Sitinjak, 2021). To address these security issues, synergy between the government, security forces, communities, and various stakeholders is needed. A preventive, participatory and data-driven approach is key in addressing these complex security issues. In addition, investment in human resource development, infrastructure, and the fulfilment of human rights are also important steps to create a safe, inclusive, and sustainable environment for Jakartan (Alekseeva et al., 2017).

Security crises are serious challenges faced by many countries and regions around the world (Mahendra et al., 2023). DKI Jakarta Province, as one of the areas with a high population density and serves as the center of government, is also inseparable from various security threats (Cusumano & Bures, 2022). In the face of a security crisis, effective and efficient decision-making becomes very important to minimize negative impacts and maintain stability (Bergmann & Müller, 2021). Decision-making in security crisis management is a complex challenge and requires in-depth analysis (Juanita & Setiani, 2022). In DKI Jakarta Province, as the capital city of Indonesia which is densely populated and has an important role in political, economic, and social aspects, security is a critical factor that must be well maintained (Hamzah et al., 2019). In this context, the use of military mathematical models in decision-making can be an effective tool to understand and address complex security challenges.

As in many urban areas around the world, DKI Jakarta may face challenges in maintaining security (Dewi, 2023). Some common problems related to urban security include street crime, theft, violence, and social disorder. However, it is important to remember that the security situation can change over time, and this can be affected by factors as diverse as social, economic, political developments, and government efforts in maintaining security. In this context, the use of military mathematical models can be a valuable tool in decision-making for security crisis management in DKI Jakarta Province (Mahendra et al., 2023). A military mathematical model is a mathematical approach that models situations and strategies related to military aspects, such as operational planning, resource use, and risk analysis. DKI Jakarta Province often faces various security crises, including social unrest, acts of terrorism, public security disturbances, and other threats. Appropriate and quick decisions in handling these situations are crucial to maintaining the security and stability of the region. However, decision-making in a security context is often complex and dependent on various factors, such as the number of troops available, the distribution of resources, the movement of potential enemies, and social dynamics in the community. This research illustrates a unique approach to dealing with security challenges in the DKI Jakarta area. In looking at similarities with other research, there are several studies that also explore criminal policy in tackling security issues in Indonesia. One of them is a study on "Criminal Policy in Overcoming Criminal Offences related to Virtual Cryptocurrency in Indonesia" (Handicha, 2020). Both of these studies focus on overcoming security crises involving elements of crime and technology in Indonesia.

In addition, this research has similarities with research on "OJK's Non-Penal Criminal Policy in Overcoming Cyber Crime Through the Peer To Peer Lending System" (Ifrani & Said, 2020). Both focus on the policy and strategy aspects of tackling the threat of crime related to the digital world, although each study focuses on a different context. Furthermore, this research is also relevant to the study on "Criminal policy to prevent corruption in public services" (Satria, 2020). Both the research on military mathematical modeling and public service corruption prevention aim to improve the security and quality of services in a particular area. Although the focus is different, they can complement each other in an effort to create a safer and more trustworthy environment. This research also has relevance to research on "The Influence of Socio-Economic Factors on Criminal Behaviour" (Adri et al., 2019). Both recognize the importance of understanding the social and economic factors that influence crime rates and security crises in an area. Military mathematical models may be used as an effective analytical

tool to identify crime patterns and trends in a broader social and economic context. Overall, this research has some similarities and differences with related studies. The similarities show the potential for collaboration and application of findings from various studies in an effort to achieve more effective and comprehensive security.

In this research, a case study will be conducted in DKI Jakarta Province to apply military mathematical models in security crisis management decision-making. This case study will involve analyzing the actual security situation that has occurred in the region and involving various related parties, such as security forces, local government, and other related institutions. The data and information obtained from this case study will be used to build a military mathematical model that is appropriate to the context of DKI Jakarta Province. The model will include relevant variables, such as threat level, available forces and resources, and possible tactical strategies. The purpose of this research is to develop and apply military mathematical model applications to support decision-making in security crisis management in DKI Jakarta Province. By using military mathematical models, it is expected that this research can provide a better understanding of the dynamics of security crises and help decision-makers to make effective and timely decisions. Thus, this research has important significance in improving the ability of security crisis management in DKI Jakarta Province and can serve as a guide for the government and related institutions in facing complex security challenges.

## RESEARCH METHODS

The research method that can be used for the application of military mathematical models in security crisis management decision-making in DKI Jakarta Province can involve several steps. First, the research can start by identifying and collecting relevant data related to security in DKI Jakarta Province, such as crime statistics, intelligence reports, demographic data, and security-related infrastructure. Next, researchers can build a mathematical model that is able to analyze and predict security patterns in the region. This model can include variables such as crime rates, population density, the presence of security forces, and other factors that affect security. The following is an overview of the process and stages in this research.



Figure 1. Research Mind Map

After the mathematical model is built, researchers can test its validity using historical data on security events in DKI Jakarta Province (Cacciapaglia et al., 2020). In this case, researchers can compare the model's predictions with actual data to see how far the model can accurately predict the security situation in the past. After the model is tested and valid, the next step is to apply the model in decision-making for security crisis management in DKI Jakarta Province. This model can be used to provide recommendations for appropriate action based on mathematical analysis of incoming data in real-time, so that it can help decision makers respond and respond to security situations quickly and effectively.

In addition, researchers can also simulate emergencies or scenarios that may occur in DKI Jakarta Province to test the model's response in different situations. In this case, researchers can simulate various security crisis scenarios and see how mathematical models can provide recommendations for optimal actions in these situations. By using this research method, it is expected that the application of military mathematical models in security crisis management decision-making in DKI Jakarta Province can make a significant contribution in improving the efficiency and effectiveness of security measures, as well as assisting authorities in making better decisions to maintain the security and stability of the region.

## RESULT AND DISCUSSION

In the face of complex challenges related to security and stability in metropolitan cities, a military mathematics approach has the potential to provide deep and strategic insights. Through the application of mathematical models developed within the framework of military science, this research seeks to analyze the dynamics of security issues in Jakarta with a strong empirical approach. By utilizing empirical data that has been collected and visualized, it will be further analyzed using military mathematical models that can make an important contribution in informing and guiding decision-making in the face of diverse security crises in DKI Jakarta Province.

### Analysis of Influence Factors

The data presented in this line chart visualization is a series of information relating to several factors relevant in the research on security crisis management decision-making in DKI Jakarta Province. The data includes year, criminal risk, net enrolment rate, unemployment rate, Gini index, and Gross Regional Domestic Product (GRDP) from 2005 to 2022.

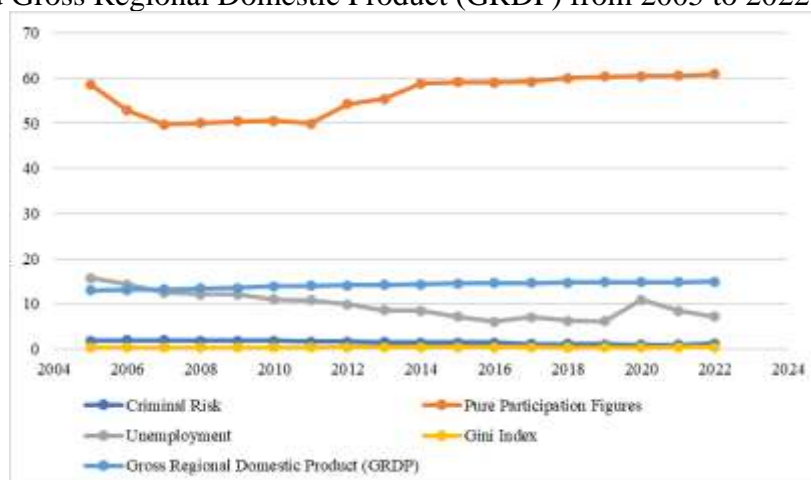


Figure 2. Graph of Research Variables

From 2005 to 2007, it can be seen that crime risk had a slight increase from 1.87 to 1.95. However, after that, the crime risk tended to decrease slowly until it reached 1.11 in 2019. This may indicate the efforts made in handling security in DKI Jakarta Province which resulted in a decrease in crime risk. Meanwhile, the net enrolment rate fluctuated from 2005 to 2012, but then tended to stabilize around 60 with little variation. The unemployment rate showed a consistent downward trend from 15.77 in 2005 to 6.22 in 2019, but increased in 2020 and 2022.

The Gini Index, which reflects the level of economic inequality, showed slight fluctuations, but tended to stabilize within the range of 0.32 to 0.43. This means that the level of economic inequality in DKI Jakarta Province has remained relatively stable over the period. GRDP shows a fairly consistent increase from 2005 to 2022, indicating positive economic growth over the period. The data provides an overview of several factors that may have an impact on security crisis management decision-making in DKI Jakarta Province. A decrease in criminal risk, a decrease in the unemployment rate, and relatively stable economic growth can be considered as positive indicators in security crisis management efforts. However, fluctuations in some variables such as the unemployment rate and the Gini index suggest that there are still challenges that need to be addressed in the context of security and stability in the region.

This research focuses on the application of military mathematical models in security crisis management decision making in DKI Jakarta Province. The purpose of this study is to analyze and understand how certain factors used as independent variables, namely Pure Participation Rate (X1), Unemployment (X2), Gini Index (X3), and GRDP (X4), relate to the dependent variable, Criminal Risk (Y).

Table 1. Research Variables

<b>Variables</b>	<b>Description</b>
Y	Criminal Risk
X1	Pure Participation Rate
X2	Unemployment
X3	Gini Index
X4	GRDP

The Net Enrolment Rate is a variable that describes the percentage of the school-age population (SD-SMA) who are attending school or are at the education level according to their age. The Net Enrolment Rate shows the level of community access to formal education, so the higher the net enrolment rate, the higher the level of access to education in a region. Furthermore, Unemployment is a variable that reflects the percentage of individuals who are not working or unemployed out of the total labour force. A high unemployment rate can lead to various social and economic problems in a region.

On the other hand, the Gini Index is a measure of income inequality within a population. The Gini Index has a range of values from 0 to 1, where a value of 0 indicates perfect income distribution (everyone has the same income) and a value of 1 indicates maximum inequality (a small portion of the population controls all income). Furthermore, GRDP stands for Gross Regional Domestic Product, which is a measure of the value of all goods and services produced by a region in a given period and reflects the economic level of a region.

The dependent variable, Criminal Risk, describes the level of crime risk or criminality in DKI Jakarta Province and can be measured by various indicators such as crime rates, theft rates, murders, and others. Thus, in this study, the military mathematical model will be used to analyze the relationship between the independent variables (Pure Participation Rate, Unemployment, Gini Index, and GRDP) and the dependent variable (Criminal Risk) in making decisions to overcome the security crisis in DKI Jakarta Province.

Table 2. Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Gross Regional Domestic Product (GRDP), Gini Index, Pure Participation Figures, Unemployment		Enter

a. All requested variables entered.

b. Dependent Variable: Criminal Risk

The table above means that there are 4 independent variables used, namely Pure Participation Rate (X1), Unemployment (X2), Gini Index (X3), and GRDP (X4), the dependent variable is Criminal Risk (Y). While the method used in the formation of the regression model is enter.

Table 3. Correlation Analysis

		Criminal Risk	Pure Participation Figures	Unemployment	Gini Index	Gross Regional Domestic Product (GRDP)
Criminal Risk	Pearson Correlation	1	-.834**	.706**	-.508*	-.919**
	Sig. (2-tailed)		.000	.001	.031	.000
	N	18	18	18	18	18
Pure Participation Figures	Pearson Correlation	-.834**	1	-.598**	.695**	.735**
	Sig. (2-tailed)	.000		.009	.001	.001
	N	18	18	18	18	18
Unemployment	Pearson Correlation	.706**	-.598**	1	-.526*	-.893**
	Sig. (2-tailed)	.001	.009		.025	.000
	N	18	18	18	18	18
Gini Index	Pearson Correlation	-.508*	.695**	-.526*	1	.603**
	Sig. (2-tailed)	.031	.001	.025		.008
	N	18	18	18	18	18
Gross Regional Domestic Product (GRDP)	Pearson Correlation	-.919**	.735**	-.893**	.603**	1
	Sig. (2-tailed)	.000	.001	.000	.008	
	N	18	18	18	18	18

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis presented shows the relationship between criminal risk and several other variables: Pure Participation Figures, Unemployment, Gini Index, and Gross Regional Domestic Product (GRDP). The correlation is measured using the Pearson Correlation Coefficient, which provides information on the strength and direction of the relationship between two variables. The results of the analysis show that criminal risk has a strong negative correlation with the unemployment rate ( $r = -0.834$ ). This means that when the unemployment rate increases, crime risk tends to decrease, and conversely, when the unemployment rate decreases, crime risk tends to increase. This correlation implies that when jobs are more accessible and the economy is growing well, the potential for crime and criminal risk is reduced.

Furthermore, there is a strong positive correlation between crime risk and the Gini Index ( $r = 0.706$ ). This means that when the level of economic inequality increases, criminal risk tends to increase as well. This phenomenon illustrates that the existence of high economic inequality can create social and economic conditions that are vulnerable to crime. In addition, there is a significant negative correlation between crime risk and GRDP ( $r = -0.508$ ). This suggests that

when the regional economy experiences high growth, crime risk tends to decrease. Factors that support economic growth, such as investment, employment opportunities, and access to resources, may contribute to reducing individuals' or groups' incentives to engage in criminal activities.

The strongest correlation is between crime risk and GRDP ( $r = -0.919$ ), indicating a very strong negative relationship between the two. Thus, strong economic growth in the region is strongly associated with a decrease in crime risk. This confirms the importance of economic growth as a factor that can support security and stability in DKI Jakarta Province. In this overall correlation analysis, it is seen that variables such as unemployment rate, Gini index, and regional economic growth have a significant relationship with crime risk in DKI Jakarta Province. These results provide important insights in understanding the dynamics of security and the factors that influence the level of crime risk in the region.

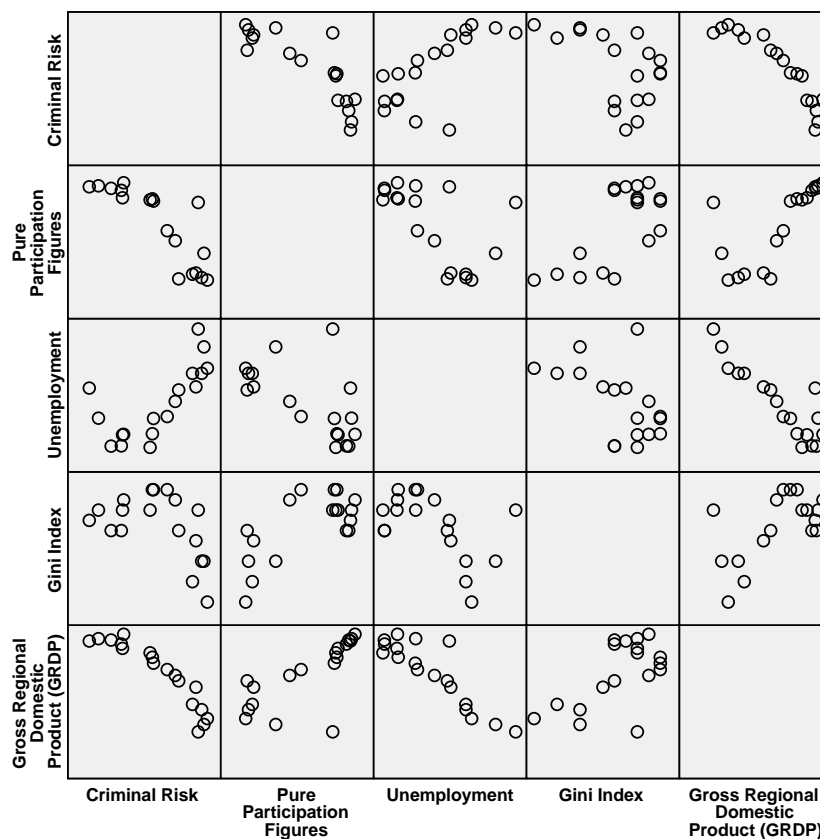


Figure 3. Scatter Plot Between Variables

### Problem Modeling

This research aims to analyze the relationship between Pure Participation Rate, Unemployment, Gini Index, and GRDP with Criminal Risk in DKI Jakarta Province. In this study, military mathematical modeling will be used to identify patterns and relationships that may exist between the independent variables ( $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$ ) and the dependent variable ( $Y$ ). Through military mathematics analysis and modeling, it is hoped that this research can provide further insight into what factors contribute to the level of Criminal Risk in DKI Jakarta Province. The results of this study are expected to provide a basis for the authorities to make the right decisions in efforts to overcome the security crisis and control crime in the region.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,988 <sup>a</sup>	,977	,969	,05956	2,186

a. Predictors: (Constant), Gross Regional Domestic Product (GRDP), Gini Index, Pure Participation Figures, Unemployment

b. Dependent Variable: Criminal Risk

From the results of linear regression analysis on the model used, the coefficient of determination (R Square) value is 0.977. This shows that about 97.7% of the variation in the dependent variable can be explained by the independent variables in this model. In addition, the Adjusted R Square value of 0.969 indicates a fairly high level of model fit and is quite good at explaining the relationship between the independent variable and the dependent variable. This model has a high level of accuracy in estimating the value of the dependent variable based on the independent variables used. Furthermore, the Standard Error of the Estimate value of 0.05956 indicates the level of prediction error of the model. The lower the Standard Error of the Estimate value, the better the model in making predictions. In this case, a low Standard Error of the Estimate indicates that the model has high precision in predicting the value of the dependent variable based on the independent variables.

To detect autocorrelation problems in the regression model, the Durbin Watson (DW) test is used as the basis for making decisions regarding autocorrelation in the model. If the DW statistic value is obtained below -2, it indicates the presence of positive autocorrelation. If the DW statistic value is between -2 and 2, it indicates that there is no autocorrelation in the model. Meanwhile, if the DW statistic value is obtained above 2, it indicates the presence of negative autocorrelation. The Durbin-Watson value of 2.186 indicates the presence of autocorrelation in the model. Supposedly, the Durbin-Watson value is between 0 and 4, and a value close to 2 indicates that there is no significant autocorrelation in the data. However, a Durbin-Watson value slightly greater than 2 indicates that there may be some form of autocorrelation in the data. Based on the results of the analysis, a Durbin Watson value of 2.186 was obtained. This value indicates that there is negative autocorrelation in the regression model used. This negative autocorrelation indicates that the residual value of the model tends to be negatively correlated with the previous residual value.

So this linear regression model has good performance with a high level of accuracy in estimating the value of the dependent variable. However, it is worth noting the presence of autocorrelation in the data which needs to be addressed further to ensure the reliability of the model. The results of this descriptive analysis provide an initial view of the extent to which this model is reliable in analyzing the relationship between the independent variables and the dependent variable relevant for the purpose of this study. To further confirm the results, it is necessary to conduct statistical testing and more in-depth analyses to test the significance and validity of this model.

Table 5. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,922	4	,480	135,449	,000 <sup>a</sup>
	Residual	,046	13	,004		
	Total	1,968	17			

a. Predictors: (Constant), Gross Regional Domestic Product (GRDP), Gini Index, Pure Participation Figures, Unemployment

b. Dependent Variable: Criminal Risk

The ANOVA table above illustrates the results of the analysis of variance (ANOVA) of the regression model that has been run. This regression model uses 4 independent variables (predictors) to predict one dependent variable (criterion). In ANOVA analysis, there are three

types of sum of squares calculated, namely Regression, Residual, and Total. The Sum of Squares for Regression is 1.922. This value shows the amount of variability of the dependent variable that can be explained by the independent variables in this model. The higher the sum of squares value for regression, the better the model is at explaining data variation.

Furthermore, the Sum of Squares for Residual is 0.046. This value represents the amount of variability that cannot be explained by the model, and is the variation in the model's prediction error. The lower the sum of squares value for residuals, the better the model in making predictions. Total Sum of Squares is 1,968, which is the total amount of variability of all data. This total Sum of Squares is the sum of the sum of squares for regression and the sum of squares for residuals. Degree of Freedom (df) indicates the amount of data used in the analysis. For regression, df is the number of independent variables minus one (4-1=3), while for residuals, df is the number of data minus the number of independent variables (17-4=13). Mean Square is the quotient between Sum of Squares and Degree of Freedom. Mean Square for regression is 0.480 and Mean Square for residual is 0.004.

F-value or F-ratio is the ratio between Mean Square for regression and Mean Square for residuals. In this ANOVA table, the F-value is 135.449. A high F-value indicates that there is a significant difference between the regression model and the actual value of the data. Significance (Sig.) is the probability value or p-value that describes the significance level of the F-ratio. In this ANOVA table, the p-value (Sig.) is 0.000 (less than 0.05). This indicates that the regression model as a whole has a significant effect on the dependent variable, and the results did not occur by chance.

The results of this ANOVA table indicate that the regression model used is good enough to explain the variation in data and significantly affects the dependent variable. However, to further confirm the results, it is necessary to conduct further tests and analyses such as assumption tests, parameter significance tests, and others. The ANOVA table above is used for the F test, which is a test of the overall model feasibility of the regression coefficients to determine whether the Pure Participation Rate (X1), Unemployment (X2), Gini Index (X3), and GRDP (X4) jointly affect Criminal Risk (Y).

Hypothesis Test:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4$$

$$H_1 : \text{at least one } \beta_k \neq 0$$

$$(\beta_1 \neq 0 \text{ or } \beta_2 \neq 0 \text{ or } \beta_3 \neq 0 \text{ or } \beta_4 \neq 0 \text{ or } \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0)$$

It appears that the Sig. = 0.000 < 0.05, meaning that at the 95% confidence level Ho is rejected. Thus, at least one is significant. So that further analyses can be conducted.

Table 6. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11,415	,817		13,971	,000
	Pure Participation Figures	-,033	,006	-,421	-5,836	,000
	Unemployment	-,054	,011	-,463	-4,806	,000
	Gini Index	2,652	,644	,248	4,119	,001
	Gross Regional Domestic Product (GRDP)	-,605	,059	-1,173	-10,310	,000

a. Dependent Variable: Criminal Risk

Based on the Coefficients table above, it appears that the value of the

$$\hat{\beta}_0 = 11,415, \hat{\beta}_1 = -0,605, \hat{\beta}_2 = -0,054, \hat{\beta}_3 = 2,652,$$

and  $\hat{\beta}_4 = -0,033$

The significance of the four coefficients can be done with a T test.

*Hypothesis Test for  $\beta_0$*

$$H_0 : \beta_0 = 0$$

$$H_1 : \beta_0 \neq 0$$

Because the Sig.= 0.000 < 0.05, Ho is rejected, meaning that the regression line does not pass through the base point (a significant constant is included in the regression model).

*Hypothesis Test for  $\beta_1$*

$$H_0 : \beta_1 = 0$$

$$H_1 : \beta_1 \neq 0$$

Because the Sig.= 0.000 < 0.05, Ho is rejected, meaning that the coefficient of  $\beta_1$  is significantly included in the model, in other words, the Pure Participation Rate (APM) variable affects Criminal Risk.

*Hypothesis Test for  $\beta_2$*

$$H_0 : \beta_2 = 0$$

$$H_1 : \beta_2 \neq 0$$

Because the Sig.= value is 0.000 < 0.05, Ho is rejected, meaning that the coefficient of  $\beta_2$  is significantly included in the model, in other words, the Unemployment variable (PG) affects Criminal Risk.

*Hypothesis Test for  $\beta_3$*

$$H_0 : \beta_3 = 0$$

$$H_1 : \beta_3 \neq 0$$

Since the Sig.= 0.001 < 0.05, Ho is rejected, meaning that the coefficient of  $\beta_3$  is significantly included in the model, in other words, the Gini Index (GI) variable affects Criminal Risk.

*Hypothesis Test for  $\beta_4$*

$$H_0 : \beta_4 = 0$$

$$H_1 : \beta_4 \neq 0$$

Because the Sig.= value is 0.000 < 0.05, Ho is rejected, meaning that the coefficient of  $\beta_4$  is significantly included in the model, in other words, the GRDP variable affects Criminal Risk.

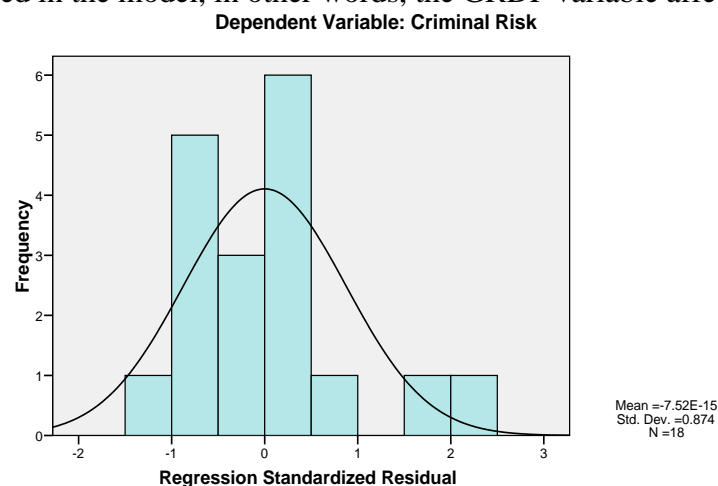


Figure 4. Histogram of Regression Standardized Residual

Based on the Histogram observations above, it can be seen that the data spreads evenly around the diagonal line and follows the direction of the diagonal line. This phenomenon indicates that the regression model has residuals that are close to normal distribution. The existence of an even distribution of data indicates homoscedasticity, where the residual

variability tends to be constant across the entire range of independent variable values. In addition, the pattern of data following the diagonal line indicates that there is no significant polynomial relationship between the independent variable and the dependent variable.

The existence of residuals that are close to a normal distribution has important implications in regression analysis. In the presence of normal residuals, the basic assumptions of linear regression such as the existence of a linear relationship between the independent and dependent variables, as well as the interdependence between the residuals and the independent variables, can be considered fulfilled. This strengthens the reliability and validity of the regression model in making predictions or generalizations to data beyond the sample used in the analysis. However, it should be noted that further analyses, such as residual normality tests and other assumption tests, are still required to ensure that the regression model fulfils more in-depth statistical assumptions.

### **Criminal Risk Analysis**

The resulting regression model can be written as follows:

$$\hat{Y} = 11,415 - 0,033X_1 - 0,054X_2 + 2,652X_3 - 0,605X_4$$

In this model, the dependent variable (Y) is Criminal Risk, while the independent variables (X1, X2, X3, and X4) are Net Enrolment Rate, Unemployment, Gini Index, and GRDP. The regression coefficient of each independent variable shows the influence of that variable on Criminal Risk. In this model, the constant value (11.415) indicates that when all independent variables (X1, X2, X3, and X4) are at the value of 0, the value of Criminal Risk (Y) will be 11.415. This can be interpreted as the basic Criminal Risk level in DKI Jakarta Province without any influence from other independent variables.

Furthermore, each regression coefficient on an independent variable shows the change in Criminal Risk caused by a one-unit change in that independent variable, with the other independent variables remaining constant. For example, a one-unit change in the Pure Participation Rate (X1) will lead to a decrease in Criminal Risk by 0.033, and so on for other variables. The results of this analysis provide an overview of the factors that influence the level of Criminal Risk in DKI Jakarta Province. The negative effect of the Pure Enrolment Rate (X1) and Unemployment (X2) variables shows that the level of population participation in education and the level of unemployment have an impact on reducing Criminal Risk. Meanwhile, the positive effect of Gini Index (X3) and GRDP (X4) indicates that income inequality and economic level contribute to increase Criminal Risk.

In the context of government efforts, the results of this analysis can be an important reference for decision-making on security crisis management in DKI Jakarta Province. The government can use the information from this model to design more effective policies and programmes to address crime and improve security in the region. The government's efforts in increasing the Pure Participation Rate and reducing the unemployment rate can be directed towards reducing Criminal Risk. In addition, the government should also pay attention to income inequality and strengthen the economic sector to reduce the factors that can lead to an increase in Criminal Risk.

Through the application of this model, the government can have a more comprehensive understanding of the factors contributing to the security crisis and direct resources more appropriately to achieve the goal of tackling crime and improving security in DKI Jakarta Province. The use of military mathematics approach in this decision-making is expected to bring positive changes and real impact in creating a safer and harmonious environment for the community. In addition, through this model, the government can also conduct simulations and scenarios to anticipate potential security crises in the future. By utilizing historical data and current information, the government can predict the level of Criminal Risk that may occur in

certain situations. This allows the government to take preventive actions earlier and allocate resources more efficiently to deal with potential security crises.

In terms of the use of military mathematical models, the government also needs to involve experts, analysts and security experts to ensure proper interpretation and use of model results. Collaboration between the government and academia in applying and developing these models will improve the quality and validity of the analysis results. In addition, the government must also pay attention to ethical aspects in the use of data and the privacy of citizens during the analysis process. In dealing with security challenges in DKI Jakarta Province, the application of military mathematics models must be integrated with cross-sector strategies and actions. Holistic and integrated government policies, involving various related agencies such as the police, education office, labour office, and economic office, will be the key to success in reducing Criminal Risk and creating sustainable security.

Thus, the use of military mathematical models in security crisis management decision-making in DKI Jakarta Province has great potential to have a significant impact on the security and welfare of the community. The government must remain committed to continuously developing and improving this model by integrating the latest data and enhancing analytical capabilities. With an evidence- and data-based approach, it is hoped that the government's efforts in dealing with security crises can be more effective, efficient, and have a positive impact on all citizens of DKI Jakarta Province.

### **Integrated Decision Making and Policy**

Based on the regression model produced, there are several security crisis management decisions that can be taken by the DKI Jakarta Provincial government:

#### *Improving Access to Education (X1)*

With a negative regression coefficient (-0.033) on the Net Enrolment Rate variable (X1), the first decision that can be made is to increase access to education for the community. An increase in the net enrolment rate, which describes the percentage of the school-age population that is in school, can help reduce the Criminal Risk. The government should focus on programmes to increase formal and non-formal education participation, as well as ensuring equitable access to education throughout DKI Jakarta Province.

#### *Reducing the Unemployment Rate (X2)*

With a negative regression coefficient (-0.054) on the variable Unemployment (X2), the second decision is to reduce the unemployment rate in the region. High unemployment can create social and economic instability, thus contributing to an increase in security crises. The government should work with the private sector and educational institutions to create new jobs, provide job training, and increase employment opportunities for citizens.

#### *Addressing Income Inequality (X3)*

With a positive regression coefficient (2.652) on the Gini Index variable (X3), the third decision is to address income inequality. High inequality can create social injustice and increase Criminal Risk. The government should focus on policies that ensure fairer income distribution and improve economic access for all levels of society.

#### *Economic Improvement (X4)*

With a positive regression coefficient (0.605) on the GRDP variable (X4), the fourth decision is to strengthen the economic sector in DKI Jakarta Province. An increase in GRDP will reflect an increase in economic activity and regional growth, which can have an impact on reducing the Criminal Risk. The government should encourage investment, improve regional competitiveness, and support the development of economic sectors with great potential.

#### *Adoption of Integrated Policies*

It is important for the government to adopt an integrated policy approach that covers the various aspects of this regression model. Policies should not only focus on one independent

variable, but should consider the interaction between these variables. Collaboration and coordination between relevant government agencies, such as the police, education office, labour office, and economic office, will be key to implementing holistic and integrated policies.

By making decisions based on the results of this regression model, it is hoped that the DKI Jakarta Provincial Government can improve the effectiveness and efficiency of efforts to overcome the security crisis. In the long run, the implementation of this decision is expected to create a safer, more stable and prosperous environment for the people of the entire DKI Jakarta Province.

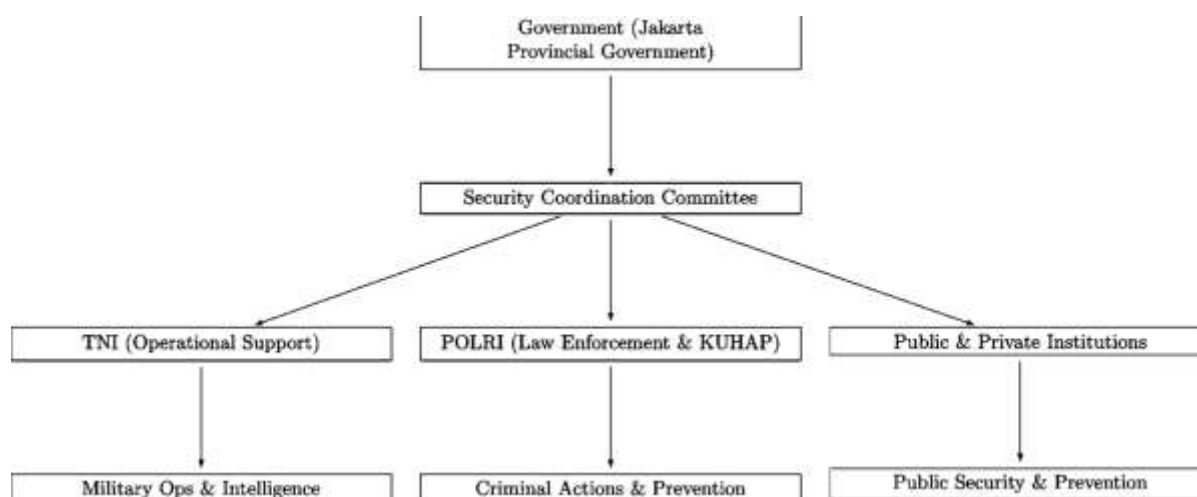


Figure 5. Interoperability of Military and Civilian Roles

The diagram depicts the cohesive security strategy and interconnected roles of the Government, TNI (Indonesian National Armed Forces), POLRI (Indonesian National Police), and Public & Private Institutions in ensuring the safety of DKI Jakarta. At the helm of this structure is the Government, specifically the Jakarta Provincial Government. As the primary policymaking body, the Government is responsible for crafting rules and regulations that govern the city's security measures. Its role is crucial as its policies shape the security strategies that are implemented across the board. Beneath the Government lies the Security Coordination Committee, a conglomerate body comprising representatives from TNI, POLRI, and various public and private institutions. The Committee's primary function is to orchestrate and synchronize all security efforts across Jakarta, creating a unified and cohesive response to any security threats or concerns. The TNI provides operational support, which includes conducting military operations and gathering intelligence to preempt and combat security threats. Their role ensures that the state's power is effectively utilized to neutralize threats and maintain order within the city.

Simultaneously, the POLRI are tasked with enforcing laws and managing the KUHAP process (Indonesian Criminal Procedure Code). Their responsibilities encompass a range of criminal actions and preventive endeavors, all aimed at upholding law and order within Jakarta. Lastly, public and private institutions play a role in maintaining public security and prevention. These institutions, which include local community organizations and businesses, have a stake in preserving a safe and secure environment. Their involvement not only helps foster a sense of community ownership in security efforts, but it also aids in early threat detection and prevention. The collective efforts of the TNI, POLRI, and the Government within this Coordination Committee are instrumental in achieving security objectives in Jakarta. The interoperability among these institutions facilitates the efficient and effective sharing of resources, information, and strategies, ultimately bolstering their capacity to preserve peace and order within Jakarta.

Their collaborative work exemplifies a robust, inclusive approach to security, incorporating both top-down governmental strategies and grassroots community involvement

## CONCLUSION

Based on the results of multiple regression analysis, it can be concluded that there is a significant relationship between the variables of Unemployment (X2), Gini Index (X3), and GRDP (X4) with Criminal Risk (Y) in DKI Jakarta. Unemployment has a positive effect on criminal risk, while the Gini Index and GRDP have a negative effect on criminal risk. Therefore, the government can use the results of this analysis to formulate policies aimed at reducing the level of criminal risk in the area. Efforts that can be made include increasing the level of GRDP, reducing unemployment, and reducing economic inequality in DKI Jakarta. However, it should be noted that the results of this analysis cannot be generalized to other regions as the characteristics and socio-economic conditions in each region may differ.

In the face of these findings, there are several recommendations for relevant stakeholders. The government needs to focus on reducing the unemployment rate by increasing employment opportunities through investment and job training. In addition, efforts to reduce economic inequality must also be made by improving income distribution and poverty alleviation programmes. In addition, the government must encourage economic growth and investment to increase DKI Jakarta's GRDP. In addition to the role of the government, the police need to utilize the results of this analysis as a reference in making decisions and determining crime handling strategies. The community must also play an active role in preventing crime by increasing awareness of the factors that influence criminal risk and providing information about suspicious events to the police. With this co-operation and measures, it is expected to increase the effectiveness of crime handling in DKI Jakarta.

## REFERENCES

- Adri, S., Karimi, S., & Indrawari, I. (2019). Pengaruh Faktor Sosial Ekonomi terhadap Perilaku Kriminalitas (Tinjauan Literatur). *Jurnal Ilmiah Administrasi Publik*, 5(2), 181–186. <https://doi.org/10.21776/ub.jiap.2019.005.02.7>
- Alekseeva, A. P., Anisimov, A. P., & Ja Ryzhenkov, A. (2017). Environmental terrorism, environmental radicalism and measures to counteract them. *Environmental Policy and Law*, 47(1), 24–34. <https://doi.org/10.3233/EPL-170008>
- Attawana, A. R. (2022). *Efektivitas Layanan Jakarta Laporan (Jaklapor) Di Dinas Komunikasi Informatika Dan Statistik Provinsi Dki Jakarta*. 0(0), 0. <http://eprints.ipdn.ac.id/10723/>
- Bergmann, J., & Müller, P. (2021). Failing forward in the EU's common security and defense policy: the integration of EU crisis management. *Journal of European Public Policy*, 28(10), 1669–1687. <https://doi.org/10.1080/13501763.2021.1954064>
- Cacciapaglia, G., Cot, C., & Sannino, F. (2020). Second wave COVID-19 pandemics in Europe: a temporal playbook. *Scientific Reports*, 10(1), 1–8. <https://doi.org/10.1038/s41598-020-72611-5>
- Cusumano, E., & Bures, O. (2022). Varieties of organised hypocrisy: security privatisation in UN, EU, and NATO crisis management operations. *European Security*, 31(2), 159–179. <https://doi.org/10.1080/09662839.2021.1972975>

- Dewi, M. (2023). Evaluating the Role of Leadership in Urban Food Security: A Case Study of DKI Jakarta Focusing on Disaster Preparedness. *Journal of Digitainability, Realism & Mastery (DREAM)*, 2(06), 14–21. <https://doi.org/10.56982/dream.v2i06.129>
- Hamzah, A. P., Hariani, S., & Usman, F. (2019). Financial Performance of the Local Government Institution (Case Study of DKI Jakarta Province). *Developing Country Studies*, 9(2).
- Handicha, D. R. (2020). Kebijakan Kriminal dalam Menanggulangi Tindak Pidana berkaitan dengan Virtual Cryptocurrency di Indonesia. *Cakrawala Hukum Majalah Ilmiah Fakultas Hukum Universitas Wijaya Kusuma*, 22(1), 35.
- Helmus, T. C., Brown, R. A., & Ramchand, R. (2023). *Prevalence of Veteran Support for Extremist Groups and Extremist Beliefs*. Santa Monica, CA: RAND Corporation. [https://www.rand.org/pubs/research\\_reports/RRA1071-2.html](https://www.rand.org/pubs/research_reports/RRA1071-2.html)
- Herrington, L. (2019). Predicting and preventing radicalisation: an alternative approach to suicide terrorism in Europe. *Intelligence and National Security*, 34(4), 480–502. <https://doi.org/10.1080/02684527.2018.1560670>
- I Gusti Ayu Ratih Charisma Dewi Atmika, M. A. M. I. M. (2020). Peran Pemerintah Daerah Provinsi Dki Jakarta Dalam Penanganan Konflik Antara Organisasi Masyarakat Pemuda Pancasila Dan Forum Betawi Rempug Di Jakarta Tahun 2016-2018 the Role of the Government of the Province of Dki Jakarta in Conflict Handling Between P. *Jurnal Damai Dan Resolusi Konflik*, 6(1), 1–26.
- Ifrani, I., & Said, M. Y. (2020). Kebijakan Kriminal Non-Penal Ojk Dalam Mengatasi Kejahatan Cyber Melalui Sistem Peer To Peer Lending. *Al-Adl : Jurnal Hukum*, 12(1), 61. <https://doi.org/10.31602/al-adl.v12i1.2607>
- Juanita, M. D., & Setiani, M. F. D. A. (2022). Fishermen Empowerment Strategy as a Solution in the Security Management Crisis in the North Natuna Sea. *Journal of Maritime Studies and National Integration*, 5(2), 93–100. <https://doi.org/10.14710/jmsni.v5i2.13450>
- Mahendra, R., Widodo, P., Saragih, H. J. R., Suwarno, P., Widodo, & Yulianto, B. A. (2023). Pencegahan Ancaman Penyebaran Radikalisme dan Terorisme oleh BNPT di Wilayah Kemaritiman sebagai Upaya Pertahanan Negara Republik Indonesia. *Jurnal Kewarganegaraan*, 7(1), 204–212.
- Muda, D. (2021). Analisis Pengaruh Keamanan, Kenyamanan, Dan Aksesibilitas Terhadap Minat Masyarakat Pengguna Mrt Jakarta. *Forum Studi Transportasi Antar Perguruan Tinggi*, 1(2), 4–6.
- Riswan, A. A., Salsabila, C., Mulya, D. P. R., & Saputra, N. (2021). Innovative Work Behavior pada Pegawai di DKI Jakarta: Pengaruh Learning Agility, Work Engagement, dan Digital Readiness. *Studi Ilmu Manajemen Dan Organisasi*, 2(2), 151–165. <https://doi.org/10.35912/simo.v2i2.833>
- Satria, H. S. (2020). Kebijakan kriminal pencegahan korupsi pelayanan publik. *Integritas: Jurnal Antikorupsi*, 6(2), 169–186. <https://doi.org/10.32697/integritas.v6i2.660>
- Sitinjak, A. B. (2021). Terrorism-Radicalism Doctrine on Social Media In Indonesia. *ICLHR*. <https://doi.org/10.4108/eai.14-4-2021.2312450>
- Subagyo, T., Suhardono, E., & Suharjo, B. (2020). Implementasi Kebijakan Wilayah Pertahanan Laut di Provinsi Daerah Khusus Ibukota Jakarta. *Jurnal Strategi Pertahanan Laut*, 6(1), 45–60. <https://www.idu.ac.id/>
- Taha, I. A., Taha, I. A., Jayawardhana, W., Johanna, P., & Cahya, A. (2022). Ketahanan Nasional Pencegahan Tindak Pidana Terorisme di Indonesia melalui Kebijakan Migrasi : Dampak dan Tantangan Pencegahan Tindak Pidana Terorisme di Indonesia melalui Kebijakan Migrasi : Dampak dan Tantangan. *Jurnal Kajian Strategik*, 5(2).

Wijarnoko, M. A., Asy'ari, M. A., & Rouf, A. (2020). Pengembangan E-Government Di Dki Jakarta (Studi Portal Resmi Provinsi Dki Jakarta). *E-Government, April*, 1–10.