NEWTON: Networking and Information Technology
Vol. 4 No. 1 June 2024, Page. 23 - 30
E-ISSN: 2797-0728

Data Visualization of Development Improvement and Budget Assistance for Village Residents Using the R Studio Program in Jombatan Village, Jombang District

Isrofi[1], Zulfikar[2],
[1]Information Systems,
[2]Informatic,Universitas KH. A. Wahab Hasbullah
Email: isrofismkumma@gmail.com
Correspondence author: zulfikardia@gmail.com

ABSTRACT
Indonesia is a country that implements a regional self-government system, where each region is given the freedom to manage an exclusive area. This sovereignty does not only apply at the provincial and regional levels but also includes villages. Implementing "Law Number 6 of 2014 concerning Villages marks the beginning of a new era in village financial management". This law increases village income by allocating the Village Budget sourced from the State Budget (APBN). Village financial management is expected to be carried out more transparently, and accountably, and involve the population's participation. Village financial management includes all activities consisting of planning, implementation, management, reporting, and accountability of village finances.

Keywords: Village Budget, Infrastructure Development, Population Empowerment

INTRODUCTION
Village Population Development is one of the important aspects of achieving national development goals. The village as the smallest unit in the government structure has a strategic role in implementing various development programs to improve the welfare of its residents. However, the reality in the field shows that Villagers still face various challenges, such as low access to education, health, infrastructure, and economic opportunities (Harahap, 2021).

To improve the welfare of village residents, the government and related parties often provide Budget incentives as an instrument to accelerate development. The Budget incentives can come from various sources, including government budgets, contributions, or inter-agency cooperation programs. The increase in Budget incentives is expected to provide a positive impetus for the growth of village residents (Santika, 2022).

The provision of the Village Budget is a form of fulfilling the Village's right to carry out its autonomy so that it can develop and grow following the development of the Village itself based on diversity, participation, original autonomy, democratization, and community empowerment. This is because the Village has the right to receive regional tax revenues and Regency/City Regional levies, as well as part of the Central and Regional Financial Balance Budget received by the Regency/City (Nurohman et al., 2019). Researchers have certain reasons for choosing the Village Budget program in Jombatan Village compared to other programs programmed by the Jombatan Village government. This interest is because the Village Budget program has very large and significant implications for the development of Jombatan Village. Control in this program is also entirely handled independently by the Regional Leader and the residents firmly. Therefore, researchers prefer to study this program because if this Budget is managed honestly and well, the development results will also be visible, and vice versa (Rijal et al., 2021).

RESEARCH METHOD
Type of Research
This study is a quantitative approach with the Inferential method. In inferential research, researchers need to formulate hypotheses and determine research variables, then operationalize these variables (Sultan et al., 2023). The following step is to choose a quality research instrument to obtain more accurate data because the validity of the results is highly dependent on the quality of the data collection instrument. After that, the sampling method is determined and data is collected through the selected instrument, observation, or documentation (Santika, 2022). The data obtained is then processed and analyzed starting from

tabulation, classification, descriptive analysis, and hypothesis testing, to the conclusion

Research Design

At the research design analysis stage, an analysis will be carried out related to the process of creating graphs and visualizations in data processing using the R program to process and analyze data. This includes the use of various R packages for statistical analysis, data visualization, and predictive models. creation of complex and interactive graphs that help in presenting data more effectively and easily understood by various stakeholders (Widyastuti et al., 2018).

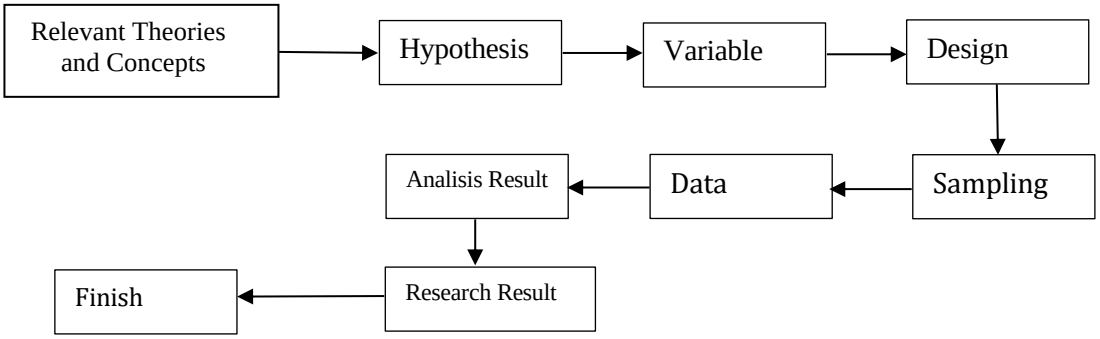

Figure 1. Research Design

Alur rancangan Penelitian ini dengan tujuan alur proses rancangan yang dapat mudah di mengerti dan dipahami.

Research Stages

- Relevant theories and concepts
  Provide a framework for understanding our environment, explaining complex phenomena, and predicting future events. In practice, these theories and concepts not only help in understanding problems but also provide effective and innovative solutions.
- Hypothesis
  Provides a framework for exploring and understanding the relationship between village budget improvement and infrastructure development.
- Variables
  Identifying and measuring these variables appropriately can provide deeper insights into the dynamics involved and provide more informed recommendations for better policy-making and management of village budgets.
- Design
  Improving village budgets and village infrastructure development is a comprehensive process and involves various stages ranging from strategic planning to management and maintenance.
- Sampling
  The sampling technique in improving village budgets and village infrastructure development ensures that the data collected is representative and reliable. with the objectives and context of the research, can produce more accurate and relevant findings, in better decision-making and policies for village development.
- Data
  Data was collected and analyzed using appropriate techniques to accurately evaluate the impact of increasing village budgets on village infrastructure development.
- Review Results
  The results of the analysis in increasing village budgets and developing village infrastructure provide in-depth insights into the effectiveness of budget use, the impact of infrastructure development, challenges faced, and opportunities for improvement.
- Research Results
  Increasing village budgets and developing village infrastructure show that while there are many successes, there are still challenges that need to be addressed to improve program effectiveness.

Procedure

The process applied by the researcher is as follows: Research Design: "This study uses quantitative and qualitative methods to analyze data" (Jumiati, 2020). This method allows the collection and analysis of numerical data and descriptive data to understand the phenomenon being studied.

Variables and Operational Definitions:

Research Variables: This study uses independent variables (Village Budget) and dependent variables (Village Infrastructure Development and Population Empowerment).

Operational Definition: Each variable is explained operationally to ensure that each variable can be measured precisely.

Measurement Scale: The measurement scale used is the Likert scale to measure the Population's perception of the impact of the Village Budget on development and empowerment.

Population and Sample:

Population: All residents in Jombatan Village, Jombang District.

Sample: The sample taken is the population using a simple random sampling method to ensure an accurate representation of the population (Ajie Hanif Muzaqi et al., 2022).

Data Collection Techniques

In the data collection process, researchers use a literature study method, namely collecting data by searching for and studying references to books, articles, journals, and websites related to the cases studied by researchers (Yulita Marpaung et al., 2020). So that researchers can collect data that can be used to achieve the desired goal stage by the researcher. Where during the data collection process three stages were directly carried out:

Questionnaire: To obtain quantitative data from residents regarding perceptions and impacts of the village budget.

Interview: To obtain more in-depth qualitative data from village officials and several residents. The data collection technique researchers apply is a combination of observation and literature study techniques, the data obtained tends to be quantitative, and data analysis is Inferential/Quantitative.

Review: In this study, researchers used a very good observation method. This method is an instrument or format for review.

The results of this data collection aim to obtain a deeper understanding of the phenomenon being studied and make valid generalizations about the population based on the sample data analyzed. In addition, this analysis is used to predict results and determine the relationship between variables (Irmawati, 2015). By using the right analysis method, researchers can ensure that the conclusions drawn are accurate and reliable.

DATA COLLECTION INSTRUMENT

Validity and Reliability Test

Validity testing and reliability testing are used to evaluate the adequacy of a research instrument. The data acquisition instrument used in this research is a questionnaire.

- Validity Test, measures how valid or reliable the instrument is a valid tool will have an elevated value and vice versa. Validity reflects the extent to which a measurement instrument can measure the intended variable. Validity testing is carried out by calculating the correlation value between the data for each question and the total score. This Validity Test uses the Pearson product-moment correlation formula.

$$r_{xy} = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x2 - (\sum x)2)(n\sum y2 - (\sum y)2}}$$

Description:

r_{xy} = Correlation coefficient between independent variable x and dependent variable y.
n = Numbers of samples.
x = Item or question being analyzed.
y = Total of variables being analyzed.

- The validity of an instrument item can be determined by comparing r count and rTable. If the r count value is equal to or greater than r table, then the instrument item is considered valid, and vice versa.

The Reliability Test was calculated in this study using the Cronbach's Alpha formula as follows:

$$r_{11} = \frac{k}{\text{k-1}} 1 - \sum \frac{\sigma b2}{\sigma t2}$$

Description:

r_{11} = Instrument reliability
k = Number of questions
$\sum\sigma^{b2}$ = Total item variance
σ^{t2} = Total Variance

Cronbach's Alpha can be used to find the reliability of an instrument that has values other than 0 and 1, such as explanatory questions.

Basic Assumption Test

The classical assumption test is needed to create a relevant regression form. Therefore, the results of the basic assumption are carried out before carrying out the analysis in the form of regression, here is the explanation::

- Normality Test
  The normality test aims to determine whether the analysis of the distribution of information is fair or not. The normality test is carried out using the Shapiro Walk procedure.
- Heteroscedasticity
  The heteroscedasticity test is used to check whether there is inequality in the regression model, which is known to have variations between the residuals of one review and the Sudarmanto review. A good regression form does not have heterogeneity.
- Multicollinearity
  Multicollinearity testing to ensure whether there is a linear relationship between one independent variable and another independent variable. A good regression model does not have the phenomenon of multicollinearity.

Data Analysis Techniques

- Simple Linear Regression Test
  The interpretation in the form of simple linear regression is based on the functional or causal relationship between the independent and dependent variables. This simple linear analysis is used to assess how the independent variables affect the dependent variables and to predict the dependent variables by utilizing the independent variables.
- Determination Number Test (R^2)
  The determination number is used in research to assess the strength of the relationship between variables, thus allowing for more detailed interpretation. The determination number indicates how much variation in a variable can be explained by the variation in other variables. Specifically, the determination number value shows the proportion of variation in the dependent variable (Y) that can be explained by the independent variable (X).
- F test
  The simultaneous F test is used to evaluate the level of significance of the influence of independent variables together on the dependent variable in one.
- T-test
  Statistical hypothesis testing is carried out on data related to the problem being handled. This process includes evaluating the significance of the findings, generally through hypothesis testing. In partial hypothesis testing such as the t-test, the analysis is carried out using statistical software such as R Studio.

RESULTS AND DISCUSSION

Visualization of Data on Development Improvement and Budget Assistance for Villagers Using the R Studio Program in Jombatan Village, Jombang District. To find out the increase in the village budget assistance and infrastructure development.

Result

The results were carried out using the r studio program which can see the percentage results of village budget assistance and infrastructure development

- Validity test results
  The validity of a questionnaire is measured to determine the validity of the tool. If the correlation number r is positive (r> Table r), the questionnaire is considered valid. Conversely, if r is negative (r <Table r), the questionnaire is considered invalid. The results of the Validity test of the research instrument can be seen in full in the following Table:

Table 1. Validaty Result

Variable	Item	R-count	r-table	Significance	Description
X	X1.1	0,726	0,213	0,00	Sah
	X1.2	0,770	0,213	0,00	Sah
	X1.3	0,765	0,213	0,00	Sah
	X1.4	0,760	0,213	0,00	Sah
	X1.5	0,788	0,213	0,00	Sah
	X1.6	0,794	0,213	0,00	Sah
	X1.7	0,754	0,213	0,00	Sah
Y^1	Y1.1	0,810	0,213	0,00	Sah
	Y1.2	0,879	0,213	0,00	Sah
	Y1.3	0,779	0,213	0,00	Sah
	Y1.4	0,644	0,213	0,00	Sah
	Y1.5	0,764	0,213	0,00	Sah
	Y1.6	0,650	0,213	0,00	Sah
Y^2	Y2.1	0,819	0,213	0,00	Sah
	Y2.2	0,769	0,213	0,00	Sah
	Y2.3	0,719	0,213	0,00	Sah
	Y2.4	0,703	0,213	0,00	Sah
	Y2.5	0,716	0,213	0,00	Sah
	Y2.6	0,808	0,213	0,00	Sah
	Y2.7	0,802	0,213	0,00	Sah
	Y2.8	0,763	0,213	0,00	Sah

- The researcher contrasts a correlation, namely by conducting each indicator with the table correlation value, its validity is measured. The table value for Pearson Correlation at a significance level of $\alpha = 0.05$ and a sample size of $n = 85$ is 0.213. Based on the test results, all 21 questions showed a higher positive correlation than the table correlation value. This indicates that the tool used in this study is effective and reliable.

- Rehabilitation test results
  In measuring the reliability of a questionnaire, the alpha formula is used to determine whether the measurement data can meet the reliability requirements. The reliability criteria using Cronbach's Alpha are if the Cronbach's Alpha number value is greater than 0.6, then the questionnaire is considered reliable; conversely, if it is less than 0.6, the questionnaire is considered unreliable. The results of the Validity and Reliability tests carried out through the R Studio program are presented in the following Table.

Table 2. Rehalibity Result

Variable	Coefficient	Description
Village fund (X^1)	0,8787	Reliable
Village Infrastructure Development (Y^1)	0,8515	Reliable
Village Community Empowerment (Y^2)	0,8945	Reliable

Based on the table, it can be concluded that all elements of the variable factors x1, y1, and y2 have a Cronbach Alpha Number greater than 0.6. Therefore, the reliability of the reporting factors of the three variables can be ensured.

- Basic Assumption Results
  Before conducting regression testing, it is necessary to conduct basic hypothesis testing, including normality testing, multicollinearity testing, and heteroscedasticity testing, as follows::
  - Normality Test
    The normality test used in this study is the non-parametric Kolmogorov-Smirnov statistical test. Kolmogorov-Smirnov. The normality test is explained in the table below:

Table 3. Budget Variables for Village Infrastructure Development (Y^1)

Description	Standardized Residual
Significance value	0.616

Table 4. Variabel Anggaran Terhadap Pemberdayaan Penduduk Desa (Y^2)

Deskripsi	Residual Terstandarisasi
Nilai Signifikansi (both)	0.874

Based on the results of the standard deviation test above, the significance values were obtained, respectively 0.616 and 0.874, both of which have values greater than the α value of 0.05. Therefore, the null hypothesis (Ho) can be accepted. It can be concluded that all independent and dependent variables used in the experiment have a normal distribution. Thus, the assumption of the standard deviation is met, and the experiment can proceed to the next step.

- Multicollinearity Test

Multicollinearity testing is conducted to check whether there is a correlation between independent variables in the regression model. A good regression model does not show any significant correlation between independent variables. Multicollinearity in the regression model can be checked using the tolerance value or variance inflation factor (VIF). Multicollinearity occurs if the correlation value between independent variables exceeds 0.95, and the tolerance value is less than 0.1. The following are the results of the multicollinearity test obtained:

Filter

	Model	Variable	Tolerance	VIF
1	1	Dana Desa	1	1

Figure 2. Budget Variable for Village Infrastructure Development

Based on the figure above, it is clear that the budget for village infrastructure development has a tolerance of 1,000 and a VIF value of 1,000. Likewise, the "Village Budget" for empowering villagers also has a tolerance value of 1,000 and a VIF value of 1,000. From these results, it can be concluded that there is no multicollinearity problem in the regression model because it is greater than 0.01 and the VIF value is less than 10.

- Heteroscedasticity Test

Heterogeneity is a condition in which the variance of the residual or error is unstable or not fixed. The heterogeneity test is carried out to check whether there is an imbalance in variance between one observation and another in the regression model. In this study, the heterogeneity test uses a better scatterplot graphical analysis method, such as the image below:

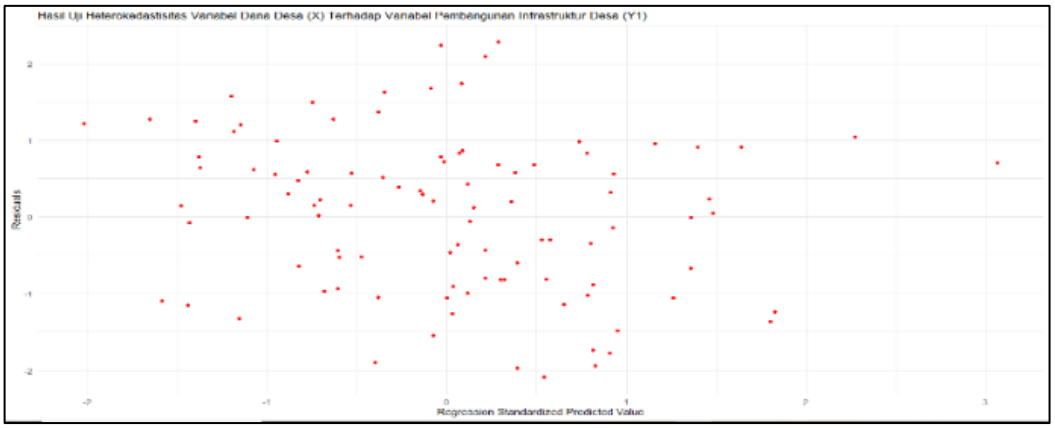

Figure 3. Budget Variable (X) Against Village Infrastructure Development Variable (Y^1)

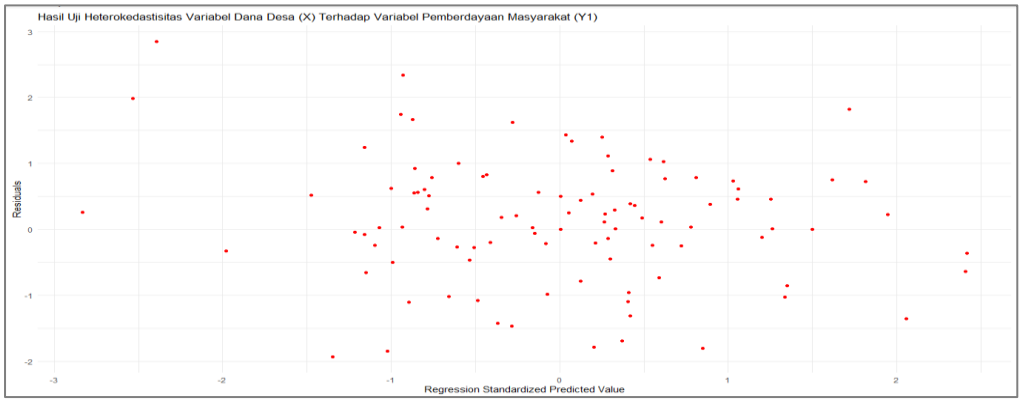

Figure 4. Budget Variable (X) Against Village Infrastructure Development Variable (Y^1)

Based on the scatterplot observations shown above, it can be concluded that the histogram is randomly distributed above and below zero on the residual axis of the regression studied. Therefore, in the construction of the regression model taught, there are no signs of heterogeneity.

DISCUSSION

This study used a questionnaire to find data on increasing development and financial support for Villagers using the R Studio program in Jombatan Village, Jombang District. The results of the questionnaire showed that many residents gave a positive response to the increase in the village aid and infrastructure development budget. This is in line with the opinion of Harahap et al. (2021), that village funds provide a positive response to increasing community welfare in the village.

The availability of funds for increasing development in the village is not entirely the responsibility of the village government. However, the village government needs full support from other parties. So that policies to meet village development needs are very necessary, especially financial assistance from the regional and central governments (Muzagi et al., 2022).

CONCLUSION

Based on the results of the study above, it can be determined that the increase in the Budget has a good impact on infrastructure progress and empowerment of the Population in Jombang District. However, researchers are very aware that there are still many challenges that need to be overcome such as optimizing Budget management and infrastructure maintenance.

REFERENCE

Harahap, A, Y. (2021). Pengaruh Alokasi Dana Desa Terhadap Kesejahteraan Masyarakat (Studi: Desa Di Kecamatan Tamiang Hulu, Kabupaten Aceh Tamiang). *Of Economics And Accounting*, *1*(3), 151–157.

Irmawati. (2015). *Pengaruh Alokasi Dana Desa Terhadap Kesejahteraan Masyarakat Desa Di Kabupaten Jeneponto*.

Jumiati, E. A. D. (2020). Pengaruh Program Dana Desa Terhadap Perekonomian Masyarakat, Perluasan Lapangan Kerja Dan Peluang Usaha Masyarakat Desa (Studi Deskriptif Korelasi Pada 10 Desa Di Kabupaten Purwakarta). Dalam *Lisyabab Jurnal Studi Islam Dan Sosial* (Vol. 1, Nomor 2). Https://Lisyabab-Staimas.E-Journal.Id/Lisyabab

Marpaung, Y., Debby Ch. Rotinsulu, & Ita Pingkan Fasnie Rorong. (2020). Analisis Dampak Penggunaan Dana Desa Terhadap Perekonomian Masyarakat Di Kecamatan Ratatotok Kabupaten Minahasa Tenggara. *Pembanguan Ekonomi Dan Keuangan Daerah*, *21*(2).

Muzaqi, A. H. Djoko Susanto, M. Daimul Abror, & Tri Ambulanto. (2022). Analisis Kebijakan Dana Desa Dalam Merespon Masalah Kemiskinan Di Indonesia. *Ilmiah Manajemen Publik Dan Kebijakan Sosial*, *6*(2).

Sultan, Rahayu, H. C., & Purwiyanta. (2023). Analisis Pengaruh Kesejahteraan Masyarakat Terhadap Pertumbuhan Ekonomi Di Indonesia. *Jurnal Informatika Ekonomi Bisnis*, 75–83. Https://Doi.Org/10.37034/Infeb.V5i1.198

Widya Santika, E. W (2022). *Analisis Pengaruh Dana Desa, Bantuan Pangan Non Tunai, Program Indonesia*

Pintar Terhadap Tingkat Kesejahteraan Masyarakat Di Kabupaten Grobogan.

Yulfan Arif Nurohman, Rina Sari Qurniawati, & Fuad Hasyim. (2019). Dana Desa Dalam Peningkatan Kesejahteraan Masyarakat Pada Desa Wisata Menggoro. *L Magisma, 7*(1).