



Analysis of the Influence of Technology, Infrastructure and the Democratic System on Unemployment in Indonesia

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Abstract

This study investigates the impact of technology, infrastructure, and the democratic system on unemployment in Indonesia from 2011 to 2021. The research employs a correlational design with a quantitative approach, utilizing secondary data from the Central Bureau of Statistics (BPS). The independent variables include technology, infrastructure, and the democratic system, while unemployment serves as the dependent variable. Purposive sampling is used for the research sample. The findings indicate that technology and infrastructure have a significantly positive effect on unemployment, while the democratic system does not exhibit a significant impact. The study underscores the importance of technology and infrastructure in reducing unemployment rates. It also emphasizes the need for strategic and sustainable government interventions to address unemployment challenges in Indonesia, such as focusing on sectors with significant job creation potential and strengthening education and skill development.

1. Introduction

One of the fundamental problems faced by every country, especially developing countries, is its high unemployment rate. Therefore, almost all regimes in power in any country always address the issue of unemployment as one of the main targets in achieving economic development, which becomes a fundamental indicator in determining the success of government initiatives. A high unemployment rate can cause economic and social problems, while a temporarily low unemployment level can help increase economic and social well-being. The condition of unemployment can vary between countries; some have low unemployment levels, while others have high levels.

In Indonesia, unemployment is an ongoing problem that continuously concerns the government and society. Although Indonesia's economy has been growing rapidly in recent years, the unemployment level remains relatively high. According to data from the Central Statistics Agency (BPS) in February 2021, the open unemployment

rate in Indonesia reached 7.07%, affecting around 9.77 million people.

Many factors contribute to the high unemployment rate in Indonesia. One of them is the lack of job opportunities in the formal sector. Many high school and vocational school graduates face difficulties finding work in the formal sector due to a lack of available jobs. Additionally, skills that do not align with market demands are another contributing factor to the high unemployment rate. Many workers possess skills that are not in line with market demands or are not competitive enough to succeed in the job market. Uneven economic growth also contributes to the high unemployment rate in Indonesia, with many areas not benefiting from the overall economic growth, resulting in economic disparities and challenges in finding decent work in certain regions.

Structural problems in the Indonesian economy, such as dependence on the informal and small manufacturing sectors, also influence the availability of job opportunities. The COVID-19 pandemic has



significantly impacted the Indonesian economy, leading many companies to reduce the number of employees or even close, further exacerbating the unemployment situation.

To overcome the problem of unemployment in Indonesia, measurable and sustainable strategies are necessary. The government needs to develop sectors capable of absorbing a significant workforce, such as manufacturing and tourism. Additionally, there is a need to enhance the quality and relevance of education to improve the skills and competitiveness of the Indonesian workforce. Strengthening regulations and supervision of the informal sector is crucial to ensure social protection and workers' rights, fostering a mutually beneficial relationship between workers and investors.

In the rapidly developing technological landscape, businesses and individuals need to continuously upgrade their knowledge to keep pace with technological advancements. Technology can play a crucial role in creating new job opportunities and improving efficiency and productivity. However, it is essential to consider the potential negative impacts of technology, such as job displacement through automation or robotics. Therefore, governments, companies, and individuals must carefully consider the implications of technology to minimize negative effects while maximizing the benefits of creating new job opportunities.

Infrastructure is another critical factor in supporting development and reducing unemployment. Well-developed infrastructure can play a vital role in lowering unemployment levels, especially when it facilitates economic growth and creates new job opportunities. Physical infrastructure, such as toll roads, railways, and airports, can enhance accessibility and mobility for the public, opening up new job opportunities in previously inaccessible

areas. Digital infrastructure, such as a fast and extensive internet network, can enable remote work and diversify job opportunities beyond specific locations. However, it is crucial to ensure that infrastructure development aligns with the needs of the economy, is efficient, and directly contributes to job creation.

Infrastructure development has been a primary focus of the Indonesian government in recent years. Ambitious projects aimed at increasing connectivity and economic growth, such as the Trans-Java Toll Road and the Jakarta-Bandung Fast Train, have been launched to improve accessibility and quality of life. However, challenges such as costs, land procurement, and proper planning need to be addressed through cooperation between the government and the private sector to ensure the successful and efficient implementation of infrastructure projects.

In 2007, Piyapong Jiwattanakupaisarn analyzed the impact of investment in toll road development on the workforce using Granger-Causality models and dynamic panel data models. The conclusion drawn was that the development of toll roads had a positive impact on increasing the workforce.

In achieving inclusive economic growth where the entire population benefits from economic development, the democratic system plays a crucial role. Under a democratic system, economic and social policies are determined through general elections and representation of the people. A government elected by the people has the responsibility to create a conducive environment for economic growth and job creation. Economic policies, such as investment incentives or tax deductions, can stimulate economic growth and create new job opportunities.

On the other hand, if the government fails to create a conducive environment for economic growth and job creation, it can lead to unemployment. Economic and



political instability can discourage investors from investing capital and creating new jobs. Insufficient training and education programs can result in a workforce lacking the necessary skills to find new employment. In a democratic system, the role of the public in addressing unemployment is crucial. The society has the right to demand policies that help overcome unemployment, and the right to form workers' unions and social organizations can aid in protecting workers' rights.

Indonesia is a democratic country with a presidential political system. Since the 1998 Reformation, Indonesia has undergone significant development in terms of democracy, including free and fair elections, freedom of the press, freedom of expression, and increased political participation. According to the Democracy Index by the Economist Intelligence Unit (EIU), Indonesia is considered a developing democratic country, with a score of 62.01 in 2020, ranking 68th out of 167 countries.

Despite the maturity of Indonesia's democratic system, challenges such as corruption, violence during general elections, restrictions on freedom of the press and expression, and issues within the judicial system still need to be addressed. Positive developments in Indonesia's democracy include increased political participation, increasingly common free and fair elections, and advancements in social media that provide a platform for public expression. Indonesia has a history of political reforms, including ongoing reforms in the judiciary and law enforcement.

Based on existing data and research outlined above, further studies are needed to understand the influence of technology, infrastructure, and institutions on unemployment in Indonesia.

2. Literature Review

Unemployment is a problem of social and economic significance in many countries

worldwide. This issue can profoundly affect the well-being of individuals and society as a whole. Unemployment can result from various factors such as changes in the economy, technological advancements, or unstable social and political conditions. A high unemployment rate can have a negative impact on a country's economy, leading to reduced production, lower national income, and increased internal strain due to unemployment benefits and social spending. Additionally, unemployment can cause social instability, as individuals facing unemployment may feel a loss of hope and lack the income necessary to meet their basic needs.

2.1 Technology

2.1.1 Theory Substitution

The theory posits that the use of technology tends to replace human labor with machines or software devices. This phenomenon can lead to a decrease in the demand for human labor and, consequently, a potentially higher level of unemployment. Brynjolfsson, E., & McAfee, A. (2014).

As digital technology continues to advance rapidly, this theory becomes increasingly relevant and significant. The application of sophisticated technologies such as artificial intelligence, machine learning, and robotics has the potential to automate tasks that were previously performed by humans. For example, jobs in manufacturing, administration, or customer service can now be automated through machines or software.

While the adoption of advanced technology can enhance efficiency and productivity in production processes or services, it also has the drawback of reducing the demand for human labor, potentially leading to higher unemployment rates. Therefore, when integrating new technologies, careful evaluation and strategic planning are necessary to minimize the negative impact on the workforce.



Several strategies can be employed to mitigate the adverse effects of substitution theory, including enhancing the qualifications and skills of workers to adapt to technological developments, creating new job opportunities in emerging sectors, and encouraging investments in industries that generate employment.

In the context of globalization and intense competition, companies should also consider their social responsibility by addressing concerns related to workforce sustainability and their contribution to society as a whole. This can be achieved through supportive policies for training and developing the skills of workers, investing in innovation and research, and engaging in sustainable and socially responsible business practices.

2.1.2 Compensation theory

According to the compensation theory, technology tends to replace more low-level jobs with more high-level jobs. In other words, while technology may initially reduce the amount of low-skilled work, it eventually creates new, higher-skilled jobs. Acemoglu, D., & Restrepo, P. (2020).

In many cases, technology indeed replaces low-skilled, repetitive tasks, such as packing or transporting goods. Simultaneously, it generates new jobs that require higher skills and knowledge, such as the development and maintenance of automated systems.

However, it is not always the case that technology creates higher-quality jobs. In some instances, technology may reduce overall employment and lead to more low-skilled jobs, especially in sectors that demand only minimal skills. Therefore, while the compensation theory provides a useful perspective on the relationship between technology and employment, each situation must be independently assessed to determine how technology will impact the job market in a particular area or industry.

2.2 Infrastructure

The theory that illustrates the connection between infrastructure and unemployment is known as structuralism. This theory posits that inadequate infrastructure can lead to structural unemployment when workers lack the appropriate skills demanded by the job market. One of the proponents of this theory is Gunnar Myrdal, an economist and sociologist from Sweden. Structuralism was developed in his book titled "Asian Drama: An Inquiry into the Poverty of Nations," published in 1968.

Infrastructure, such as wide highways and regular transportation networks, can enhance the mobility of the workforce. This facilitates job-seeking for workers in more spacious areas and makes it easier for companies to find skilled workers. Moreover, robust infrastructure can attract new investments to an area, fostering economic growth. This increased economic activity generates a higher demand for labor, subsequently reducing unemployment levels. Infrastructure elements like ports, airports, and other transportation networks can also improve the efficiency of production and distribution, helping companies reduce production costs and enhance competitiveness, leading to an increased demand for labor.

2.3 System Democracy

Seymour Martin Lipset, in his book "Political Man: The Social Bases of Politics" (1960), asserts that a democratic system accelerates the modernization process, leading to a reduction in unemployment levels. Lipset argues that democracy creates a social and political environment conducive to economic growth, thereby increasing job opportunities and decreasing unemployment.

However, there are also critical theories suggesting that a democratic system might, in fact, contribute to higher levels of



unemployment. Anthony Giddens, in his book "The Third Way: The Renewal of Social Democracy" (1998), puts forth such a perspective. Giddens suggests that in a democratic system, government policies are often influenced by political pressures from different interest groups. This influence may impede the government's ability to make effective economic decisions, resulting in higher unemployment levels.

Additionally, there are theories suggesting a conflict perspective, contending that a democratic system can reinforce economic inequality, leading to increased unemployment. This theory is attributed to Karl Marx and Friedrich Engels, as presented in "The Communist Manifesto" (1848). Marx and Engels argue that in a capitalist system, which forms the basis of a democratic system, wealth becomes concentrated in the hands of a few, causing economic hardship and unemployment for the majority of the population.

3. Research Methodology

This study utilizes a quantitative associative method, drawing upon secondary data from the Central Statistics Agency (BPS), scientific articles, journals, and literature to support its examination. The collected data will undergo analysis, with the results providing insights into the impact of technology, infrastructure, and democratic systems on unemployment in Indonesia.

In employing the method of multiple regression analysis, the study aims to comprehend the strength of the connection between the dependent variable, unemployment, and its influencing factors. The regression equation is structured as follows: $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$, where Y represents unemployment, α is the constant, $\beta_1 - \beta_3$ are the coefficients of regression for each variable (X_1 for Technology, X_2 for

Infrastructure, and X_3 for System Democracy), and e denotes the error term.

Hypothesis testing is conducted both together (simultaneously) and individually (partially). The simultaneous testing assesses if independent variables collectively significantly influence the dependent variable, using the F-test by comparing F count with F table. Meanwhile, individual testing determines whether each independent variable significantly affects the dependent variable through the t-test, comparing t-count with t-table.

Operational definitions are provided for key variables:

1. Unemployment: Measured by the average unemployment rate (TPT) per year for the months of February and August from 2017 to 2021, representing the percentage of the workforce not working and actively seeking employment.
2. Infrastructure: Referring to the National Road, including main arteries, collector roads in the provincial intercapital road network, strategic national roads, and toll roads. The measurement considers the condition of roads per kilometer (KM).
3. Technology: Measured using the Information and Communication Technology Development Index (IP-ICT), sourced from BPS data and secondary data from the Ministry of Communication and Information (Kemkominfo).
4. System Democracy: Assessed based on the quality of democracy in Indonesia using the Indonesian Democracy Index (IDI), which categorizes the index as poor (<60), moderate (60-80), or good (>80). Aspects include civil freedoms, political rights, and democratic institutions, each with various indicators.

4. Results and Discussion

4.1 Test Assumptions Classic

Test assumptions classic is something procedure used. For inspect is assumption base in statistical models, such as normality



, homogeneity variance, and data independence, are met or No. Gujarati, D.N. (2003)

4.1.1 Normality test

Table 1 Normality Test Results

One-Sample Kolmogorov-Smirnov Test	
Statistical Tests	,154
Asymp. Sig. (2-tailed)	,200 ^{c,d}

Based on Kolmogorov-Smirnov normality test results obtained mark significance $0.200 > 0.05$, then can concluded that residual values are normally distributed.

4.1.2 Heteroscedasticity

Table 2 Heteroscedasticity Test Results

Variable	Sig.	Conclusion
Technology	,580	Homoscedasticity
Infrastructure	,929	Homoscedasticity
System Democracy	,398	Homoscedasticity

Heteroskedasticity test results Glejser show mark significance variable free technology, infrastructure, and systems Democracy each has mark more from 0.05. So that can concluded that No happen heteroscedasticity in the regression model.

4.1.3 Multicollinearity test

Table 3 Multicollinearity Test Results

Variable	Tolerance	VIF
Technology	,370	2,703
Infrastructure	,665	1,504
System Democracy	,494	2,023

Multicollinearity test results show tolerance value for each variable more big from 0.10 and the VIF value of each variable not enough of 10, so can concluded that regression model free multicollinearity.

4.2 Simultaneous Test (F Test)

Based on the F test results are known that mark significance that is of 0.013 which

is the value significance the more small from 0.05. Temporary For mark Fcount 7,552, more big from mark Ftable namely 4.07. With thereby Fcount $>$ Ftable or $7.552 > 4.07$. This matter show that all variable independent that is Technology (X1), infrastructure (X2) and Systems Democracy (X3) basically simultaneous influential significant to Unemployment.

4.3 Coefficient Test Determination

Table 4 Coefficient Test Results

Determination

Model Summary^b

Model	R	R Square	Adjusted R Square
1	.874 ^a	,764	,663

In table 5 above show mark *R Square* is 0.764 or amounting to 76.4% p This can show that variable independent ie technology, infrastructure, and systems Democracy can explain variable dependent unemployment amounting to 76.4% and the remainder that is amounting to 23.6% is influenced by other variables that are not There is in study This.

4.4 Partial Test (t Test)

To determine the influence of the independent variable partially on the dependent variable, a t test is carried out, namely by comparing the probability value or p-value (sig-t) with a significance level of 0.05. If the significance value is smaller than 0.05, then there is an influence between the independent variable and the dependent variable. The t test results are obtained as follows:

Based on the t test results, the following things can be seen:

- **H1: Technology has a significantly negative effect on unemployment.**

It is known that the test results show a significance value of 0.008, which is a value smaller than 0.05. Apart from that, it is known that the t-count value is -3.710, while the t table value is 2.364, so that t-count $>$ t-



table ($-3.710 > -2.364$), it can be concluded that technology has a significant effect on unemployment. So, H1 which states that technology has a significant and negative effect on unemployment is accepted. This is in accordance with research by Firm Hadi Priyono and Shelsa Gianavasya (2023), where in their research it was found that Information and Communication Technology (IP-ICT) has a negative and significant influence on the level of open unemployment in Indonesia.

Technological development can reduce unemployment because technology can help increase efficiency in various sectors, such as manufacturing, transportation, agriculture, and others. With increased efficiency, companies can increase their production, reduce costs, generate more revenue that can be used in business development, and create new jobs. Technological development can also help increase worker mobility. For example, remote technology allows workers to work remotely, which can increase flexibility and create more jobs in the area ultimately reducing unemployment.

- **H2: Infrastructure has a significantly negative effect on unemployment.**

The test results show a significance value of 0.007, a value smaller than 0.05. Meanwhile the t-count value is -3.760, while the t table value is 2.364, so the t-count is greater than the t-table or $-3.760 > 2.364$, so it can be concluded that infrastructure has a significant effect on unemployment. So, H2 which states that infrastructure has a significant effect on unemployment is accepted.

The test results also show a negative value for Coefficient B of the infrastructure variable. This shows an inverse relationship between infrastructure and unemployment. Improving infrastructure can certainly reduce unemployment because infrastructure development requires a lot of

labor, both for planning, building or managing the infrastructure. This can create new jobs for people who were previously unemployed. In addition, developing infrastructure such as roads and other transportation access can increase the mobility of people and goods, thereby increasing business and trade opportunities and strengthening the local economy by opening access to resources that were previously difficult to reach. This can certainly increase the productivity and competitiveness of a region, open up opportunities for business, investment and create new jobs.

- **H3: The democratic system has no significant effect on unemployment.**

It is known that the test results show a significance value of 0.445, a value greater than 0.05. Apart from that, it is known that the t-count value is 0.809, while the t table value is 2.364, so the t-count is smaller than the t-table ($0.809 < 2.364$), so it can be concluded that the Democratic System does not have a significant effect on unemployment. So, H3 which states that the Democratic System has a significant effect on Unemployment is rejected. This is in accordance with research conducted by Andrea Ceron and Stefano Gagliarducci (2016) which shows that there is no significant relationship between the level of democracy and the level of unemployment. A democratic system can influence government policy, but certain policies may not be focused on solving the problem of unemployment. For example, governments may focus more on policies related to economic growth or financial stability, rather than on policies that have a direct impact on unemployment rates.



5. Closing

5.1 Conclusion

Based on results data analysis and discussion done can concluded things as following:

1. Technology influential negative and significant to Unemployment in Indonesia.
2. Infrastructure influential negative and significant to Unemployment in Indonesia.
3. System Democracy No influential in a way significant to Unemployment in Indonesia.

5.2 Suggestion

Based on results research that has been obtained then any suggestions can be made given is as following :

1. For researcher furthermore expected For can do the same research with take period observation more research long to get results more testing complex .
2. For other researchers will do study more carry on with the same topic with study this is so you can add other supporting variables study this among others is investment foreign direct, expenditure government, growth economy nor factor other influencing factors unemployment .

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