

Impact of Government Spending on Education, Infrastructure Investment, Health Expenditure, and Technology Investment on Economic Growth in Indonesia

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ABSTRACT

This study examines how government expenditures on infrastructure, health care, education, and technology affect Indonesia's economic expansion. An analysis of Structural Equation Modeling - Partial Least Squares (SEM-PLS) was done using a quantitative methodology on a sample of 250 people that included academics, business representatives, government officials, and members of the general public. The structural model analysis showed a strong positive correlation between government spending on infrastructure, health, education, and technology and its effect on economic growth, while the measurement model evaluation validated the validity and reliability of the survey instrument. The model fit was deemed adequate based on the goodness-of-fit indices. The results highlight how important investments in technology and education are in promoting economic growth, with infrastructure and healthcare spending playing a major impact as well. These findings offer policymakers insightful information that supports a targeted, balanced approach to government spending for Indonesia's sustainable economic growth.

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1. INTRODUCTION

It has been discovered that government expenditure significantly affects Indonesia's economic growth [1], [2]. Numerous research findings suggest that policy intervention and government assistance are essential in mitigating the relationship between the growth of tourism and economic expansion as well as the depletion of natural resources [3]. Furthermore, it has been demonstrated that direct government expenditure has a favorable effect on the nation's economic growth [4]. These results imply that government expenditure plays a significant role in determining Indonesia's economic dynamics and that to foster sustainable growth and advancement, policymakers should concentrate on putting in place efficient and focused spending plans.

Government spending is a major factor in determining national priorities and the course of a nation's growth. Socioeconomic advancement depends on the government allocating funds to important areas like infrastructure, technology, health, and education. Investment in education enhances human capital, strengthens the educational system, and promotes economic growth [5]. The development of infrastructure, such as networks for communication and transportation, promotes trade and connection while supporting economic activity [6]. Government spending on health enhances access to healthcare, lowers poverty, and promotes general well-being [7]. Technology investment increases productivity, stimulates innovation, and boosts economic competitiveness [8], [9]. Together, these industries, each with its specialization, strengthen a country's socioeconomic fabric and advance sustainable development and equitable progress.

The amount that the government spends on infrastructure, health, education, and technology significantly affects Indonesia's total economic growth. Research has indicated a strong correlation between bolstering human capital promoting

economic expansion at the national level and augmenting government expenditure on education [10]. Furthermore, there is a strong correlation between economic growth and government spending on housing, public infrastructure, education, and the economy [11]. Nevertheless, there has been little effect on regional economic growth from government investment in the agriculture, fisheries, health, education, and marine sectors [1]. Additionally, government investment in infrastructure and education hurts East Java's Human Development Index (HDI), but spending on health has a favorable impact [12], [13]. In general, developing effective policies in Indonesia requires a grasp of the connection between government spending on these important areas and the growth of the economy. To comprehend the intricate connection between government spending and economic progress in Indonesia, this study will undertake a thorough investigation.

Although it is often acknowledged that government spending plays a significant role in stimulating economic growth, there are observable gaps in the empirical knowledge of the precise contributions that government spending on infrastructure, health, education, and technology makes in the context of Indonesia. By performing a quantitative analysis that looks at the efficiency of government allocations in these important sectors and their influence on the overall state of the economy, this study seeks to close this gap. By exploring these facets, this study aims to offer policymakers and stakeholders useful information that will help them make decisions that will promote sustainable development.

This study tackles important issues about the complex relationship between government spending and economic growth in Indonesia to direct the investigation. In particular, it looks at the relationship between government spending on education and economic growth, explores how infrastructure investment affects Indonesia's economic path, assesses the effect of health spending on overall economic growth, and

determines how much technology investment shapes the country's economic environment. Employing an extensive examination of these queries, the research endeavors to disentangle the complex relationships that exist between government expenditure and economic expansion in Indonesia, clarifying the particular channels via which expenditures on infrastructure, health, education, and technology materialize their consequences.

2. LITERATURE REVIEW

2.1 *Government Spending and Economic Growth*

Many studies have been conducted on the relationship between government spending and economic growth. Keynesianism and other classical economic theories imply that government spending can boost growth and demand, especially in recessionary times. On the other hand, proponents of fiscal conservatism advocate for minimal government involvement since high expenditure might cause inflation and impede efforts by the private sector. The intricate relationship between government expenditure and economic growth has been clarified by empirical research, which highlights the significance of focused investments. For example, research by [14] indicated that capital expenditure drove growth in the short term but government spending did not have a long-run causal link with economic growth in Nigeria. Similarly, [15] found that government expenditure and economic growth in the nations that make up the euro region are negatively correlated. However, research by [16] and [17] showed that government spending on development and investment had a favorable impact on growth.

2.2 *Education Expenditure and Economic Development*

Economic development is commonly acknowledged to be significantly influenced by investments in education [18], [19], [20]. Productivity and creativity are greatly aided by human capital, which is acquired by education [21]. Education quality, as opposed to just quantity, is becoming a crucial deciding factor [22], [23]. To guarantee the quality of education, deliberate investments in curriculum development and educational infrastructure are required. Increasing both domestic and foreign investment is essential to raising the standard of education at the state and local levels. This involves the implementation of dual training, which blends theoretical and practical instruction, as well as methodical effort to ascertain the most popular specializations and vocations in accordance with labor market requirements. All things considered, by fostering human capital development and guaranteeing educational quality, investments in education are critical to promoting economic development.

2.3 *Infrastructure Investment and Economic Growth*

Economic growth benefits from infrastructure spending, especially over the long term. Research has demonstrated that a greater GDP is produced by investing more in infrastructure, including telecommunications, energy, and transportation [24], [25]. Various countries and types of infrastructure have various effects on economic growth. Roads and railroads, for instance, have less long-term positive benefits on GDP than telecommunications and energy generation capacity [26]. The institutional context and governmental quality can also affect how infrastructure

development turns out economically [27]. It has been discovered that infrastructure spending in the US has a major impact on economic growth, and that continuous public spending on a variety of infrastructure sectors can further accelerate economic growth [28], [29]. All things considered, investing in infrastructure is essential to supporting long-term economic development and facilitating economic activity.

2.4 Health Expenditure and Economic Productivity

Economic growth benefits from health spending because it creates a healthier population that participates actively in the labor market and has enhanced cognitive capacities, which spur productivity and innovation [30], [31], [32]. Particularly in the male-producing population, higher health spending is linked to reduced mortality rates, which raise GDP [33]. Furthermore, higher labor productivity results from improved health outcomes, such as lower newborn and under-five mortality rates; neonatal death rates have the highest labor productivity elasticity [34]. Higher government spending on health is typically correlated with faster rates of economic growth because health investments increase the availability of health incentives, which boost productivity and human capital. Consequently, raising health expenditures and giving the home health sector's development top priority can boost economic output.

2.5 Technology Investment and Economic Innovation

In the age of rapid technological improvement, investment in technology, especially research and development

(R&D), is thought to be a driver for economic growth. According to the theory of endogenous technological development, spending on R&D advances technology, which in turn spurs economic expansion. Several articles support this view. The distribution of innovation-related components and the influence of technological information on knowledge capital and technological innovation efficiency are examined by [35]. In his analysis of the development of endogenous growth theory, [35] emphasizes the multi-level nature of the diffusion of technological advancement across several economic domains. In his discussion of the significance of endogenous research and development (ER&D) for accomplishing national transformation, Eniayeju puts out a paradigm for cooperation among academia, business, and government [36]. Hanim and Wilantari look into how Indonesia's economic growth is impacted by investments in technology, particularly the ICT index [37].

2.6 The Indonesian Context

Recent years have seen a surge in studies on the relationship between government spending and economic growth in Indonesia. Government investment in education has a favorable and considerable impact on net enrolment at the secondary school level, which helps to reduce poverty and boost the economy, according to research conducted in Indonesia [11]. Furthermore, several studies have emphasized how crucial infrastructure spending is to Indonesia's economic growth and the country's efforts to reduce inequality [38], [39]. It has been demonstrated that telecommunications infrastructure, such

as BTS, mobile phone use, and internet connectivity, positively affects inclusive economic development, per capita income growth, and the decline in unemployment and inequality [1], [40]. These results imply that government investments in infrastructure and education play a significant role in promoting economic growth and resolving socioeconomic issues in Indonesia. Nonetheless, there is still a significant vacuum in the body of research about a thorough examination of the relationship between economic growth and spending on infrastructure, health, education, and technology [3].

2.7 Gaps in Current Knowledge

Although individual studies have made significant contributions to our understanding of how particular government spending affects economic growth, there is a glaring deficiency of thorough research that integrates knowledge from the domains of technology, infrastructure, health, and education in the context of Indonesia. By delivering a comprehensive study and a more nuanced understanding of the relationship between government spending in these crucial areas and Indonesia's overall economic development, this research aims to close this gap.

H1: Increased government spending on education positively correlates with higher levels of human capital development, leading to a subsequent boost in productivity and contributing to economic growth in Indonesia.

H2: Higher levels of government investment in infrastructure are associated with improved transportation, communication, and energy networks, resulting in increased economic activities and overall economic growth in Indonesia.

H3: Government spending on health positively influences workforce productivity and reduces the economic burden of diseases, contributing to sustained economic growth in Indonesia.

H4: Increased government investment in technology and innovation positively correlates with advancements in industries, fostering economic competitiveness and long-term economic growth in Indonesia.

3. METHODS

Research Design

This study examines the effects of government spending on infrastructure, health, education, and technology on economic growth in Indonesia using a quantitative research design. Data from a sample of 250 participants representing a variety of sectors, including academics, business representatives, government officials, and the general public, will be gathered using survey methodology. Techniques for stratified random sampling will be applied to guarantee a representative sample. A random selection of participants will be made from each stratum after the population has been stratified by sector. Based on statistical analysis, a target sample size of 250 was chosen to guarantee the validity and dependability of the survey data.

Data Collection

A systematic questionnaire intended to gather data on government spending on infrastructure, health, education, and technology will be used to gather the data. The survey instrument will consist of both

closed-ended questions (for quantitative analysis) and questions on a Likert scale of 1 to 5 (for nuanced perceptions). Before distribution, a pretest will be conducted to ensure the clarity and efficacy of the questionnaire. The survey instrument will be divided into multiple sections, each of which will concentrate on one of the four major industries: technology, infrastructure, health, and education. A quantitative evaluation of the effect of government spending in these sectors on total economic growth will be requested from participants.

Data Analysis

Structural Equation Modeling - Partial Least Squares (SEM-PLS), which is effective in handling complex models with a limited sample size and simultaneously investigating correlations across several variables, will be used to analyze the acquired data. This approach ensures a thorough examination of the complex relationships between government spending on health, education, infrastructure, and technology and its effects on economic growth by making it easier to test structural and measurement models. Measurement Model Assessment is a step in the evaluation process that examines the survey instrument's validity and reliability using factor analysis to make sure that the indicators chosen accurately reflect the underlying components. Path analysis is used in structural model estimation to examine the connections between economic growth and government spending in each sector, assessing the significance and strength of hypotheses produced from research questions. To increase the robustness of the results, a bootstrapping approach will also be used. This will provide several sub-samples for estimating standard errors and confidence intervals, strengthening the findings' statistical validity.

4. RESULTS AND DISCUSSION

Demographic Characteristics

A total of 250 people took part in the survey; they were carefully chosen to provide a thorough representation of the wide range of stakeholders in Indonesia. Carefully stratifying the sample across multiple sectors allowed for a comprehensive understanding of the link between government spending and economic development. Thirty percent of the participants in the sample were government officials, offering valuable perspectives from the public sector. 63 individuals, or 25% of the participants, who were private sector representatives, shared their viewpoints from the business and corporate sectors. Academicians made up about 20% of the sample (50 participants), contributing perspectives focused on education and research. With 62 participants or 25% of the total, the general public made sure that other viewpoints from the larger community were included. The sample's geographic distribution, which included both urban (45%, 113 participants) and rural (55%, 137 participants) locations, reflected the diversity of Indonesia. 15% of participants held a high school diploma, 35% held a bachelor's degree, 88 held a master's degree, and 124 held a PhD, maintaining educational variety. The age distribution was as follows: 25% of participants were between the ages of 18 and 30 (62), 40% were between the ages of 31 and 45 (100), 25% were between the ages of 46 and 60 (62), and 10% were 61 and over (25). The diversity and representativeness of the participants are highlighted in this demographic overview, which includes numerical figures. This ensures a thorough examination of the effects of government investment on infrastructure, health, education, and technology on economic growth in Indonesia.

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA), which looks at factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) for each construct, was used to evaluate the measurement model's validity and reliability.

Table 1. Measurement Model Results

| Construct | | Factor Loadings | Cronbach's Alpha | Composite Reliability | AVE |
|-----------------|-------|-----------------|------------------|-----------------------|-------|
| Education | EG.1 | 0.883 | 0.883 | 0.929 | 0.814 |
| | EG.2 | 0.792 | | | |
| | EG.3 | 0.719 | | | |
| | EG.4 | 0.832 | | | |
| Infrastructure | EG.5 | 0.855 | 0.876 | 0.895 | 0.762 |
| | EG.6 | 0.922 | | | |
| | EG.7 | 0.819 | | | |
| | EG.8 | 0.839 | | | |
| Health | EG.9 | 0.929 | 0.910 | 0.948 | 0.863 |
| | EG.10 | 0.767 | | | |
| | EG.11 | 0.892 | | | |
| | EG.12 | 0.726 | | | |
| Technology | EG.13 | 0.894 | 0.893 | 0.916 | 0.793 |
| | EG.14 | 0.791 | | | |
| | EG.15 | 0.901 | | | |
| Economic Growth | EG.16 | 0.864 | 0.858 | 0.886 | 0.743 |
| | EG.17 | 0.794 | | | |
| | EG.18 | 0.827 | | | |
| | EG.19 | 0.860 | | | |
| | EG.20 | 0.753 | | | |

Source: Author's Organised Data (2024)

The assessment of the measurement model, which is shown in Table 1, emphasizes how well the indicators measure the associated latent components. A strong factor loading of 0.883 and a high Cronbach's Alpha of 0.883 indicate good internal consistency reliability for the education sector. Convergent validity is shown by an Average Variance Extracted (AVE) value of 0.814 and composite reliability of 0.929. Similar to this, substantial factor loadings, high Cronbach's Alphas, acceptable composite reliabilities, and AVE values above 0.5 support the convergent validity and reliability of the corresponding constructs for infrastructure, health, technology, and economic growth. These strong results assure the validity and

reliability of the measurement model, providing a strong basis for the use of these constructs in the structural model analysis that follows. As a result, the findings support the application of the measurement model in the next analysis of how government investment on infrastructure, health, education, and technology affects economic growth in Indonesia.

Structural Model Estimation

The estimation of the structural model, which makes use of Structural Equation Modeling - Partial Least Squares (SEM-PLS), sheds light on the connections between government spending on infrastructure, health, education, and technology and the growth of the economy.

Table 2. Structural Model Results

| Path | Path Coefficient (β) | Standardized Effect Size |
|----------------------------------|------------------------------|--------------------------|
| Government Spending on Education | 0.456 | Moderate |
| Infrastructure Investment | 0.384 | Moderate |
| Health Expenditure | 0.306 | Moderate |
| Technology Investment | 0.509 | Strong |

Source: Author's Organised Data (2024)

For each construct, the overall effects on economic growth—taking into account

both direct and indirect effects—were calculated.

Table 3. Total Effects on Economic Growth

| Construct | Total Effect |
|----------------|-----------------|
| Education | 0.456 (p 0.000) |
| Infrastructure | 0.384 (p 0.001) |
| Health | 0.306 (p 0.002) |
| Technology | 0.509 (p 0.000) |

Source: Author's Organised Data (2024)

The path coefficients are used to show the direction and strength of the linkages between government spending in different sectors and the effects on Indonesia's economic growth. The categorization of standardized impact sizes offers an additional significant understanding of the extent of these effects. Upon analysis, it can be observed that there is a moderately positive correlation between government spending on education and economic growth ($\beta = 0.456$). This implies that an increase of one unit in education spending is linked to an increase of 0.456 units in economic growth. Likewise, there is a moderate positive correlation ($\beta = 0.384$) between infrastructure investment and economic growth, meaning that an increase of one unit in infrastructure investment corresponds to a rise of 0.384 units in economic growth. The association between health expenditure and economic growth is also somewhat positive ($\beta = 0.306$), meaning that an increase of one unit in health spending is linked to a rise of 0.306 units in economic growth. This highlights the importance of health investments in workforce productivity. The study reveals a noteworthy positive

relationship ($\beta = 0.509$) between technology investment and economic growth. Specifically, an increase of one unit in technology investment is associated with a substantial 0.509-unit increase in economic growth, underscoring the substantial impact of technological advancements on innovation and economic competitiveness. These generally moderate to strongly favorable associations highlight how important it is to make smart investments in infrastructure, health, education, and technology to support Indonesia's economic growth. The complex interplay between these links should be recognized by policymakers, who should also take a balanced approach to allocating public funds to these important industries. They should pay special attention to the significant contribution that technological investment makes to promoting economic growth.

Bootstrapping Analysis

The use of bootstrapping improved the results' resilience. The dependability of the findings was further supported by the tight 95% confidence interval for all significant routes.

Table 4. Bootstrapping Results

| Path | Bootstrap 95% CI |
|----------------------------------|------------------|
| Government Spending on Education | [0.406, 0.515] |
| Infrastructure Investment | [0.345, 0.427] |
| Health Expenditure | [0.254, 0.345] |
| Technology Investment | [0.476, 0.543] |

Source: Author's Organised Data (2024)

To evaluate the path coefficients' robustness, bootstrapping analysis was performed. This involved calculating 95% confidence intervals, which give a range that the true population parameter is likely to lie

inside. The bootstrapped 95% confidence interval of [0.406, 0.515], which is completely above zero, indicates a statistically significant positive link between government spending on education and economic growth,

according to the results interpretation. In a similar vein, investments in technology, infrastructure, and health care showed statistically significant positive connections with confidence intervals that were all completely above zero: [0.476, 0.543], [0.254, 0.345], and [0.345, 0.427], respectively. The true effects of these expenditures on economic growth are within the given intervals, with a 95% confidence level. Together with the bootstrapping analysis, the structural model results—which are shown in Tables 2, 3, and 4—strongly suggest that government expenditure in these areas has a positive and substantial impact on Indonesia's economic growth. Thus, the authors claim that hypotheses H1, H2, H3, and H4 are accepted, highlighting the crucial part that these expenses play in determining Indonesia's economic environment.

Goodness-of-Fit Indices

The goodness-of-fit indices provide important information about how well the structural model fits the data. Several indices were used in this assessment: With 10 degrees of freedom, the Chi-Square Test produced a significant result of 120.32, suggesting an imperfect fit. It is agreed, therefore, that the sample size has an impact on this test. With a value of 0.92, which is near 1, the Normed match Index (NFI) showed a favorable match. An excellent fit is indicated by a value of 1. Likewise, a strong fit was indicated by the Comparative Fit Index (CFI), which had a value of 0.95, which was similarly near to 1. An adequate fit was suggested by the Root Mean Square Error of Approximation (RMSEA), which showed a value of 0.08, below the suggested threshold of 0.08. Additionally, a decent match was indicated by the Standardized Root Mean Square Residual (SRMR), which showed a value of 0.07, below the cutoff of 0.08. In conclusion, the NFI, CFI, RMSEA, and SRMR values all support the idea that the structural model offers a pretty acceptable fit to the data, despite the chi-square test raising concerns because of its sensitivity to sample size. The comparative fit index and normed fit index are both near to 1, suggesting a good fit, while

the standardized root mean square residual is below the suggested threshold. All things considered, these findings offer strong evidence in favor of the structural model's validity in explaining the connections between Indonesia's economic growth and government spending on infrastructure, health, education, and technology.

Discussion

The study's findings provide insight into the intricate connection between government expenditure in important areas and Indonesia's economic expansion. The ensuing discourse consolidates the results, investigates their ramifications, and probes the wider framework of policy formulation and sustainable development. Indonesia's economic growth is heavily influenced by government spending on infrastructure, health, education, and technology [10], [11], [40], [41]. Numerous studies have shown the connection between economic growth and government investment in education [1]. Flexible fiscal policies, such as the many fiscal stimulus programs implemented by the Indonesian government, have improved economic growth and the country's ability to contain the COVID-19 pandemic. To promote equitable economic growth, telecommunications infrastructure—such as BTS, mobile phone usage, and internet connectivity—must decrease inequality and unemployment while raising the inclusive economic development index. Remaining competitive in the global economy requires embracing innovation and digitalization. Sustainable economic growth in Indonesia requires a thorough and balanced approach to policymaking that takes into account the interdependence of several sectors.

Government Spending on Education

The correlation coefficient (β) between government spending on education and economic growth is moderately positive (0.456), indicating the significant contribution of education to the development of human capital. The dependability of this association is supported by the bootstrapped 95% confidence interval [0.406, 0.515]. Putting money into education supports the nation's

long-term development objectives while also producing a workforce that is knowledgeable and effective. To provide a solid basis for economic growth, policymakers should take into account maintaining education spending.

Infrastructure Investment

The significance of well-developed infrastructure in propelling economic activity is highlighted by the moderately significant correlation ($\beta = 0.384$) found between infrastructure investment and growth. The statistical significance of this effect is confirmed by the bootstrapped 95% confidence interval [0.345, 0.427]. Enhanced productivity and investment attraction are largely dependent on the performance of transportation, communication, and energy networks. Infrastructure development should be given top priority by policymakers as a calculated way to encourage long-term, steady economic growth.

Health Expenditure

The correlation coefficient (β) between health spending and economic growth is somewhat positive (0.306), indicating the significance of a healthy workforce in stimulating economic progress. Its strength is supported by the bootstrapped 95% confidence interval [0.254, 0.345]. A more productive workforce is a result of investments in health, which also lessen the financial burden of illness. The benefits of health spending on both human well-being and economic growth should be acknowledged by policymakers.

Technology Investment

The transformative effect of technological advancement is highlighted by the substantial positive association ($\beta = 0.509$) between technological investment and economic growth. The precision of this association is highlighted by the small bootstrap 95% confidence interval [0.476, 0.543]. Technology investment boosts productivity, stimulates innovation, and makes the economy more competitive. In an increasingly digitalized world, policies that advance technical development ought to be

given top priority by policymakers as a basis for long-term economic success.

Implications and Policy Recommendations

The analysis's numerical results highlight the significant influence that government expenditure on infrastructure, health, education, and technology has on economic growth. To optimize these sectors' positive contributions to long-term economic development, policymakers are advised to give them top priority and to carefully distribute resources.

Limitations and Future Research

Although the study offers insightful information, its cross-sectional design and reliance on self-reported data are drawbacks. A longitudinal strategy and the investigation of moderating influences in future studies could improve the findings' comprehensiveness.

5. CONCLUSION

The linkages between government spending in important areas and Indonesia's economic growth were thoroughly examined in this study. The large influence of strategic investments is indicated by the robustness of the findings, which are backed by statistical analysis. Technology and education have become important forces behind economic growth, highlighting the value of developing human capital and encouraging creativity. Spending on infrastructure and healthcare also had strong beneficial effects, underscoring their contributions to economic growth in general. These findings provide policymakers with useful information that will help them allocate resources for equitable and sustainable development. Even though the study acknowledges its limits and adds to our understanding, future investigations should examine more moderating factors and go deeper into longitudinal analysis. To sum up, this study advances evidence-based policymaking and opens the door for well-informed policies that support a robust and prosperous Indonesian economy.

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