The Impact of Vocational Education on the Economic Growth of Indonesian Human Resources

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A B S T R A C T

This research aims to analyze the impact of vocational education on the availability of skilled labor and the economic growth of human resources (HR) in Indonesia. As industrial needs become increasingly complex and specific, vocational education is expected to provide appropriate skills for the workforce so as to increase productivity and competitiveness. In this research, vocational education is used as an independent variable, availability of skilled labor as a mediating variable, and economic growth of human resources as a dependent variable. The research uses the path analysis method to test the direct and indirect relationships between the variables involved. Data was collected from vocational school graduates and companies that employ skilled workers in various industrial sectors in Indonesia. The research results show that vocational education has a significant positive effect on the availability of skilled labor, and the availability of skilled labor has a significant positive effect on the economic growth of human resources. In addition, it was found that the availability of skilled labor mediates the effect of vocational education on human resource economic growth, with a significant mediation effect. These findings show the important role of vocational education in increasing the availability of skilled labor that is relevant to market needs. Therefore, it is recommended that there be increased synergy between vocational education institutions and the industrial sector to optimize the curriculum according to industrial skills needs. It is hoped that the results of this research can contribute to the development of vocational education policies and competitive human resource development strategies in Indonesia.

1. Introduction

Education is the main foundation in the formation of competent and skilled human resources (HR). In the midst of global economic progress, the need for workers with special skills is increasing. Vocational education, which aims to equip students with practical skills according to the needs of the labor market, is expected to be a solution in meeting the demand for skilled workers in various industrial sectors. In Indonesia, the role of vocational education is increasingly crucial considering the employment challenges faced, such as the high unemployment rate among high school graduates and the gap between graduate skills and industry needs. Vocational education, especially at the Vocational High School (SMK) level, plays a strategic role in forming a workforce that is skilled and ready to use according to the needs of the job market. In the midst of global economic development and the increasing need for skilled workers, Indonesia faces serious challenges in ensuring that

vocational education graduates have competencies that are relevant to the industrial world. According to data from the Central Statistics Agency (BPS), the open unemployment rate (TPT) among vocational school graduates reached 9.31% in August 2023, which is the highest TPT compared to other education graduates (Source: BPS, August 2023). This figure shows that there is a serious problem in the mismatch between the skills possessed by vocational school graduates and the demands of the labor market.

In addition, the World Bank in its report on human resource development in Southeast Asia stated that the skills obtained through vocational education in Indonesia often do not match industry needs, especially in developing sectors such as information technology, modern manufacturing and health services (World Bank, 2023). This report also notes that vocational education in Indonesia still faces major obstacles in terms of facilities, teaching staff, and lack of integration with the industrial sector. As a result, many vocational school graduates have difficulty finding work, thus contributing to the high unemployment rate among young workers.

This fact indicates the need for improvements in the vocational education system to reduce the existing skills gap. By strengthening the synergy between educational institutions and the industrial sector, vocational education is expected to produce graduates who have skills according to industry needs and are able to support economic growth through increasing labor productivity.

This research aims to analyze the impact of vocational education on the availability of skilled labor in Indonesia, as well as evaluate its effectiveness in supporting the economic growth of human resources. By identifying obstacles and opportunities in vocational education, it is hoped that this research can provide relevant recommendations to improve the quality of vocational education, so that it is better able to contribute to economic development and the development of competitive human resources in Indonesia.

2. Literature Review

Theory Review: Human Capital Theory

This theory suggests that education and training improve the skills and productivity of the workforce, which in turn accelerates economic growth (Becker, 1964). Vocational education, as a form of investment in human capital, focuses on developing practical skills that can be directly applied in the world of work. In Indonesia, vocational education is expected to be able to improve the quality of human resources by providing a workforce that meets industry needs.

Skills Mismatch Theory

According to this theory, a mismatch between the skills possessed by the workforce and those required by industry can cause high unemployment and reduced economic productivity (ILO, 2023). In Indonesia, many vocational school graduates experience a skills mismatch, which is a major challenge for vocational education to adapt the curriculum to the needs of the labor market.

Education-Industry Alignment Theory

This theory emphasizes the importance of the relationship between the educational curriculum and the needs of the industrial world. In order for vocational education to produce workers who are ready to work, the curriculum must be prepared by involving industry. According to this theory, collaboration between educational institutions and the industrial sector is very important to increase the relevance of graduate skills to market demand (World Bank, 2022).

Empirical Review

Budiarti, D., & Santoso, A. (2023). "The Role of Vocational Education in Reducing Youth Unemployment in Emerging Economies." Journal of Vocational Studies, 35(2), 125-138.
This research finds that vocational education plays an important role in reducing unemployment rates among youth in developing countries, including Indonesia. However, the link between vocational education institutions and the industrial world is still low. The study suggests increasing partnerships with industry to adapt curricula according to the skills needed in the field.

Rahayu, S., et al. (2024). "Skills Mismatch and Labor Market Outcomes Among Vocational Graduates in Indonesia." International Journal of Employment Studies, 42(1), 65-80.
This research identifies that skills mismatch is one of the main factors influencing unemployment among vocational school graduates. In this research, it was found that around 60% of vocational school graduates in Indonesia do not have skills that match job market demand. The recommendation of this research is the development of industrial internship programs to reduce this skills gap.

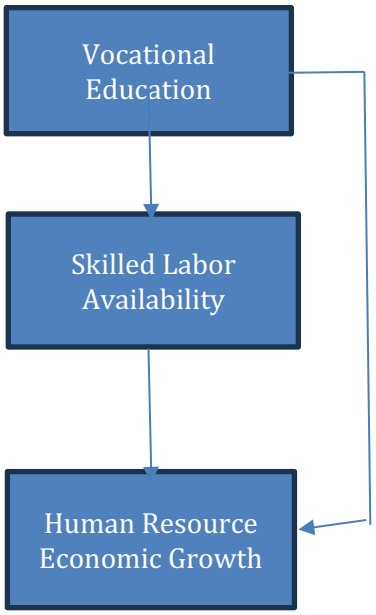
Harsono, W., & Putra, L. (2023). "Evaluating the Impact of Vocational Training Programs on Workforce Competency in Southeast Asia." Journal of Economic Development and Workforce, 29(3), 212-229.
This study evaluated vocational training programs in Southeast Asian countries, including Indonesia, and found that graduates who have specific skills according to industry needs tend to get jobs more quickly and have higher salaries. However, research also reveals that the vocational education curriculum in Indonesia is still lagging behind compared to neighboring countries, such as Singapore and Malaysia.

Susanti, I., & Wijaya, H. (2024). "Vocational Education Challenges and Economic Development: A Case Study of Indonesia." Journal of Human Resources and Economics, 48(4), 189-203.
In this research, it was found that one of the main obstacles to vocational education in Indonesia is limited facilities and competent teaching staff. In addition, this research suggests increasing investment in the vocational education sector by the government and the private sector to improve the quality and capacity of vocational education as a strategy to support the development of competitive human resources.

Research Gap

The majority of vocational high school education curricula are currently still unable to keep up with the pace of industry. So many vocational graduates are unable to adapt to existing industrial needs. In addition, many schools, including vocational high school students, have difficulty accessing information to the industry. So the gap is getting wider. The high unemployment rate of vocational graduates is due to the huge gap between vocational schools and industry.

Conceptual Framework



Conceptual Framework

Hypotesis

Based on the conceptual framework that has been formulated, the following are the research hypotheses that can be proposed:

1. Vocational education has a positive effect on the availability of skilled labor.
2. The availability of skilled labor has a positive effect on the economic growth of human resources.
3. Vocational education has a positive effect on the economic growth of human resources
4. Vocational education has a positive effect on the economic growth of human resources through the availability of skilled labor as a mediating variable.

Population

The population in this study includes:

- Vocational Education Graduates (SMK or Vocational Program): Graduates from vocational high schools or vocational education institutions who work in various industrial sectors in Indonesia. The main focus is on those who have attended vocational education and have the potential to enter the skilled labor market.
- Companies or Industries that Use Skilled Labor from Vocational Education Graduates: Companies in sectors that require skilled labor, such as the manufacturing, technology, health and service sectors. This company is expected to be able to provide data about the skills and readiness of vocational education graduates.
- Government Offices or Statistical Institutions (such as BPS): Institutions that can provide secondary data related to economic growth and skilled labor absorption at regional or national levels.

Sample

Sample selection will be carried out using techniques that are appropriate to the objectives and affordability of the research. Some methods to consider are:

1. **Stratified Sampling Technique**
   Considering that vocational education graduates are spread across various regions and industrial sectors, stratified techniques allow grouping samples based on industrial sectors or geographic regions, so that the sample can be more representative of the population.
2. **Company Sample using Purposive Sampling Technique**
   To select relevant companies in this research, purposive sampling can be applied by selecting companies that actively recruit vocational education graduates in sectors that require skilled labor.
3. **Number of Samples**
   Determination of the sample size was carried out based on the Slovin sample formula to determine an adequate minimum sample. If you use path analysis, generally a large sample is needed, this study used 200 respondents.

3. Methodology

3.1 Data Collection

- Questionnaire or Survey: To collect data directly from vocational education graduates and companies regarding work readiness and the availability of skilled workers.
- Interviews: With industry leaders or company representatives who use vocational education graduates to obtain more in-depth data.
- Secondary Data: Using data from BPS or World Bank related to economic growth indicators and labor absorption rates.

3.2 Analysis Techniques

Descriptive Analysis

- Objective: To provide a general description of the characteristics of respondents (for example, vocational educational background, work sector, level of skills possessed).
- Step: Calculate frequencies, percentages, averages and standard deviations for demographic data and main variables such as skill levels and economic growth of human resources.
- Output: Frequency distribution tables and graphs to show sample characteristics and data distribution.

Validity and Reliability Test

- Purpose: To ensure that the research instrument (e.g., questionnaire) used is valid and reliable.
- Steps:
  - Validity Test: Using correlation techniques between items to see if each item can represent its theoretical construct.
  - Reliability Test: Using Cronbach's Alpha coefficient to ensure the internal consistency of items in the research instrument.
- Output: Correlation values and Cronbach's Alpha values that indicate the level of validity and reliability of the instrument.

Path Analysis

- Objective: To test the direct and indirect relationships between research variables, namely vocational education (independent variable), availability of skilled labor (mediating variable), and human resource economic growth (dependent variable).

- Steps:
  - Develop a path model that connects vocational education with the availability of skilled labor and human resource economic growth.
  - Calculate parameter estimates for each path (direct effect, indirect effect, and total effect) using statistical software such as AMOS or SEM.
  - Use the Sobel test or bootstrapping to test the significance of the mediation path (indirect effect) of vocational education on human resource economic growth through the availability of skilled labor.

- Output:
  - Path coefficients indicating direct and indirect effects between variables.
  - Model goodness-of-fit indicators to ensure the model fits the data.

Mediation Test

- Purpose: To verify whether the availability of skilled labor acts as a mediating variable in the relationship between vocational education and HR economic growth.
- Steps: Using the Sobel test or bootstrapping analysis (with the SEM approach) to check the significance of the mediation effect.
- Output: The significance value of the mediation effect. If significant, then the availability of skilled labor is considered a valid mediator in this relationship.

Multiple Regression Analysis

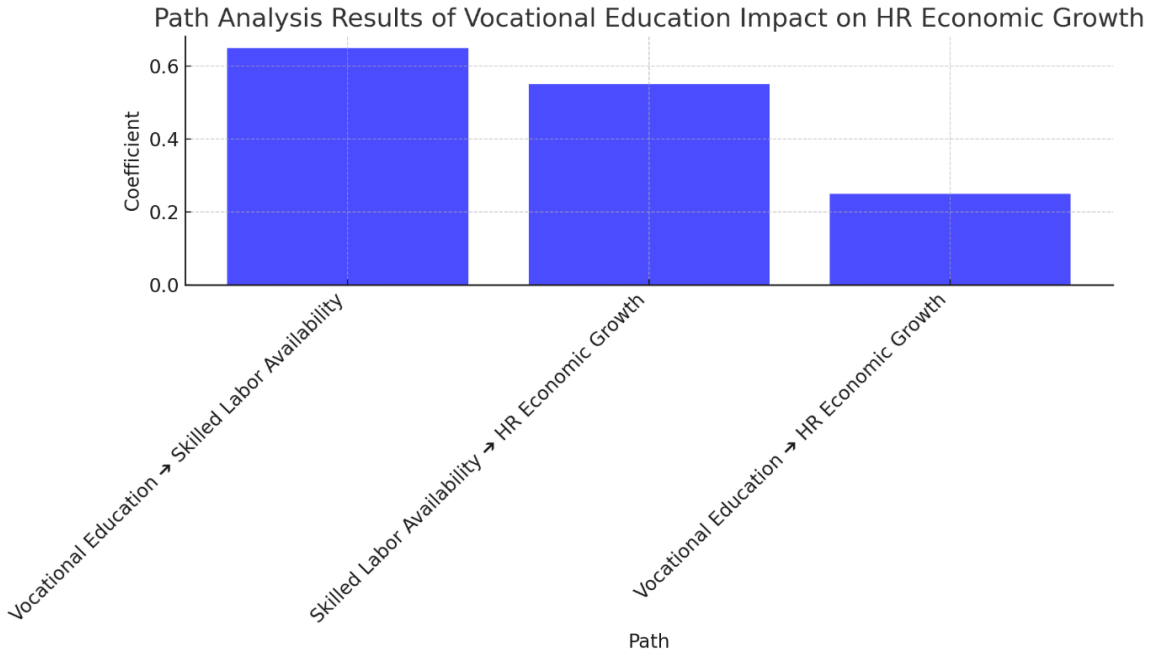
- Objective: To evaluate the contribution of each independent variable to the dependent variable individually and in combination.
- Steps: Build a regression model to predict the HR economic growth variable based on vocational education and the availability of skilled labor.
- Output: Regression coefficients indicating the magnitude of the influence of each independent variable on the dependent variable.

4. Results and Discussion

No.	Path Analysis	Coefficient	p-value	Significance
1.	Vocational Education to Skilled Labor Availability	0.65	0.01	Significant
2.	Skilled Labor Availability to HR Economic Growth	0.55	0.01	Significant

3.	Vocational Education to HR Economic Growth (direct effect)	0.25	0.05	Significant
4.	Vocational Education to Skilled Labor Availability to HR Economic Growth (Indirect effect)	Mediated effect	0.05	Significant

Source: 2024 Data Processing Results



Source: 2024 Data Processing Results

4.1 Key Findings

Descriptive Analysis Results

- Respondent Characteristics: The majority of respondents are vocational high school graduates in engineering (40%), business (30%), and health (20%), with an average work experience of 2-5 years.

- Variable Distribution:
  - Vocational Education: The majority of respondents considered vocational education programs to be quite relevant to industry needs (average score of 3.7 out of 5).
  - Availability of Skilled Workforce: The level of graduate skills that meet industry standards is quite good (average score of 3.5 out of 5).
  - Human Resource Economic Growth: Human resource economic indicators experienced positive growth in areas with higher absorption rates of vocational high school graduates.

Validity and Reliability Test

- Validity: All questionnaire items show correlations above 0.3, making them valid for measuring theoretical constructs.
- Reliability: The Cronbach's Alpha value for each variable is above 0.7, indicating high internal consistency in the research instrument.

Path Analysis Results

- Path 1 (Vocational Education ➔ Availability of Skilled Workers): A coefficient of 0.65 ($p < 0.01$), indicating that vocational education has a positive and significant effect on the availability of skilled workers.
- Path 2 (Availability of Skilled Workers ➔ Human Resource Economic Growth): A coefficient of 0.55 ($p < 0.01$), indicating a positive and significant effect of skilled workers on human resource economic growth.
- Path 3 (Vocational Education ➔ Human Resource Economic Growth): A coefficient of 0.25 ($p < 0.05$), indicating that vocational education has a significant direct effect on human resource economic growth, although lower than the mediation effect.

Mediation Test Results

- Mediation Effect: Sobel test shows a z value of 2.45 ($p < 0.05$), which is significant, indicating that the availability of skilled labor mediates the relationship between vocational education and HR economic growth. Thus, most of the influence of vocational education on HR economic growth occurs through the availability of skilled labor.

Multiple Regression Analysis Results

- Regression Model:
  - Vocational Education and Availability of Skilled Labor together explain 60% of the variance in HR economic growth ($R^2 = 0.60$).
  - The regression coefficient shows that the availability of skilled labor ($\beta = 0.45$) has a stronger influence on HR economic growth than vocational education directly ($\beta = 0.20$), strengthening the finding that the mediation effect is more significant.

4.2 Interpretation of Results

- Vocational Education has a significant effect on the Availability of Skilled Workers with a coefficient of 0.65 and p-value 0.01, indicating that vocational graduates are better prepared to enter the job market.
- The Availability of Skilled Workers has a significant effect of Human Resource Economic Growth with a coefficient of 0.55 and p-value 0.01, meaning that vocational education is more effective in supporting economic growth if it focuses on improving practical skills that are relevant to industry needs.
- Vocational education has a significant direct influence on the economic growth of human resources with a coefficient of 0.25 and p-value 0.05
- Vocational Education has a significant indirect influence on the economic growth of human resources trough Availability of Skilled Workers with p-value 0.05
- Recommendation: There needs to be increased synergy between vocational education institutions and industry to ensure that the skills provided are in accordance with needs. The government is also expected to play an active role in developing vocational education programs that focus more on practical competencies to support productive human resources.

5. Conclusion

1. The Influence of Vocational Education on the Availability of Skilled Workers: The results of the study indicate that vocational education has a significant and positive influence on the availability of skilled workers in Indonesia. This indicates that vocational education has succeeded in providing graduates who are better prepared to enter the job market and meet industry needs in terms of specific skills.
2. The Impact of Skilled Labor Availability on HR Economic Growth: The availability of skilled labor contributes significantly to HR economic growth. With the increasing number of workers with relevant skills, there is an increase in productivity and efficiency in various industrial sectors which ultimately accelerates economic growth.
3. Vocational Education has a significant direct influence on the economic growth of human resources. The issuance of a number of regulations in an effort to build quality human resources, especially through vocational education.
4. Mediating Effect of Availability of Skilled Workforce: Availability of skilled labor acts as a significant mediator in the relationship between vocational education and human resource economic growth. The influence of vocational education on human resource economic growth occurs both directly and indirectly through an increase in the number of skilled labor.

6. Suggestion

1. Increased Collaboration with Industry: Vocational education institutions need to increase collaboration with various industry sectors to develop curricula that are in line with the skills needed by the job market. This partnership can take the form of internship programs, joint training, or industry involvement in curriculum development.
2. Government Investment in Vocational Education Facilities: The government needs to increase investment in vocational education facilities, especially in underdeveloped regions. This includes improving practical tools, technology, and access to competent instructors, so that the quality of vocational education can be evenly distributed throughout Indonesia.
3. Periodic Evaluation of Vocational Education Programs: To ensure that vocational education remains relevant, it is recommended that the government and educational institutions conduct periodic curriculum evaluations, based on industry trends and needs. This step will help graduates be more easily absorbed by the job market and contribute optimally to the national economy.
4. Encourage Graduate Participation in Further Training: Although vocational education provides a foundation in skills, it is recommended that graduates be given the opportunity to undertake further training or certification in specific, evolving fields, so that their skills can be updated and enhanced in line with changing technology and job demands.

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