Journal of Information Systems Engineering and Management
2025, 10(55s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Unraveling Challenges: Quality of Life, Investment, and Competitiveness in the Indonesia-Malaysia-Thailand Growth Triangle

Ahmad Tantowi[1], Bambang Supriadi[2]
[1]*Sekolah Tinggi Islam Kendal, Indonesia*
[2]*Universitas Merdeka Malang, Indonesia*

ARTICLE INFO

Received: 29 Dec 2024

Revised: 12 Feb 2025

Accepted: 27 Feb 2025

ABSTRACT

Introduction: Human resource development plays a crucial role in economic growth, particularly through investments in health and education, workforce participation, and overall quality of life. This study investigates the relationship between these factors and human resource performance in Thailand, Malaysia, and Indonesia, emphasizing how dynamic threshold effects influence economic outcomes.

Objectives: The study aims to analyze the impact of health and education investments, workforce participation, and quality of life on economic growth. Specifically, it explores how these factors interact and whether they exhibit threshold effects that shape human resource development.

Methods: Using secondary data from the World Bank spanning 1990–2022, the research employs Dynamic Threshold Autoregressive (DTAR) analysis. DTAR models integrate threshold elements with autoregressive models, allowing state transitions that provide a more flexible framework for examining the interplay between variables.

Results: The estimation results indicate that when a specific threshold (estimated at 3.221) is exceeded, quality of life—along with labor force participation, education investment, and health investment—significantly influences economic growth. Beyond this threshold, economic growth exhibits a self-reinforcing effect, where education investments enhance human resource caliber and health investments contribute to a healthier and more productive workforce.

Conclusions: Quality of life, encompassing education, health, and environmental factors, is pivotal in fostering human resource development. When quality of life surpasses a critical threshold, its positive effects amplify economic growth and workforce performance. Consequently, policies promoting education and health investments, alongside improvements in quality of life, can yield substantial benefits for human resource development and economic progress in Thailand, Malaysia, and Indonesia.

Keywords: Education Investment, Health Investment, Quality Of Life, Work Participation

INTRODUCTION

The governments of Indonesia, Malaysia, and Thailand established the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) in 1993 as a subregional cooperation effort (Permana et al., 2020). The goal of this collaboration is to hasten the merger of the states and provinces within the three nations, as well as the economic and social reform. The welfare of the people living in this region has improved as a result of cooperation in the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) (Viphindrartin & Bawono, 2023). Community welfare contributes to sustainable economic growth. IMT-GT cooperation also has a positive impact on the welfare of people in Indonesia,

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Journal of Information Systems Engineering and Management
2025, 10(55s)
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https://www.jisem-journal.com/ **Research Article**

Malaysia, and Thailand. Investments in Quality of life, including education, health, and the environment, can increase work participation and productivity and create an environment conducive to economic growth (Haas, 2022).

One major goal is the development of human resources (HR). Within the collaboration of the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), the three countries are trying to increase access to education and training for their citizens. Student exchange programs, scholarships, and cross-border training help strengthen HR competencies and skills. IMT-GT encourages collaboration in research and development (Hatane et al., 2023). Universities, research institutions, and the private sector work together to produce innovations and technologies that benefit society. Through business meetings and industry forums, IMT-GT facilitates the exchange of experience and knowledge between industry players. This includes sectors such as tourism, agriculture, manufacturing, and technology. Training and support programs for entrepreneurs help increase economic independence and human resource creativity in the IMT-GT region. Cooperation in the health sector includes the exchange of medical knowledge and improving health infrastructure and social welfare programs. All forms of collaboration aim to strengthen human resources in the three countries and encourage economic growth and social welfare (Munir et al., 2021).

Widarni and Bawono's (2023) research has highlighted the relationship between education and economic growth. Individuals with more years of education tend to have better skills and higher productivity, which contributes to the economic sector's growth. Indrawati and Kuncoro (2021) explained that in Indonesia, student participation at the middle and high levels increased along with high economic growth. Good education encourages innovation and technological development.

Countries with high Average Years of Schooling are more likely to create an environment that supports research and development. Countries that prioritize education with high Expected Years of Schooling will allocate more resources to human development. This includes training, scholarships, and educational infrastructure. Individuals with high expected lengths of schooling tend to have better social well-being, which impacts productivity and participation in economic activities (Forestier & Kim, 2020).

Education investment and health have an impact on increasing economic growth (Raghupathi & Raghupathi, 2020). Although both are important, research by Widarni and Bawono (2021) shows that Health investment has a greater influence on economic growth in Indonesia. The level of work participation also influences economic growth. Higher life expectancy can contribute to economic growth due to a healthy population and productivity.

The Indonesian government has made efforts to improve the quality of education to create superior human resources. Investment in education will help create a generation that is able to compete at the global level (Ningsih et al., 2022). Health is also an important part of human resource investment. By improving access and quality of health services, Indonesia can improve the welfare and productivity of its people (Erlyn et al., 2022).

Malaysia has allocated a large budget for education and health. This investment helps improve the quality of human resources and strengthen the competitiveness of Malaysia (Asadullah & Mansor, 2021). Thailand has a strong education system and focuses on developing skills and knowledge. Investments in education help create a skilled and competitive workforce. Overall, investment in education and health is key to developing quality human capital in these three countries. By strengthening human capital, countries can achieve sustainable economic growth and reduce social inequality (Puriwat & Tripopsakul, 2020).

Human Resources (HR) development is a challenge for Indonesia. Despite large investments in education and health, the results have been lower than expected (Triatmanto et al., 2023). Malaysia has great potential in human resources, including many entrepreneurs who create new businesses online and are active in the creative industries. However, there are concerns that Malaysia still needs to maximize its human capital. Universal access to high-quality early childhood care and education is one of the priority areas for increasing human resource productivity in Malaysia (Asadullah & Mansor, 2021). Thailand is a kingdom in Southeast Asia that has a rich and diverse culture. The majority of the population are members of the Thai/Lao ethnic group. Thai society has strong social commitment and fosters close relationships within the family (Draper et al., 2022). Thailand has challenges such as economic instability and increasing fraud and corruption (Nikomborirak, 2020). This research aims to investigate the dynamics of the reciprocal relationship of human resource development through Education investment and

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e-ISSN: 2468-4376
https://www.jisem-journal.com/ **Research Article**

Health investment, Quality of life, work participation, and human resource performance as indicated by economic growth in Indonesia, Malaysia and Thailand.

The economic progress of a nation is significantly influenced by its quality of life. Socioeconomic stability and labor productivity can both benefit from longer life expectancies (Gryshova et al., 2020). A high standard of living may boost a nation's competitiveness and aid in its economic expansion. However, challenges such as capital efficiency and innovation still need to be overcome to achieve sustainable growth (Prasetyo & Kistanti, 2020).

Investment in education has a significant impact on the Quality of life and the future of a country (Bahrain, Syah Aji, Yussof, & Mohd Saukani, 2020). The Indonesian government has allocated funds through the Education Fund Management Institute program for the development of education in Indonesia. Even though there are many scholarship models, Indonesia still needs to work on achieving its higher education participation targets. The quality of higher education in Indonesia needs to be improved so that it can compete with other countries (Gunawan & Siahaan, 2021).

Malaysia has a high adult literacy rate (94%) and occupies third place in ASEAN on the list of the best education in the world (Rusydiyah et al., 2023). Even though Malaysia's economic growth is lower than Indonesia's, this country has succeeded in relying its economy on domestic demand and has a good investment rating (Fernandez & Joseph, 2020). Thailand has a better quality of higher education than Indonesia. Thai universities are ranked higher than Indonesian universities. Even though Thailand's economic growth is lower than Indonesia's, this country has a stable investment rating and focuses on domestic demand (Fry et al., 2023). By increasing education investment, Indonesia, Malaysia, and Thailand can improve the quality of life of their people and prepare a better future generation (Indrawati & Kuncoro, 2021).

Investments in health have a significant impact on Quality of life and economic growth in Indonesia, Malaysia, and Thailand. Focusing investment on detection, reporting, and compliance with international standards can improve the quality of life and productivity of society. Indonesia is facing a demographic bonus, which, if exploited through massive investment in public health, could increase productivity and GDP growth (Widarni & Wilantari, 2021).

Investments in the health sector have the potential to create a conducive environment for investors. Malaysia allocates more funds for health than Indonesia. Investments in the health system and compliance with international standards contribute to a better Quality of life (Lim et al., 2023).

Thailand's continued population growth promises huge opportunities in the health sector. Health investment is not only about the physical aspect but also has a positive impact on productivity and overall quality of life. Public awareness of investing in health will open up opportunities for economic growth and prosperity in the ASEAN community (Susilo, 2022).

Quality of Work Life is a management approach that aims to improve the quality of employee work-life on an ongoing basis. The focus is on work environment conditions and how they affect performance. The main goal is to create an adequate work environment that meets individual needs so as to increase productivity and job satisfaction (Verbeek et al., 2020). A good quality of work life can increase employee motivation and satisfaction. When employees feel comfortable and appreciated, they are more likely to participate actively in work and make maximum contributions. A positive and supportive work environment can increase productivity (Bhende et al., 2020).

Employees who feel happy and satisfied with their work will work more efficiently and effectively. Good quality of work life also affects relationships between employees. Good communication, collaboration, and team support can increase participation in the team and the organization as a whole (Ali & Anwar, 2021; Sulisnaningrum & Braun, 2021). Poor quality of work life can lead to stress and imbalance. On the other hand, a healthy and safe work environment will support employees' mental and physical well-being so they are more motivated to participate. Organizations need to pay attention to the quality of work life in order to increase work participation and achieve company goals more effectively (Aruldoss et al., 2021).

Human Resource Development (HR) is a company or organization activity that aims to improve HR capabilities and skills within a certain period. This involves training, increasing knowledge, and developing positive attitudes of employees (Al-Kassem, 2021). At a macro level, the quality of human resources needs to be improved in order to achieve national development goals (Triatmanto & Bawono, 2023). At a micro level, the quality of human resources

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is important for optimal results in education planning, training, and workforce management. With effective HR development, companies can maximize performance and business performance and meet company needs as a whole (Chaşovschi et al., 2021).

H1. There is a dynamic relationship of reciprocal human resource development through Education investment and Health investment, Quality of life, work participation, and human resource performance, which is indicated by economic growth in Indonesia, Malaysia, and Thailand

H2. Quality of life has a role in strengthening reciprocal relationships in human resource development through Education investment and Health investment, Quality of life, work participation, and human resource performance, which is indicated by economic growth in Indonesia, Malaysia, and Thailand

OBJECTIVES

The study aims to analyze the impact of health and education investments, workforce participation, and quality of life on economic growth. Specifically, it explores how these factors interact and whether they exhibit threshold effects that shape human resource development.

METHODS

This research aims to investigate the dynamics of human resource development through Education investment and Health investment, Quality of life, work participation, and human resource performance as indicated by economic growth in Indonesia, Malaysia, and Thailand using secondary data from world banks with an observation period from 1990 to 2022. Table 1 presents a description of the variables

Table 1. Descriptive Variables

Variables	Description	Unit Analysis	Source
Labor force participation	Percentage of people actively working or looking for work in the labor force. This data is measured in percentages and can be found at the World Bank.	Percent	www.worldbank.org
Education investment	Percentage of investment allocated to the education sector. This data is also measured in percentages and can be found at the World Bank	Percent	www.worldbank.org
Health investment	Percentage of investment given to the health sector. As before, this data is measured in percentages and can be found at the World Bank.	Percent	www.worldbank.org
Quality of life	The life expectancy indicator measures the quality of life in this study. Life expectancy describes the average age a person is expected to reach at birth. The higher the life expectancy, the better the quality of life of a population	Percent	www.worldbank.org
Economic growth	The percentage of economic growth of a country or region. This data is also measured in percentages and can be found at the World Bank.	Percent	www.worldbank.org

This research uses dynamic threshold autoregressive analysis. The Dynamic Threshold Autoregressive (DTAR) model is a dynamic regression model that combines threshold elements with an autoregression model. This model takes into account changes in the state of the system and allows transitions between states in a more flexible manner than ordinary autoregressive models. In the Dynamic Threshold Autoregressive (DTAR) Model there are two components of the equation. The first equation is the Autoregressive equation, which is expressed as follows:

$$Y_t = \phi_{j,0} + \phi_{j,1} Y_{t-1} + \phi_{j,2} Y_{t-2} + \cdots + \phi_{j,p} Y_{t-p} + \epsilon_t$$

Where Yt is the variable observed at the time (t), $.\phi$ is the kth autoregression coefficient in the jth regime. P is the sequence of autoregressive sections. The second equation is the threshold equation, which is stated as follows:

$$S_t = j \text{jika} r_{j-1} \leq z_t < r_j$$

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Journal of Information Systems Engineering and Management
2025, 10(55s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

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In the second equation, the observed threshold zt determines the regime at time t (St value). Where the parameter r $_j$ is an unobserved threshold.

Pesaran's cross-dependence test is an important analytical tool in econometric research, especially when using dynamic threshold data models. This test is used to identify whether there is a dependence between units across time in panel data. This study used several approaches to test this cross-dependence, including the Friedman test, the statistics proposed by Frees, and the cross-dependence (CD) test developed by Pesaran. The results of this test can provide significant evidence of the existence of cross-dependence in innovation output between countries or regions. The mathematical equation for the cross-dependency test is expressed in the following equation:

$$CD = \frac{1}{N(N-1)} \sum_{i=1}^{N} \sum_{j=1, j \neq i}^{N} \left(\frac{\hat{\rho}_{ij}}{\sqrt{\hat{\rho}_{ii} \hat{\rho}_{jj}}} \right)$$

N is the number of cross units in the panel data.

$\hat{\rho}_{ij}$ is the correlation coefficient between units (i) and (j).

$\hat{\rho}_{ii}$ And $\hat{\rho}_{jj}$ are the correlation coefficients between units (i) and (i) and units (j) and (j), respectively

This research uses the Dumitrescu-Hurlin Causality Test to test the cause-and-effect relationship (Granger causality) in panel data. This method is an extension of the Granger test for panel data and was developed by Dumitrescu and Hurlin in 2012.

RESULTS

We conducted Pesaran's cross-dependence test to determine whether the panel data shows interdependence between units across time. The test results are displayed in Table 2.

Table 2. Pesaran's Cross Dependence Test

Variables	CD test	p-value
Labor force participation	9 . 23	0,000
Education investment	9 . 14	0,000
Health investment	9 . 53	0,000
Quality of life	1 1 . 01	0,000
Economic growth	9 .0 2	0,000

The CD test statistic for the labor force participation variable is 9.23, with a p-value of 0.000. A low p-value indicates strong evidence against the null hypothesis that there is no cross-sectoral dependency. In other words, there is likely to be cross-sectoral dependency in labor force participation across panel units. The CD test statistic for educational investment is 9.14, with a p-value of 0.000. This shows that there is significant cross-sectoral dependence on education investment. The health investment CD test statistic is 9.53, and the p-value remains 0.000. Once again, there is strong evidence of cross-sectoral dependencies in health investments. The highest quality of life CD test statistic among the variables was 11.01, with a p-value of 0.000. Quality of life also shows significant cross-sectoral dependencies. Economic growth has a CD test statistic of 9.02 and a p-value of 0.000. This variable also shows evidence of cross-sectoral dependency. The Unit Root Test results are displayed in Table 3.

Table 3. Unit Root Test

Variables	CIPS test	Hadri and Rao's test
Labor force participation	-1. 52 *	0.098 ***
Education investment	-1. 11 **	0. 09 1***
Health investment	-1. 0 1 *	0.1 15 ***
Quality of life	1. 03 **	0.097 ***
Economic growth	1. 22 **	0.1 02 **

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2025, 10(55s)
e-ISSN: 2468-4376
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The variables Labor force participation, Education investment, Health investment, Quality of life, and economic growth have t-statistic values greater than 0.05. Therefore, the data can be concluded to be stationary. Table 4 displays the Dumitrescu-Hurlin Causality Test findings.

Table 4. Dumitrescu-Hurlin Causality Test

Hypothesis	W-stat	Zbar-stat	Conclusion
Quality of life, →Economic growth	1. 21	1. 41	Quality of life, ←→Economic growth
Economic growth, →Quality of life	1. 42	1. 31	
Economic growth →Education investment	1. 31	1. 29	Economic growth, ←→Education investment
Education investment →Economic growth	1. 13	1. 27	
Economic growth →Labor force participation	1. 24	1. 16	Economic growth, ←→Labor force participation
Labor force participation, →Economic growth	1. 09	1. 28	
Economic growth, →Health investment	1. 18	1. 32	Economic growth, ←→Health investment
Health investment, →Economic growth	1.07	1. 29	
Labor force participation, →Education investment	1. 11	1. 17	Labor force participation, ←→Education investment
Education investment →Labor force participation	1. 27	1. 22	
Quality of life →Labor force participation	1. 15	1. 32	Quality of life, ←→Labor force participation
Labor force participation →Quality of life	1. 26	1. 49	

There is a reciprocal relationship between quality of life and economic growth. This means that improving the quality of life can influence economic growth and vice versa. There is a reciprocal relationship between economic growth and educational investment. Economic growth can influence educational investment and vice versa. A reciprocal relationship also occurs between economic growth and labor force participation. Economic growth can influence labor force participation and vice versa. Increased investment in health is also reciprocally related to economic growth. Both influence each other. Labor force participation and educational investment have a reciprocal relationship. Labor force participation can influence educational investment and vice versa. Quality of life is also reciprocally related to labor force participation. Both have a mutual influence. The estimation results of the dynamic threshold data model are presented in Table 5.

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2025, 10(55s)
e-ISSN: 2468-4376
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Table 5. Dynamic Threshold Data Model Estimation

Dependent Variable	Economic growth
Variable Thresholds	Quality of life
Threshold Estimate	3 . 221 ***
Labor force participation	2 .0 11 **
Education investment	2 . 441 ***
Health investment	2 . 114 ***
Quality of life	2 . 155 ***
Economic growth	2 . 339 ***
Constant	1 . 552 ***
Wald test	1 11367.22 ***
Sargan teat	5 4 . 35
AR(1)	1. 112 ***
AR(2)	0.771
SupWald Statistics	1 1 . 33 ***

The Threshold Variable is Quality of Life. The threshold estimate for quality of life is 3.221 (significant at the 1% level). This means that the effects of other variables on economic growth change when quality of life exceeds this threshold.

At the 5% significance level, the calculated coefficient for labor force participation is 2.011. There is a 2,011-unit rise in economic growth for every unit increase in labor force participation.

At the 1% significance level, the predicted coefficient for educational investment is 2.441. There is a 2,441-unit rise in economic growth for every unit increase in education spending.

At the 1% significance level, the predicted coefficient for health investment is 2.114. There is a 2,114-unit boost in economic growth for every unit increase in health investment.

At the 1% significance level, the predicted coefficient for quality of life over the threshold is 2.155. Over the threshold, an increase in economic growth of 2,155 units is correlated with a one-unit rise in quality of life.

At the 1% significance level, the calculated coefficient for economic growth above the threshold is 2.339. When economic growth exceeds the threshold, a rise of one unit is linked to a self-reinforcing impact of 2,339 units in economic growth.

The constant represents the intercept when all other variables are zero. The constant value is 1.552 (significant at the 1% level).

The Wald test tests the overall significance of the model. Its statistic is 111367.22 (significant at the 1% level). The Sargan test tests the validity of overidentification restrictions in the model. Its statistic is 54.35.

AR(1) and AR(2) describe the temporal dependency in model error. The estimated coefficients for the first-order (AR(1)) and second-order (AR(2)) autoregressive terms are 1.112 and 0.771, respectively. The SupWald statistic tests the joint significance of threshold variables. The SupWald statistic is 11.33 (significant at the 1% level).

DISCUSSION

A good quality of life has a positive impact on economic growth. Countries with high life expectancy and access to adequate health services tend to have better productivity. Investments in public health can reduce the burden of health costs and increase workforce productivity.

Investment in education contributes to the development of quality human resources (HR). Countries that allocate sufficient resources to primary and secondary education tend to have better economic growth. Education provides the knowledge, skills, and productive capacity necessary for innovation and economic development.

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e-ISSN: 2468-4376
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Human resource development involves investment in education, health, and training. Countries that prioritize human resource development have a competitive advantage in the global market. Human resource development also contributes to increasing productivity, innovation, and economic competitiveness. Overall, the interrelationship between quality of life, education investment, health, and human resource development plays an important role in economic growth in Indonesia, Malaysia, and Thailand. The results of this research strengthen the findings of Viphindrartin Bawono (2023)

Health and education spending have a big influence on economic expansion. Nations that invest in healthcare and education typically have more productive labor forces, which fosters innovation and economic growth. While investments in health care lower health-related expenses and increase life expectancy, education enhances the quality of human resources (HR). The findings of Widarni Bawono (2021) and Triatmanto, Bawono, Wahyuni (2023) are reinforced by the results of this study.

Economic growth also influences educational investment and labor force participation. As the economy grows, governments and the private sector tend to allocate more funds to education. Additionally, economic growth creates new job opportunities, encourages labor force participation, and increases demand for relevant skills.

Quality of life plays an important role in encouraging the development of strong, superior, and competitive human resources. A good environment, access to health services, and high life expectancy influence the quality of human resources. Countries that prioritize quality of life tend to have a workforce that is healthier, more educated, and ready to compete in the global marketplace. Overall, the reciprocal relationship between investment in education, health, economic growth, and quality of life plays a crucial role in human resource development in Indonesia, Malaysia, and Thailand. These countries must continue to invest in human capital to achieve sustainable and inclusive growth.

Countries that actively allocate resources to education tend to have a more skilled and productive workforce. Investments in education, such as improving school infrastructure, improving the quality of teaching, and providing wider access to higher education, can help create competent human resources ready to contribute to economic development. Apart from that, investment in the health sector also has a positive impact on labor productivity. Countries that pay attention to the health and well-being of their populations, such as expanding access to basic health services, promoting healthy lifestyles, and reducing the burden of disease, will have a healthier and better-performing workforce. Healthy employees tend to be absent less, are more focused, and are more productive in their work.

When the quality of life exceeds a certain threshold (estimated at 3.221), other variables such as labor force participation, education investment, and health investment have a significant influence on economic growth. Above this threshold, economic growth also has a self-reinforcing effect. Educational investment contributes to improving the quality of human resources. In other words, when quality of life reaches a certain threshold, factors such as labor force participation and investment in education and health become more relevant in influencing economic growth. Apart from that, economic growth itself has a positive impact, which further strengthens conditions above this threshold. Investment in education also plays an important role in improving the quality of human resources, which in turn contributes to sustainable economic growth.

The quality of education influences an individual's ability to contribute to society and the economy. Countries with good education systems tend to have more skilled and productive human resources. Investments in education, including equitable access and relevant curricula, can improve the quality of life and the potential for human resource development.

Good health allows a person to participate actively in daily activities. Countries with strong health systems and equitable access to health services have healthier and more productive populations. Disease prevention efforts, access to medical care, and awareness of the importance of a healthy lifestyle all contribute to a better quality of life.

A clean, sustainable, and safe environment influences human well-being. Air, water, and soil pollution can damage health and hinder development. Countries that invest in environmental protection and sustainability create conditions that support sustainable human capital growth.

Policies that support investment in the education and health sectors have a positive impact on human resource development. By improving access to education and health services, countries can ensure that their citizens have

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the knowledge and skills necessary to contribute to economic growth. This investment also helps reduce social disparities and improve people's quality of life.

Better quality of life includes aspects such as physical, mental, and social well-being. Countries can improve the quality of life of their populations by improving health infrastructure, reducing poverty, and providing better access to basic services. A better quality of life also impacts the productivity and overall performance of human resources.

Investments in education and health, as well as improving the quality of life, contribute to economic growth. Educated and healthy human resources tend to be more productive, innovative, and able to adapt to change. Sustainable economic growth requires policy support that strengthens human resources and improves their performance.

CONCLUSIONS

There is a reciprocal relationship between quality of life, education investment, and health with economic growth and human resource (HR) development in Indonesia, Malaysia, and Thailand. Improving the quality of life has an impact on economic growth and vice versa. Education and health investments influence economic growth, and economic growth also influences education investments and labor force participation. Quality of life plays a role in encouraging the development of strong, superior, and competitive human resources. Thus, investment in education and health is the key to achieving comprehensive social transformation and improving human resource performance. In the context of human resource development in Indonesia, Malaysia, and Thailand, investment in education and health plays a crucial role. The estimation results from the dynamic threshold data model show that when the quality of life exceeds a certain threshold (estimated at 3.221), other variables such as labor force participation, education investment, and health investment have a significant influence on economic growth. Above this threshold, economic growth also has a self-reinforcing effect. Educational investment contributes to improving the quality of human resources. Countries that allocate resources to education tend to have a more skilled and productive workforce. Likewise, with health investments, A country that pays attention to the health welfare of its population will have a healthier and better-performing workforce. Quality of life, which includes aspects of education, health, and the environment, is an important factor in encouraging human resource development. When quality of life exceeds a certain threshold, the positive effects can strengthen economic growth and overall human resource performance. Policies that support investment in education and health, as well as improving the quality of life, will have a positive impact on human resource development and human resource performance as reflected by economic growth in these three countries.

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Journal of Information Systems Engineering and Management
2025, 10(55s)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

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