

THE RELATIONSHIP BETWEEN SOCIAL ASPECTS AND PRODUCTIVITY TOWARDS SUSTAINABLE ECONOMIC DEVELOPMENT IN INDONESIA

Nurul Sahara

Akademi Komunitas Teknologi Syarifuddin

Abstract

The interplay among life sustainability indicators, education, health, and enduring economic development exhibits mutually reinforcing dynamics. The present study quantifies these interdependencies within the Indonesian context, utilising the vector error correction model (VECM) framework over a two-decade span from 1999 to 2022. The evidence generated underscores the significance of contemporaneous and lagged interrelationships. Economic expansion, oriented towards sustainability, consequently catalyses enhancements in the educational system, thereby elevating productive capacity. Concomitantly, the increment in national income expands the fiscal space required to guarantee comprehensive and equitable healthcare access, resulting in a healthier labour force. As the populace engages with augmented educational and health inputs, life expectancy and per capita productivity both experience upward movement. Taken together, these mechanisms substantiate a policy agenda that prioritises improved, equitable access to educational and healthcare services as a cornerstone of durable economic development.

Keyword : Life Sustainability, Education, Health, Productivity, Sustainable Economic Development.

Introduction

In discussions of human capital, the construct of life sustainability denotes the capacity of a child to survive and flourish, ultimately reaching full health and capacity prior to adulthood (Bhutta et al., 2023). This dimension has become a core indicator in the Human Capital Index, a benchmark that the World Bank employs to gauge the effectiveness of a nation's human resource health (Gerhart & Feng, 2021). Life sustainability draws upon a multifaceted set of determinants that jointly shape the health status and overall well-being of the early years of life. Foremost among these determinants is the availability and quality of health services, which include vaccination, antenatal health, and effective management of infectious morbidity. Equally important is the quality of nourishment, comprising both a regular intake of diverse and balanced foods and the availability of uncontaminated drinking water. This nutritional content is decisive, both in fueling physical growth and in supporting cognitive development (Black, Trude, & Lutter, 2020). Finally, the presence of a non-threatening, environmentally sound physical space, free of violence and toxic exposure, fundamentally undergirds any effort to ensure that children consistently traverse the trajectory toward sustained developmental health. Evidence confirms that these interrelated health, dietary, and contextual factors are in turn noticeably conditioned by broader socio-economic structures (Likhar, Baghel, & Pathil, 2022). On a macro-scale, life sustainability encapsulates a nation's capacity to furnish environments wherein children can flourish (Clark et al., 2020). Nations characterized by resilient health delivery networks, cohesive nutritional frameworks, and secure living conditions consistently report elevated life sustainability indices. Accordingly, resource allocation toward pediatric health, nutritional stability, and protective infrastructure emerges as

more than an act of humanitarian impulse; it constitutes a foundational pillar of economic and social advancement (Perrin et al., 2020).

Access to comprehensive health services serves as a decisive determinant of life sustainability among children. It encompasses such indispensable dimensions as immunization, antenatal and postnatal counseling, and the provision of potable water together with integrated sanitation (Rebouças et al., 2022). Immunization campaigns effectively curb vaccine-preventable infections, most pressingly measles, polio, and diphtheria, that pose severe mortality risks to the pediatric population (Cinicola et al., 2021). Complementarily, antenatal and postnatal services guarantee adequate maternal and infant monitoring during the gestational and early post-partum periods, thereby averting life-threatening complications and engendering longer-lived health trajectories for children (McCauley et al., 2022). Furthermore, reliable access to potable water and hygienic sanitation facilities substantially mitigates diarrheal morbidity, habitually the foremost cause of pediatric mortality in various low- and middle-income settings, thereby fortifying overall life sustainability. Nations possessing resilient health-care systems and robust infrastructure exhibit elevated rates of child life sustainability, owing to their capacity to deliver timely and effective health services (Jaca et al., 2022). Such systems not only facilitate the prevention and management of life-threatening paediatric conditions but also guarantee that fundamental requirements, including potable water and adequate sanitation, are satisfied (Ellwanger et al., 2021). Consequently, targeted investments in core health services comprising vaccination programmes, prenatal and postnatal services, and the development of water and sanitation infrastructure are indispensable for advancing child survival and longevity (Abubakar et al., 2022). When states achieve these objectives, they not only enhance the current health and welfare of their youth but also establish a durable platform for sustained well-being and economic productivity in forthcoming generations (Pulimeno et al., 2020). The data hence affirm that the vitality of a nation's children constitutes a cornerstone of broader socio-economic advancement (Kruk et al., 2022).

Sufficient nutritional intake emerges as a non-negotiable determinant of childhood survivorship (Mkhize & Sibanda, 2020). Only through optimized nutrition throughout the developmental window can the likelihood of surviving to adulthood free of chronic sequelae be maximized (Wickramasinghe et al., 2020). Diets rich in high-quality protein, bioavailable vitamins, and trace minerals promote vigorous immunological, somatic, and neurocognitive maturation. Conversely, deficits and imbalances precipitate insidious yet irreversible pathologies in the earliest years of life. Among these, stunting represents the severest and most enduring manifestation, signalled by a height-for-age z-score falling below the WHO reference median (Thurstan et al., 2022). Attenuated stature is rarely a purely aesthetic issue; the repercussions of stunting extend far into adulthood, compromising somatic resilience, lifelong educational attainment, and the social productivity of afflicted individuals (Suryawan et al., 2022). Stunted height correlates with a hyperresponsive inflammatory state, chronic illness susceptibility, and subpar scholastic performance, thereby perpetuating cycles of poverty and underdevelopment.

Furthermore, inadequate nutrient intake can precipitate additional health complications, including anemia, specific vitamin shortages, and various metabolic anomalies (Kiani et al., 2022). Consequently, the prompt provision of sufficient dietary intake during childhood emerges as a decisive factor in enhancing both life expectancy and the overall well-being of this age group. Structured nutritional interventions, involving the

distribution of fortified foods, the provision of vitamin and mineral supplements, and targeted dietary education for caregivers, remain essential for both the prevention and the repair of malnutritional states (Charles Shapu et al., 2020). Equally, comprehensive public policies that guarantee sustained access to high-quality, affordable foods and healthcare services substantially extend the protective environment necessary for the optimal physical and cognitive trajectories of every child (Hargreaves et al., 2022). Allocation of public and private financial resources to child-focused nutritional programs not only improves personal health outcomes but also creates a productive, socially cohesive adult population that contributes to the sustained economic growth of the nation (Norris et al., 2022).

An environment that minimizes risk is pivotal for the sustainable development of children's lives (Goldhaegen et al., 2020). When children are insulated from violence, pollution, and other hazards, they have substantially improved prospects for both physical and psychological maturation (Vergunst & Berry, 2022). Such a protective environment spans a broad spectrum, incorporating both physical safeguards, such as mitigated exposure to violence and accidents and ecological integrity, defined by unpolluted air and uncontaminated water (Miah, Chand, & Malhi, 2023). The resultant advantages include improved general health, reduced stress levels, and a heightened capacity to realize latent potential. Formulating and implementing policies that fortify environmental safety is therefore essential to enhancing the survivability and flourishing of future generations. Comprehensive regulatory frameworks targeting pollutants can significantly curtail the atmospheric and hydrological contaminants closely linked to childhood morbidity (Manisalidis et al., 2020). Concurrently, protective interventions, such as violence deterrence initiatives and the establishment of secure recreational spaces, materially fortify psychosocial and physical growth environments (Amisi & Naicker, 2021). Community-wide instructional efforts that cultivate awareness of the health benefits procured by a resilient and secure environment likewise represent a complementary and indispensable advance in assuring favorable developmental trajectories. Investing in the systematic establishment of safe environments generates measurable returns in the health and psychosocial welfare of children and, by extension, the wider community (Jourdan et al., 2021). Consequently, the design and implementation of safe environments should be enshrined as a core objective in all public policy and developmental initiatives (Tamers et al., 2020).

Maternal educational attainment is a pivotal determinant of children's life-years and life-sustainability indicators (Ngandu et al., 2020). Well-informed mothers are better equipped to discern the link between adequate healthcare and nutrition, to recognize and to surmount barriers to service access, and, in turn, to maximize health-promoting behaviours throughout their offspring's early life. Such behaviours encompass adherence to immunization schedules, consistent prenatal and postnatal supervision, and parenting practices that ensure optimal macronutrient and micronutrient provisioning (Ayouni et al., 2023). Moreover, mothers with a sustained educational trajectory demonstrate an increased capacity to discern subtle clinical manifestations of illness and to expedite the child to appropriate healthcare, thereby averting the trajectory of preventable morbidity and fortifying life-sustainability odds (Carter et al., 2020). The external effects of maternal schooling upon intra-household nutrition, resource allocation, and illness prevention cumulatively elevate the long-term living standards of the entire family unit. Maternal education is consistently associated with improved management of household resources, particularly in food and financial domains, thereby

ensuring that children obtain sufficient, nutritious foods and dwell in hygienic, supportive environments (Reshi et al., 2022).

Beyond resource management, education cultivates a mother's capacity to make informed decisions affecting her offspring's health and to navigate complex health and educational institutions with greater efficacy. Allocating public and private resources to women's educational attainment substantively enhances child health, sustains life trajectories of successive cohorts, and fortifies the economic as well as the social architecture of states (Finlay, 2021). Piecemeal effects of education accumulate to broader economic dividends, as educated women demonstrate higher labour force attachment and earnings capacity, with resulting incremental family income and empirical compression of poverty incidence (Hydee, Greene, & Darmstadt, 2020). Sustained exposure to education produces further generational effects, namely the progressive intergenerational transmission of educational attainment, yielding an enduring, self-reproductive spiral of human capability and economic advancement. Consequently, the policy priority must coalesce around guaranteeing equitable, enduring, and high-quality educational pathways for females, without which aspirations for child well-being and life sustainability remain unattainable (Kancherla, Roos, & Walani, 2022). Structured programmes that pair targeted scholarships, income-smoothing financial assistance, and the construction of safe, gender-sensitive, and pedagogically supportive school environments supply strategic vectors for fulfilment (Salmi & D'Addio, 2021). Far from being merely remedial, such investments furnish a platform for healthier populations, greater social justice, and a concomitant trajectory of sustainable prosperity (Smith & Sinkford, 2022).

Life sustainability in the context of human capital results from a combination of various interconnected factors (Shela, Ramayah, & Noor Hazlina, 2023). Improving life sustainability must include a holistic approach that enhances access to healthcare services, adequate nutrition, a safe environment, and quality education (Owolabi et al., 2023). Thus, the state can ensure that their children grow into healthy and productive individuals, who in turn will contribute to sustainable economic development (Chiriaco et al., 2022). In this context, access to quality healthcare services is crucial for preventing and treating diseases and ensuring that every individual has the opportunity to live a healthy life (Wenger et al., 2022). Adequate nutrition is crucial, as good nutrition supports optimal physical and mental development. In addition, a safe environment, including access to clean water and good sanitation, is crucial for preventing diseases and supporting overall health (Matta et al., 2022). Quality education also plays an essential role in improving life sustainability rates. Education provides the knowledge and skills necessary for work and raises awareness about the importance of health and nutrition (Auld et al., 2020). A good education enables individuals to make better decisions about their health and their families. Therefore, a holistic approach that encompasses all these aspects is essential to ensure that every individual has the opportunity to live a healthy and productive life. The improvements in life sustainability rates allow countries to ensure a healthy and productive population, ultimately contributing to sustainable economic development (Jaiswal et al., 2022). This shows that investing in human capital is an investment in a better future for everyone (Maharani & Saputra, 2021).

The relationship between life sustainability, education, health, and productivity is very close in human resource development. Life sustainability is the foundational basis that allows individuals to grow and develop (Ruggerio, 2021). Children who survive to

adulthood can access better education and healthcare services, enhancing their quality of life and economic productivity (Moscibrodzki et al., 2021). A good quality of life from an early age provides a strong foundation for a child's physical and mental development. Healthy children tend to be better able to absorb lessons in school, opening up opportunities for higher education and better skills (Hahn & Barnett, 2023). A good education provides academic knowledge and essential life skills, such as problem-solving, critical thinking, and communication abilities (Razak et al., 2022). All of this contributes to the increase in individual productivity in the future. In addition, good health is a prerequisite for optimal productivity (Alagawany et al., 2021). A healthy individual has the energy and vitality to work efficiently and effectively. They also tend to have lower absenteeism rates and the ability to contribute more in the workplace. Good healthcare services, including access to medical care, immunizations, and preventive health programs, are essential to ensure that individuals remain healthy and productive (Rodrigues & Plotkin, 2020). High productivity, in turn, contributes to sustainable economic growth. A productive individual can produce more, which means higher income and a better quality of life (Lutz et al., 2021). This also creates a domino effect, where individual productivity contributes to national productivity, ultimately enhancing the well-being of the entire society (Grimshaw, 2020).

Investment in one aspect will positively impact others, creating a strong synergy for sustainable and inclusive economic development (Dantas et al., 2021). Countries that successfully integrate these four elements into their policies and programs will significantly improve their communities' quality of life and productivity (Baraković et al., 2020). Life sustainability, education, health, and productivity are interconnected and mutually supportive in the development of human resources (Anlesinya & Susomrith, 2020). However, this result contradicts the notion that education does not yield tangible health benefits (Xue, Cheng, & Zhang, 2021). This research will explore the relationship between life sustainability, education, health, and productivity. Based on the background above, this research aims to provide a comprehensive insight into the interconnection between life sustainability, education, health, and productivity that influences human resource development and contributes to economic and social development in Indonesia.

Literature Review

The relationship between life sustainability, education, health, and productivity is very close and mutually influential in the development of human resources (Hitka et al., 2021). Life sustainability is the foundational basis that allows individuals to grow and develop. (Gatto, 2020). Children who survive to adulthood can access better education and healthcare services, enhancing their quality of life and economic productivity. Education provides the knowledge and skills necessary to participate in the job market, while good health ensures that individuals can work effectively and efficiently (Kim & Park, 2020). Investment in education and health enhances life sustainability and drives economic growth and social development (Luyckx et al., 2021). The high productivity of healthy and educated individuals contributes to the increase in income and overall well-being of society. Therefore, efforts to enhance life sustainability, education, and health must be carried out in an integrated manner to achieve sustainable and inclusive human development (Haikos & Gkampoura, 2021).

Life sustainability is often measured by life expectancy, which reflects the quality of life and the well-being of society (Betley et al., 2023). In Indonesia, life expectancy has

significantly increased in recent decades, reflecting improvements in healthcare services, access to education, and overall living conditions. The increase in life expectancy indicates that more people can live longer and healthier lives, enhancing workforce productivity (Luy et al., 2020). Improvements in healthcare services, such as increased access to medical facilities, better immunization programs, and public health campaigns, have significantly contributed to life expectancy (Freeman et al., 2020). In addition, the increasing awareness of the importance of a healthy lifestyle, including a balanced diet and regular exercise, also plays a crucial role in improving public health (Jia et al., 2022). In addition to healthcare services, other factors such as education and economic conditions also increase life expectancy. Better education enables individuals to understand and apply good health practices, while better economic conditions allow for broader access to quality healthcare services (Nutbeam & Muscat, 2021). Thus, the increase in life expectancy reflects improvements in the health sector and progress in various aspects of people's lives. The increase in life expectancy also has a positive impact on labor productivity (Domnich, 2022). Individuals who live longer and healthier tend to be more productive, as they have the energy and capacity to work more effectively. This ultimately contributes to sustainable economic growth and social development. Therefore, efforts to increase life expectancy must continue to be promoted as part of a comprehensive and inclusive national development strategy (Foster & Walker, 2021). Based on previous research, we developed hypothesis 1 as follows:

Hypothesis 1 : The life sustainability rate positively impacts sustainable economic development.

Education plays a crucial role in improving health and productivity (Tang et al., 2022). Educated individuals tend to understand better good health practices, such as the importance of balanced nutrition, hygiene, and regular exercise. This knowledge enables them to make better decisions regarding a healthy lifestyle, reducing the risk of disease and enhancing overall well-being (Kris-Etherton et al., 2021). In addition, education opens up better job opportunities, which can increase income and access to better healthcare services (Bell et al., 2020). Higher-income gives individuals access to higher-quality medical care, the ability to purchase nutritious food, and the opportunity to live in healthier environments. This creates a positive cycle where good health supports higher productivity and higher productivity allows for better access to education and healthcare services (Black et al., 2021). Education not only enhances the quality of individual lives but also contributes to overall economic productivity. An educated and healthy society tends to be more innovative and efficient, ultimately driving economic growth and sustainable social development. Therefore, investing in education is an important strategic step towards achieving long-term welfare and prosperity (Occhipinti et al., 2022). Overall, life sustainability, education, health, and productivity are interconnected and mutually supportive in human resource development. Investment in one aspect will positively impact the others, creating a strong synergy for sustainable and inclusive economic development. Countries that successfully integrate these four elements into their policies and programs will significantly improve their communities' quality of life and productivity. The relationship between these four factors is crucial to understand to enhance community welfare and promote sustainable economic growth (Boar et al., 2022). Therefore,

governments and other stakeholders must continue investing in education and health to improve community welfare and workforce productivity (Perry et al., 2021).

Ethics teaches individuals to act with integrity and honesty, while responsibility teaches them to participate actively in their community and environment (Begum et al., 2022). In Indonesia, improving access to and quality education has become an important strategy to ensure that future generations are prepared to face challenges and seize opportunities (Sudarmo et al., 2021). Enhancing access to and quality education is a crucial strategy for Indonesia to ensure that future generations are ready to tackle challenges and take advantage of opportunities. Expanding access to education, especially in remote and underdeveloped areas, is essential to ensure that all children have equal opportunities to learn and grow (Rao et al., 2021). In addition, improving the quality of education through teacher training, relevant curricula, and adequate facilities will help create a conducive learning environment. Based on previous research, we developed Hypothesis 2 as follows:

Hypothesis 2: Education has a positive impact on sustainable economic development. Good health is a prerequisite for high productivity (Adesina et al., 2020). Healthy individuals can work efficiently and productively as they possess the energy and stamina to complete their tasks effectively. In addition, good health also reduces work absenteeism caused by illness, enhancing continuity and consistency in work (Ruhle et al., 2020). When employees are rarely absent, companies and organizations can achieve their targets and goals more effectively. This high productivity benefits the company and contributes to overall economic growth. Good health also reduces healthcare costs that individuals and society must bear (Rochmah et al., 2021). When individuals are healthy, they tend to require less medical care, which means that spending on healthcare costs can be reduced. This allows individuals to allocate their resources to other, more productive needs, such as education, investment, or skill development (Kim & Park, 2020). Good health not only enhances the quality of life for individuals but also positively impacts the economy of families and communities. In addition, good health also plays a role in enhancing mental and emotional well-being (Levine et al., 2021). Physically healthy individuals tend to have better mental health, essential for maintaining motivation and work spirit. Good mental health also helps individuals cope with stress and work pressure, allowing them to work more focused and effectively (Micklitz, Wong, & Howick, 2021). Therefore, investment in public health, such as disease prevention programs, promotion of healthy lifestyles, and improved access to healthcare services, is essential for creating a productive and competitive workforce. Sustainable strategies can enhance the quality and accessibility of healthcare services and ensure that the population maintains good health, ultimately contributing to sustainable productivity and economic growth (Ali, Anufriev, & Amfo, 2021). At the societal level, reducing healthcare costs means the government can allocate budgets to other sectors supporting economic growth, such as infrastructure, education, and research (Timilsina, Hochman, & Song, 2020). Therefore, investing in quality healthcare services is an investment in economic productivity. Quality healthcare services ensure that individuals receive timely and effective care, which helps them recover faster and return to productivity (Hick et al., 2020). Furthermore, good healthcare services also include prevention programs and health education, which assist communities in maintaining their health and preventing diseases. Health investment improves individual quality of life and contributes to long-term economic stability and

growth (Callegari & Feder, 2022). A healthy society is the foundation for a strong and sustainable economy, as the high productivity of healthy individuals drives innovation, efficiency, and shared prosperity. Poor health can diminish an individual's ability to work effectively and efficiently. When someone experiences health issues, whether physical or mental, their ability to contribute optimally to work and daily activities will decline (Oakman et al., 2020).

Good health enables workers to work longer and with higher productivity, ultimately contributing to economic growth (Isham, Mair, & Jackson, 2021). Healthy workers tend to have more incredible energy, lower absenteeism rates, and the ability to adapt to the demands of a dynamic job. In addition, good health also contributes to mental well-being, which is essential for maintaining motivation and work enthusiasm (der Kinderen & Khapova, 2020). Thus, public health investment improves individual quality of life and provides broad economic benefits. Improving public health will create a more productive and competitive workforce, ultimately driving sustainable economic growth in Indonesia (Basri & Hill, 2020). High productivity results from life sustainability, education, and good health. High productivity also means increased income and living standards, which can enhance access to better education and healthcare services, creating a positive cycle in human resource development (Tricarico, Kebreab, & Wattiaux, 2020). Based on previous research, we formulated hypothesis 3 as follows:

Hypothesis 3: Health has a positive impact on sustainable economic development.

Productivity is a measure of efficiency in producing goods and services. (Tambare et al., 2021). In Indonesia, labor productivity is one of the critical indicators used to assess economic performance. Various factors, including health, education, and wages, influence productivity (Bimpong et al., 2020). Good health enables workers to perform optimally without being hindered by health issues. Adequate education provides the skills and knowledge necessary to enhance work efficiency (Fajaryati et al., 2020). A fair wage also motivates workers to work harder and more efficiently. Improvements in health and education can significantly enhance workforce productivity. Healthy workers tend to have lower absenteeism rates and can work more consistently. Furthermore, healthy and educated workers can work efficiently and produce higher output (Pramana et al., 2021). This is very important in the era of globalization and increasingly fierce competition, where productivity is critical to maintaining competitiveness. On the other hand, a good education provides the foundation of knowledge and skills necessary to operate new technologies and more efficient work methods (Haleem et al., 2022). Therefore, investment in health and education benefits not only individuals but also the workforce's overall productivity. (Vargas-Martinez et al., 2021).

One way to enhance productivity is by focusing on sectors that have already demonstrated strong performance, such as real estate and information and communication (Jensen & van der Voordt, 2020). These sectors have shown higher productivity compared to the national average, which means there are best practices that other sectors can adopt. The right strategy to enhance labor productivity in Indonesia must include improvements in health, education, and wages (Salim et al., 2020). Therefore, there is a need for strategies to make appropriate investments in these three aspects to create a more productive and competitive workforce. In addition, the government and companies must collaborate to create a work environment that supports productivity. (Babapour Chafi et al., 2021). This includes providing adequate healthcare facilities, training and skill development programs, and fair wage policies. Additionally,

the government and other stakeholders need to continue investing in education and health to enhance the community's well-being and the workforce's productivity. (Afzal et al., 2021). Based on previous research, we formulated hypothesis 4 as follows:

Hypothesis 4: Productivity has a positive impact on sustainable economic development.

Research Method

This research attempts to understand the interconnection between life sustainability, education, health, and productivity and how they influence sustainable economic development. The data is sourced from the World Bank and the Central Statistics Agency of Indonesia, covering 1999 to 2022. We use the variables of life sustainability, education, and productivity measured by the unemployment rate and economic development measured through GDP growth. Furthermore, we analyze using the VECM model to measure and explain the influence of the research variables.

Table 1. Description of Research Variables

Variable	Description	Source	Unit Analysis
Life Expectancy	This variable explains that the life expectancy at birth represents the number of years a newborn would live if the mortality rates at the time of the infant's birth remained constant.	World Bank	Percent
Education	This variable explains that the education indicator displays the percentage of school-age children who are enrolled in the proper level of education for their age. APM is computed as a percentage by comparing the corresponding age group population with the number of students at a given educational level.	Central Statistics Agency of Indonesia	Percent
Health	This variable explains an indicator that shows the proportion of the population reporting health problems in the last month.	Central Statistics Agency of Indonesia	Percent
Unemployment Rate	This variable explains that the percentage of the labour force that is jobless but actively looking for work is known as the unemployment rate. Every country has a unique definition of the labour force and unemployment.	World Bank	Percent
GDP Growth	This variable explains that the GDP growth rate is expressed as	World Bank	Percent

	a yearly percentage at constant local currency pricing at the market. The aggregates are based on constant prices from 2015 and are given in U.S. dollars. The gross domestic product (GDP) is the sum of the gross value added by all producers who are citizens of the nation, plus any product taxes and less any unaccounted-for subsidies.		
--	---	--	--

$$\begin{aligned}
 LFE_t &= \beta_0 + \beta_1 EDU_t + \beta_2 HLT_t + \beta_3 UEM_t + \beta_4 GDP_t + e_t && \text{eq1 1} \\
 EDU_t &= \beta_0 + \beta_1 HLT_t + \beta_2 UEM_t + \beta_3 GDP_t + \beta_4 LFE_t + e_t && \text{eq1 2} \\
 HLT_t &= \beta_0 + \beta_1 UEM_t + \beta_2 GDP_t + \beta_3 LFE_t + \beta_4 EDU_t + e_t && \text{eq1 3} \\
 UEM_t &= \beta_0 + \beta_1 GDP_t + \beta_2 LFE_t + \beta_3 EDU_t + \beta_4 HLT_t + e_t && \text{eq1 4} \\
 GDP_t &= \beta_0 + \beta_1 LFE_t + \beta_2 EDU_t + \beta_3 HLT_t + \beta_4 UEM_t + e_t && \text{eq1 5}
 \end{aligned}$$

Description:

LFE = Life Expectancy

EDU = Education

HLT = Health

UEM = Unemployment Rate

GDP = GDP per capita

β = the magnitude of the effect of causality

E = Error term

The Vector Error Correction Model (VECM) is a research model that is part of VAR, which is a statistical analysis technique used to model the dynamic relationships between several time variables. Stationarity testing needs to be conducted because this test is essential to ensure that the data does not have trends or seasonal patterns that could affect the analysis results. Stationarity testing is conducted using the Augmented Dickey-Fuller test method. (ADF). Next, the optimal lag length is determined using information criteria such as the Akaike Information Criterion (AIC) or the Schwarz Bayesian Criterion. (SBC). After the optimal lag length is determined, the VAR model can be estimated by including the lags of the analyzed variables. Next, the VECM model can be implemented for further analysis. Next, the Granger causality test is used to see if one variable can be used to predict another variable. In addition, the Impulse Response Function (IRF) analysis provides an overview of how changes in one variable can affect other variables in the short and long term. Finally, Variance Decomposition (VD) analysis was conducted to understand the proportion of variability of each variable that can be explained by shocks to other variables. This analysis provides deeper insights into the dynamic relationships between the variables being analyzed.

Result and Discussion

Preliminary research data will be tested through a stationarity test using the Augmented Dickey-Fuller model. (ADF). This test aims to observe and ensure that the data does not have trends or seasonal patterns that could affect the analysis results later on. In addition, it also examines stationary data at the same level. The unit root stationarity test is explained in Table 2 below:

Table 2. Stationary test or unit root test

Variabel	Unit Root	Statistics for the Augmented Dickey Fuller	Probability	Description
Life Expectancy (LFE)	Level	-1.913651	0.3206	No Stationary
	First Different	-4.985247	0.0007	Stationary
Education (EDU)	Level	-0.370616	0.8989	No Stationary
	First Different	-3.147543	0.0375	Stationary
Health (HLT)	Level	-2.518336	0.1269	No Stationary
	First Different	-4.700366	0.0014	Stationary
Unemployment Rate (UEM)	Level	-3.287077	0.0312	Stationary
	First Different	-4.699319	0.0013	Stationary
GDP Growth (GDP)	Level	-4.303187	0.0029	Stationary
	First Different	-4.787630	0.0011	Stationary

The stationarity test through the unit root test with the ADF model is explained in Table 3 above. Based on the table, all variables have become stationary at the first difference level. Next, the determination of the optimal lag is shown in Table 3 below:

Table 3. Lag Optimum Test Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	399.8451	NA	1.34e+09	35.20392	35.45077	35.26600
1	318.4370	120.3424*	10545408*	30.29887*	31.77995*	30.67136*

The optimal lag in the research has been determined through the tests above. The results in Table 3 show that the chosen optimal lag is lag 1. The cointegration test was conducted to strengthen the assumptions of the model, as explained in Table 4 below:

Table 4. Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.950554	124.0357	69.81889	0.0000
At most 1 *	0.707766	57.88436	47.85613	0.0043
At most 2 *	0.488718	30.81995	29.79707	0.0380
At most 3 *	0.423398	16.06159	15.49471	0.0411
At most 4 *	0.164287	3.948335	3.841466	0.0469

The VECM model is used in the research, as evidenced by the indication of cointegration shown in the test results presented in Table 4 above. Therefore, the results of the VECM model testing are explained in Table 5 below:

Table 5. Results of the VECM Test

	LFE	EDU	HLT	UEM	GDP
LFE(-1)	1.020879	0.194675	0.203338	-14.69348	0.204435
	(0.03860)	(0.06931)	(0.08667)	(59.7143)	(0.08695)
	[26.4467]	[2.80888]	[2.34617]	[-0.24606]	[2.35119]
EDU(-1)	0.001758	0.942801	0.002093	5.032109	-0.093364
	(0.02431)	(0.04364)	(0.05457)	(37.6001)	(0.05475)
	[0.07232]	[21.6039]	[0.03836]	[0.13383]	[-1.70530]
HLT(-1)	-0.077138	-0.315735	0.485606	30.47172	-0.152193
	(0.07777)	(0.13962)	(0.17460)	(120.299)	(0.17517)
	[-0.99192]	[-2.26131]	[2.78126]	[0.25330]	[-0.86885]
UEM(-1)	5.40E-05	-0.000447	-0.000200	0.676728	-0.000299
	(0.00010)	(0.00018)	(0.00023)	(0.15534)	(0.00023)
	[0.53788]	[-2.48157]	[-0.88798]	[4.35646]	[-1.32033]
GDP(-1)	0.161776	0.008036	0.269630	-30.42222	0.036310
	(0.09858)	(0.17700)	(0.22133)	(152.498)	(0.22205)
	[1.64106]	[0.04540]	[1.21822]	[-0.19949]	[0.16352]

Life sustainability, education, and health levels collectively influence sustainable economic development. Based on the test results in Table 5, LFE positively influences EDU with a t-statistic value of [2.80888], which has a more significant impact than the coefficient value (0.06931). LFE also positively affects HLT with a coefficient value of (0.08667), smaller than the t-statistic value of [2.34617]. LFE positively influences GDP with a t-statistic value of [2.35119], which affects the coefficient value. (0.08695). Improvements in life sustainability rates align with advancements in education, health, and economic development. An increase in life sustainability rates will reflect better access to quality education and healthcare services. This, of course, has the potential to enhance individual productivity, which will, in turn, impact sustainable economic growth. This result supports hypothesis 1, that the life sustainability rate positively impacts sustainable economic development.

EDU positively influences LFE with a t-statistic value of [0.07232], which has a more significant impact than the coefficient value (0.02431). EDU also positively affects HLT with a t-statistic value of [0.03836], influencing the coefficient value. (0.05457). This result explains that improvements in education will enhance life sustainability rates and health. Individuals with maximum access to education will develop their potential, leading to increased productivity and directly improving life sustainability rates. Furthermore, educated individuals will strive for maximum access to health services, achieving productivity and positively impacting economic development. These results support hypotheses 2 and 3 that education and health positively impact sustainable economic development.

On the other hand, UEM negatively influences EDU with a t-statistic value of [-2.48157] that is greater than the coefficient value (0.00018). UEM also negatively influences HLT with a t-statistic value of [-0.88798] that affects the coefficient value (0.00023). Lastly, UEM exerts the same negative influence on GDP with a t-statistic value of [-1.32033], affecting the coefficient value. (0.00023). The unemployment rate hurts education, health, and economic development. As a representation of productivity,

the unemployment rate demonstrates that the decline in individual productivity, indicated by the rising unemployment rate, is influenced by low education levels. Furthermore, unproductive individuals are also affected by declining health levels. This makes significant sense because productivity will increase when accompanied by optimal education and easy access to healthcare. Furthermore, the decline in productivity, as indicated by the rising unemployment rate, will negatively impact economic growth. This result supports hypothesis 4, which states that productivity positively impacts sustainable economic development.

Lastly, GDP has a positive influence on three variables. The positive influence of GDP on LFE is indicated by a t-statistic value of [1.64106], which affects the coefficient value (0.09858). GDP also positively impacts EDU with a t-statistic of [0.04540], influencing the coefficient value (0.17700). There is also a positive influence from GDP on HLT, with a t-statistic of [1.21822], significantly affecting the coefficient value (0.22133). On the other hand, GDP negatively influences UEM, with a t-statistic of [-0.19949], affecting the coefficient value. (152.498). This result proves that sustainable economic growth will strive for better educational facilities, thereby increasing societal productivity. Economic growth also provides easy access to healthcare services for the entire community so that their quality of life will improve with healthy individuals and optimal education. Furthermore, this will positively impact individual productivity, leading to a decrease in the unemployment rate. This serves as the basis for stakeholders' considerations regarding policies to improve access to education and health to realise a productive society, subsequently enhancing sustainable economic growth.

Table 6. Granger Causality Test

Null Hypothesis :	Obs	F-statistic	Prob
EDU does not Granger Cause LFE	23	0.72538	0.4045
LFE does not Granger Cause EDU		2.16440	0.1568
HLT does not Granger Cause LFE	23	0.09000	0.7673
LFE does not Granger Cause HLT		0.23344	0.6342
UEM does not Granger Cause LFE	23	0.35137	0.5600
LFE does not Granger Cause UEM		0.07220	0.7909
GDP does not Granger Cause LFE	23	3.87979	0.0629
LFE does not Granger Cause GDP		2.40193	0.1369
HLT does not Granger Cause EDU	23	0.79848	0.3822
EDU does not Granger Cause HLT		0.30995	0.5839
UEM does not Granger Cause EDU	23	3.59425	0.0725
EDU does not Granger Cause UEM		0.04288	0.8380
GDP does not Granger Cause EDU	23	0.64474	0.4314
EDU does not Granger Cause GDP		1.59313	0.2214
UEM does not Granger Cause HLT	23	3.15890	0.0907
HLT does not Granger Cause UEM		0.03208	0.8596
GDP does not Granger Cause HLT	23	3.00645	0.0983
HLT does not Granger Cause GDP		1.01057	0.3268
GDP does not Granger Cause UEM	23	0.08300	0.7762
UEM does not Granger Cause GDP		0.06865	0.7960

Based on the Granger causality test shown in Table 6 above, all variables do not have causal relationships. This is indicated by the probability values of all variables being

above 0.05. To further explore how each variable responds in each period, please analyze the impulse response graph shown in Fig1 below:

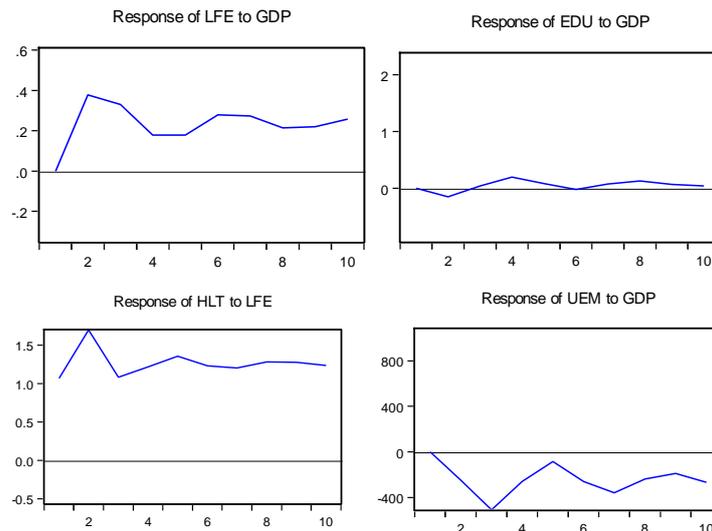


Fig 1. Highlight of Impulse Response Function

The graph above explains the relationships between each variable, LFE, EDU, HLT, UEM, and GDP change after a shock occurs in one of the variables. The response of LFE to GDP shows a positive response with an increase in the second period. However, there is a decline in the fourth and fifth periods. After that, fluctuations occurred until the tenth period. The response of EDU to GDP appeared more stable, with a decline in the second period followed by an increase until the fourth period, remaining stable until the tenth. The response of HLT to LFE showed a positive response with an increase in the second period. However, there was a decline in the third period, followed by another increase in the subsequent period, then stabilizing until the tenth. The response of UEM to GDP indicated a negative response, with a sharp decline until the third period. The fourth to fifth periods saw an increase but declined again in the subsequent period and remained stable until the tenth period.

Table 7. Variance Decomposition

Period	S.E.	LFE	EDU	HLT	UEM	GDP
1	1.982151	51.14945	0.199743	2.866925	25.02682	20.75707
2	2.193860	43.04402	1.800904	7.681797	27.21247	20.26081
3	2.289012	40.23156	5.603289	7.979308	27.23492	18.95092
4	2.517556	38.03245	8.102625	7.179091	28.50140	18.18444
5	2.753004	36.62460	9.764230	6.870516	28.81404	17.92662
6	2.905728	35.45269	11.40688	6.694581	29.08306	17.36280
7	3.049624	34.32251	12.91998	6.445988	29.51982	16.79170
8	3.215903	33.42957	14.04564	6.218357	29.83242	16.47401
9	3.374071	32.84905	14.90812	6.050196	29.94685	16.24579
10	3.510272	32.31114	15.71005	5.908337	30.10433	15.96615

Table 7 above explains the contribution of each variable in explaining their respective variability through the Variance Decomposition test. The life sustainability rate through the LFE variable explains that it plays the most significant role in explaining its variability, with a percentage of 100% in the first period and a decline after that until the tenth period, with a percentage of 57.85%. UEM contributes 12.5% in the second period and decreases to 5.88% in the tenth period. Furthermore, GDP shows a stable

percentage of 14.57% in the second period and 14.24% in the tenth period. The results of the tests show that the life sustainability rate is the most critical factor in explaining its variability over ten years. However, other variables also contribute to the influence. Interestingly, the contribution of LFE in explaining GDP is quite significant. In the first period, the percentage was 51.14% and decreased to 32.31% by the tenth period. Additionally, the contribution of the UEM variable in explaining GDP was 25.02% and increased to 30.10% in the tenth period. This result explains that the life sustainability rate and productivity through the unemployment rate have a high contribution and are essential factors in explaining the variability of economic development.

Conclusion

Life sustainability, education, life wellbeing, productivity, and economics development and sustainability are interconnected. Based on research findings, the life sustainability rate has a positive correlation with the rate of sustainable economic development. This validates hypothesis 1. Education has a positive correlation with sustainable economic development. This validates hypothesis 2. Health has a positive correlation with sustainable economic development. This validates hypothesis 3. In addition, productivity as productivity can be measured through the reduction in the unemployment rate, has a positive correlation with sustainable economic development. This validates hypothesis 4. Improved access to quality education and health services boosts individual productivity which in turn, improves economic growth and increases life sustainability rate. In the opposite, individual who acquire maximum education will be stocked with higher potential and engage with much productivity which directly improves life sustainability rates. Moreover, such individuals will be productive enough to seek optimal level of health services which in turn, positively impact economic development. Such arguments form the justification for stakeholders to focus on improving the policies concerning the education and health system. To realize such policies, productive economic and development efforts can be made to facilitate the sustainable economic development endeavors in Indonesia.

Limitation and Originalitas

This research was conducted from 1999 to 2022 to uncover the interconnections between life sustainability, education, health, productivity, and sustainable economic development. Although the analysis uses a long-term time frame, the results of this study do not fully explain the dynamic changes occurring outside the measured period. In addition, this research focuses on the interactions of variables occurring in Indonesia, thus limiting generalization to a broader population scope. The research method also limits the influence between variables, so other methods are believed to yield more comprehensive results. This research fills the gap in the existing literature regarding the analysis of the effects of life sustainability, education, health, productivity, and sustainable economic development. The findings of this research are expected to be used by policymakers as foundational information to consider policies that support the results of this study. Thus, this research provides new insights into the relationship between these variables and offers a strong foundation for better decision-making in the pursuit of sustainable economic development.

Suggestion and Policy Contribution

This research is expected to contribute academically by providing insights into the relationship between life sustainability, education, health, productivity, and sustainable economic development. This research has limitations, including that it is analyzed over a long time; however, the results must fully explain the dynamic changes outside the measured period. In addition, this research focuses on the interaction of variables in Indonesia, thus limiting the generalization of the results to a broader population. The research method also limits the understanding of the influence between variables, so using other methods is believed to yield more comprehensive results. Therefore, future research could expand the study's timeframe to allow for more complex analytical exploration and provide the desired insights. In addition, it is essential to expand the observed subjects so that the results can be generalized. Lastly, the use of more diverse research methods and the development of dynamic models so that research results are more comprehensive. Thus, this research provides new insights into the relationship between these variables and offers a strong foundation for better decision-making in the pursuit of sustainable economic development.

References

- Abubakar, I., Dalglish, S. L., Angell, B., Sanuade, O., Abimbola, S., Adamu, A. L., ... & Zanna, F. H. (2022). The Lancet Nigeria Commission: investing in health and the future of the nation. *The Lancet*, 399(10330), 1155-1200.
- Adanma, U. M., & Ogunbiyi, E. O. (2024). The public health benefits of implementing environmental policies: A comprehensive review of recent studies. *International Journal of Applied Research in Social Sciences*, 6(5), 978-1004.
- Adesina, I., Bhowmik, A., Sharma, H., & Shahbazi, A. (2020). A review on the current state of knowledge of growing conditions, agronomic soil health practices and utilities of hemp in the United States. *Agriculture*, 10(4), 129.
- Afzal, M. M., Pariyo, G. W., Lassi, Z. S., & Perry, H. B. (2021). Community health workers at the dawn of a new era: 2. Planning, coordination, and partnerships. *Health Research Policy and Systems*, 19, 1-17.
- Alagawany, M., Elnesr, S. S., Farag, M. R., Tiwari, R., Yatoo, M. I., Karthik, K., ... & Dhama, K. (2021). Nutritional significance of amino acids, vitamins and minerals as nutraceuticals in poultry production and health—a comprehensive review. *Veterinary Quarterly*, 41(1), 1-29.
- Ali, E. B., Anufriev, V. P., & Amfo, B. (2021). Green economy implementation in Ghana as a road map for a sustainable development drive: A review. *Scientific African*, 12, e00756.
- Amisi, M. M., & Naicker, S. N. (2021). Preventing violence against women and children: An evidence review. *ISS Southern Africa Report*, 2021(46), 1-44.
- Anlesinya, A., & Susomrith, P. (2020). Sustainable human resource management: a systematic review of a developing field. *Journal of Global Responsibility*, 11(3), 295-324.
- Auld, M. E., Allen, M. P., Hampton, C., Montes, J. H., Sherry, C., Mickalide, A. D., ... & Parson, K. (2020). Health literacy and health education in schools: collaboration for action. *NAM perspectives*, 2020.
- Ayouni, I., Amponsah-Dacosta, E., Noll, S., Kagina, B. M., & Muloiwa, R. (2023). Interventions to Improve Knowledge, Attitudes, and Uptake of Recommended

- Vaccines during Pregnancy and Postpartum: A Scoping Review. *Vaccines*, 11(12), 1733.
- Babapour Chafi, M., Hultberg, A., & Bozic Yams, N. (2021). Post-pandemic office work: Perceived challenges and opportunities for a sustainable work environment. *Sustainability*, 14(1), 294.
- Baraković, S., Baraković Husić, J., Van Hoof, J., Krejcar, O., Maresova, P., Akhtar, Z., & Melero, F. J. (2020). Quality of life framework for personalised ageing: a systematic review of ICT solutions. *International journal of environmental research and public health*, 17(8), 2940.
- Basri, C., & Hill, H. (2020). Making economic policy in a democratic Indonesia: The first two decades. *Asian Economic Policy Review*, 15(2), 214-234.
- Bawono, S. (2021). Human capital, technology, and economic growth: A case study of Indonesia. *Journal of Asian Finance, Economics and Business*.
- Begum, A., Liu, J., Qayum, H., & Mamdouh, A. (2022). Environmental and moral education for effective environmentalism: An ideological and philosophical approach. *International Journal of Environmental Research and Public Health*, 19(23), 15549.
- Bell, O. N., Hole, M. K., Johnson, K., Marcil, L. E., Solomon, B. S., & Schickedanz, A. (2020). Medical-financial partnerships: cross-sector collaborations between medical and financial services to improve health. *Academic pediatrics*, 20(2), 166-174.
- Betley, E. C., Sigouin, A., Pascua, P. A., Cheng, S. H., MacDonald, K. I., Arengo, F., ... & Sterling, E. J. (2023). Assessing human well-being constructs with environmental and equity aspects: A review of the landscape. *People and Nature*, 5(6), 1756-1773.
- Bhutta, Z. A., Bhavnani, S., Betancourt, T. S., Tomlinson, M., & Patel, V. (2023). Adverse childhood experiences and lifelong health. *Nature Medicine*, 29(7), 1639-1648.
- Bimpong, K. A. A., Khan, A., Slight, R., Tolley, C. L., & Slight, S. P. (2020). Relationship between labour force satisfaction, wages and retention within the UK National Health Service: a systematic review of the literature. *BMJ open*, 10(7), e034919.
- Black, M. M., Behrman, J. R., Daelmans, B., Prado, E. L., Richter, L., Tomlinson, M., ... & Yoshikawa, H. (2021). The principles of Nurturing Care promote human capital and mitigate adversities from preconception through adolescence. *BMJ Global Health*, 6(4), e004436.
- Black, M. M., Trude, A. C., & Lutter, C. K. (2020). All children thrive: integration of nutrition and early childhood development. *Annual Review of Nutrition*, 40(1), 375-406.
- Boar, A., Bastida, R., & Marimon, F. (2020). A systematic literature review. Relationships between the sharing economy, sustainability and sustainable development goals. *Sustainability*, 12(17), 6744.
- Callegari, B., & Feder, C. (2022). A literature review of pandemics and development: The long-term perspective. *Economics of Disasters and Climate Change*, 6(1), 183-212.
- Carter, B., Roland, D., Bray, L., Harris, J., Pandey, P., Fox, J., ... & Neill, S. (2020). A systematic review of the organizational, environmental, professional and child and family factors influencing the timing of admission to hospital for children with

- serious infectious illness. *PloS one*, 15(7), e0236013. Charles Shapu, R., Ismail, S., Ahmad, N., Lim, P. Y., & Abubakar Njodi, I. (2020). Systematic review: effect of health education intervention on improving knowledge, attitudes and practices of adolescents on malnutrition. *Nutrients*, 12(8), 2426.
- Chiriaco, M. V., Bellotta, M., Jusić, J., & Perugini, L. (2022). Palm oil's contribution to the United Nations sustainable development goals: outcomes of a review of socio-economic aspects. *Environmental Research Letters*, 17(6), 063007.
- Cinicola, B., Conti, M. G., Terrin, G., Sgrulletti, M., Elfeky, R., Carsetti, R., ... & Duse, M. (2021). The protective role of maternal immunization in early life. *Frontiers in Pediatrics*, 9, 638871.
- Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., ... & Costello, A. (2020). A future for the world's children? A WHO–UNICEF–Lancet Commission. *The Lancet*, 395(10224), 605-658.
- Dantas, T. E. T., de-Souza, E. D., Destro, I. R., Hammes, G., Rodriguez, C. M. T., & Soares, S. R. (2021). How the combination of Circular Economy and Industry 4.0 can contribute towards achieving the Sustainable Development Goals. *Sustainable production and consumption*, 26, 213-227.
- der Kinderen, S., & Khapova, S. N. (2020). Positive psychological well-being at work: The role of eudaimonia. *The Palgrave handbook of workplace well-being*, 1-28.
- Díez, F., Villa, A., López, A. L., & Iraurgi, I. (2020). Impact of quality management systems in the performance of educational centers: educational policies and management processes. *Heliyon*, 6(4).
- Domnich, E. (2022). The impact of product and process innovations on Productivity: A review of empirical studies. *Foresight and STI Governance*, 16(3), 68-82.
- El Keshky, M. E. S., Basyouni, S. S., & Al Sabban, A. M. (2020). Getting through COVID-19: The pandemic's impact on the psychology of sustainability, quality of life, and the global economy—A systematic review. *Frontiers in Psychology*, 11, 585897.
- Espinosa, V. I., Alonso Neira, M. A., & Soto, J. H. D. (2021). Principles of sustainable economic growth and development: A call to action in a post-COVID-19 world. *Sustainability*, 13(23), 13126.
- Fajaryati, N., Budiyo, Akhyar, M., & Wiranto. (2020). The employability skills needed to face the demands of work in the future: Systematic literature reviews. *Open Engineering*, 10(1), 595-603.
- Finlay, J. E. (2021). Women's reproductive health and economic activity: A narrative review. *World Development*, 139, 105313.
- Foster, L., & Walker, A. (2021). Active ageing across the life course: towards a comprehensive approach to prevention. *BioMed Research International*, 2021(1), 6650414.
- Freeman, T., Gesesew, H. A., Bamba, C., Giugliani, E. R. J., Popay, J., Sanders, D., ... & Baum, F. (2020). Why do some countries do better or worse in life expectancy relative to income? An analysis of Brazil, Ethiopia, and the United States of America. *International journal for equity in health*, 19, 1-19.
- Gatto, A. (2020). A pluralistic approach to economic and business sustainability: A critical meta-synthesis of foundations, metrics, and evidence of human and local development. *Corporate Social Responsibility and Environmental Management*, 27(4), 1525-1539.

- Gerhart, B., & Feng, J. (2021). The resource-based view of the firm, human resources, and human capital: Progress and prospects. *Journal of management*, 47(7), 1796-1819.
- Giurge, L. M., Whillans, A. V., & West, C. (2020). Why time poverty matters for individuals, organisations and nations. *Nature Human Behaviour*, 4(10), 993-1003.
- Goldhagen, J. L., Shenoda, S., Oberg, C., Mercer, R., Kadir, A., Raman, S., ... & Spencer, N. J. (2020). Rights, justice, and equity: a global agenda for child health and wellbeing. *The Lancet Child & Adolescent Health*, 4(1), 80-90.
- Grimshaw, D. (2020). International organisations and the future of work: How new technologies and inequality shaped the narratives in 2019. *Journal of Industrial Relations*, 62(3), 477-507.
- Hahn, R. A., & Barnett, W. S. (2023). Early childhood education: Health, equity, and economics. *Annual review of public health*, 44(1), 75-92.
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable operations and computers*, 3, 275-285.
- Halkos, G., & Gkampoura, E. C. (2021). Where do we stand on the 17 Sustainable Development Goals? An overview on progress. *Economic Analysis and Policy*, 70, 94-122.
- Hargreaves, D., Mates, E., Menon, P., Alderman, H., Devakumar, D., Fawzi, W., ... & Patton, G. C. (2022). Strategies and interventions for healthy adolescent growth, nutrition, and development. *The Lancet*, 399(10320), 198-210.
- Hensher, M., Tisdell, J., Canny, B., & Zimitat, C. (2020). Health care and the future of economic growth: exploring alternative perspectives. *Health economics, policy and law*, 15(4), 419-439.
- Hick, J. L., Hanfling, D., Wynia, M. K., & Pavia, A. T. (2020). Duty to plan: health care, crisis standards of care, and novel coronavirus SARS-CoV-2. *Nam Perspectives*, 2020.
- Hitka, M., Štarchoň, P., Lorincová, S., & Caha, Z. (2021). Education as a key in career building. *Journal of Business Economics and Management*, 22(4), 1065-1083.
- Hyde, E., Greene, M. E., & Darmstadt, G. L. (2020). Time poverty: Obstacle to women's human rights, health and sustainable development. *Journal of global health*, 10(2).
- Isham, A., Mair, S., & Jackson, T. (2021). Worker wellbeing and productivity in advanced economies: Re-examining the link. *Ecological Economics*, 184, 106989.
- Jaca, A., Malinga, T., Iwu-Jaja, C. J., Nnaji, C. A., Okeibunor, J. C., Kamuya, D., & Wiysonge, C. S. (2022). Strengthening the health system as a strategy to achieving a universal health coverage in underprivileged communities in Africa: a scoping review. *International journal of environmental research and public health*, 19(1), 587.
- Jaiswal, K. K., Chowdhury, C. R., Yadav, D., Verma, R., Dutta, S., Jaiswal, K. S., & Karuppasamy, K. S. K. (2022). Renewable and sustainable clean energy development and impact on social, economic, and environmental health. *Energy Nexus*, 7, 100118.
- Javaid, M., Haleem, A., Singh, R. P., Suman, R., & Gonzalez, E. S. (2022). Understanding the adoption of Industry 4.0 technologies in improving environmental sustainability. *Sustainable Operations and Computers*, 3, 203-217.

- Jensen, P. A., & van der Voordt, T. (2020). Productivity as a value parameter for FM and CREM. *Facilities*, 39(5/6), 305-320.
- Jia, T., Liu, Y., Fan, Y., Wang, L., & Jiang, E. (2022). Association of healthy diet and physical activity with breast cancer: lifestyle interventions and oncology education. *Frontiers in public health*, 10, 797794.
- Jourdan, D., Gray, N. J., Barry, M. M., Caffè, S., Cornu, C., Diagne, F., ... & Sawyer, S. M. (2021). Supporting every school to become a foundation for healthy lives. *The lancet child & adolescent health*, 5(4), 295-303.
- Kancherla, V., Roos, N., & Walani, S. R. (2022). Relationship between achieving Sustainable Development Goals and promoting optimal care and prevention of birth defects globally. *Birth Defects Research*, 114(14), 773-784.
- Kiani, A. K., Dhuli, K., Donato, K., Aquilanti, B., Velluti, V., Matera, G., ... & Bertelli, M. (2022). Main nutritional deficiencies. *Journal of preventive medicine and hygiene*, 63(2 Suppl 3), E93.
- Kim, J., & Park, C. Y. (2020). Education, skill training, and lifelong learning in the era of technological revolution: A review. *Asian-Pacific Economic Literature*, 34(2), 3-19.
- Kohl, K., Hopkins, C., Barth, M., Michelsen, G., Dlouhá, J., Razak, D. A., ... & Toman, I. (2022). A whole-institution approach towards sustainability: a crucial aspect of higher education's individual and collective engagement with the SDGs and beyond. *International Journal of Sustainability in Higher Education*, 23(2), 218-236.
- Kris-Etherton, P. M., Petersen, K. S., Després, J. P., Anderson, C. A., Deedwania, P., Furie, K. L., ... & Ma, J. (2021). Strategies for promotion of a healthy lifestyle in clinical settings: pillars of ideal cardiovascular health: a science advisory from the American Heart Association. *Circulation*, 144(24), e495-e514.
- Kruk, M. E., Lewis, T. P., Arsenault, C., Bhutta, Z. A., Irimu, G., Jeong, J., ... & Yousafzai, A. K. (2022). Improving health and social systems for all children in LMICs: structural innovations to deliver high-quality services. *The Lancet*, 399(10337), 1830-1844.
- Lavy, S. (2020). A review of character strengths interventions in twenty-first-century schools: Their importance and how they can be fostered. *Applied Research in Quality of Life*, 15(2), 573-596.
- Levine, G. N., Cohen, B. E., Commodore-Mensah, Y., Fleury, J., Huffman, J. C., Khalid, U., ... & American Heart Association Council on Clinical Cardiology; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular and Stroke Nursing; and Council on Lifestyle and Cardiometabolic Health. (2021). Psychological health, well-being, and the mind-heart-body connection: a scientific statement from the American Heart Association. *Circulation*, 143(10), e763-e783.
- Likhar, A., Baghel, P., & Patil, M. (2022). Early childhood development and social determinants. *Cureus*, 14(9).
- Lutz, W., Striessnig, E., Dimitrova, A., Ghislandi, S., Lijadi, A., Reiter, C., ... & Yildiz, D. (2021). Years of good life is a well-being indicator designed to serve research on sustainability. *Proceedings of the National Academy of Sciences*, 118(12), e1907351118.
- Luy, M., Di Giulio, P., Di Lego, V., Lazarevič, P., & Sauerberg, M. (2020). Life expectancy: frequently used, but hardly understood. *Gerontology*, 66(1), 95-104.

- Luyckx, V. A., Al-Aly, Z., Bello, A. K., Bellorin-Font, E., Carlini, R. G., Fabian, J., ... & Stanifer, J. (2021). Sustainable development goals relevant to kidney health: an update on progress. *Nature Reviews Nephrology*, 17(1), 15-32.
- Maharani, A., & Saputra, F. (2021). Relationship of investment motivation, investment knowledge and minimum capital to investment interest. *Journal of Law, Politic and Humanities*, 2(1), 23-32.
- Manisalidis, I., Stavropoulou, E., Stavropoulos, A., & Bezirtzoglou, E. (2020). Environmental and health impacts of air pollution: a review. *Frontiers in public health*, 8, 14.
- Matta, G., Kumar, P., Uniyal, D. P., & Joshi, D. U. (2022). Communicating water, sanitation, and hygiene under sustainable development goals 3, 4, and 6 as the panacea for epidemics and pandemics referencing the succession of COVID-19 surges. *Acs Es&t Water*, 2(5), 667-689.
- McCauley, H., Lowe, K., Furtado, N., Mangiaterra, V., & van den Broek, N. (2022). Essential components of postnatal care—a systematic literature review and development of signal functions to guide monitoring and evaluation. *BMC Pregnancy and Childbirth*, 22(1), 448.
- Miah, M. H., Chand, D. S., & Malhi, G. S. (2023). Selected river pollution in Bangladesh based on industrial growth and economic perspective: a review. *Environmental Monitoring and Assessment*, 195(1), 98.
- Micklitz, K., Wong, G., & Howick, J. (2021). Mindfulness-based programmes to reduce stress and enhance well-being at work: a realist review. *BMJ open*, 11(3), e043525.
- Mishra, N., Grima, S., & Ozen, E. (2024). Unpacking the black box: Investigating the role of social protection programmes in promoting decent work and economic growth in low-income countries. *Sustainable Development*.
- Mkhize, M., & Sibanda, M. (2020). A review of selected studies on the factors associated with the nutrition status of children under the age of five years in South Africa. *International Journal of Environmental Research and Public Health*, 17(21), 7973.
- Moscibrodzki, P., Enane, L. A., Hoddinott, G., Brooks, M. B., Byron, V., Furin, J., ... & Chiang, S. S. (2021). The impact of tuberculosis on the well-being of adolescents and young adults. *Pathogens*, 10(12), 1591.
- Mouratidis, K. (2021). Urban planning and quality of life: A review of pathways linking the built environment to subjective well-being. *Cities*, 115, 103229.
- Ngandu, C. B., Momberg, D., Magan, A., Chola, L., Norris, S. A., & Said-Mohamed, R. (2020). The association between household socio-economic status, maternal socio-demographic characteristics and adverse birth and infant growth outcomes in sub-Saharan Africa: a systematic review. *Journal of developmental origins of health and disease*, 11(4), 317-334.
- Norris, S. A., Frongillo, E. A., Black, M. M., Dong, Y., Fall, C., Lampl, M., ... & Patton, G. C. (2022). Nutrition in adolescent growth and development. *The lancet*, 399(10320), 172-184.
- Nutbeam, D., & Lloyd, J. E. (2021). Understanding and responding to health literacy as a social determinant of health. *Annu Rev Public Health*, 42(1), 159-73.
- Nutbeam, D., & Muscat, D. M. (2021). Health promotion glossary 2021. *Health promotion international*, 36(6), 1578-1598.

- Oakman, J., Kinsman, N., Stuckey, R., Graham, M., & Weale, V. (2020). A rapid review of mental and physical health effects of working at home: how do we optimise health?. *BMC public health*, 20, 1-13.
- Occhipinti, J. A., Buchanan, J., Skinner, A., Song, Y. J. C., Tran, K., Rosenberg, S., ... & Hickie, I. B. (2022). Measuring, modeling, and forecasting the mental wealth of nations. *Frontiers in Public Health*, 10, 879183.
- Owolabi, M. O., Leonardi, M., Bassetti, C., Jaarsma, J., Hawrot, T., Makanjuola, A. I., ... & Servadei, F. (2023). Global synergistic actions to improve brain health for human development. *Nature Reviews Neurology*, 19(6), 371-383.
- Perrin, J. M., Duncan, G., Diaz, A., & Kelleher, K. (2020). Principles And Policies To Strengthen Child And Adolescent Health And Well-Being: Study describes National Academies of Sciences, Engineering, and Medicine reports on poverty, mental, emotional, and behavioral health, adolescence, and young family health and education. *Health Affairs*, 39(10), 1677-1683.
- Perry, H. B., Chowdhury, M., Were, M., LeBan, K., Crigler, L., Lewin, S., ... & Hodgins, S. (2021). Community health workers at the dawn of a new era: 11. CHWs leading the way to “Health for All”. *Health Research Policy and Systems*, 19, 1-21.
- Pramana, C., Chamidah, D., Suyatno, S., Renadi, F., & Syaharuddin, S. (2021). Strategies to Improved Education Quality in Indonesia: A Review. *Turkish Online Journal of Qualitative Inquiry*, 12(3).
- Pulimeno, M., Piscitelli, P., Colazzo, S., Colao, A., & Miani, A. (2020). School as ideal setting to promote health and wellbeing among young people. *Health promotion perspectives*, 10(4), 316.
- Ramírez-Montoya, M. S., Castillo-Martínez, I. M., Sanabria-Z, J., & Miranda, J. (2022). Complex thinking in the framework of Education 4.0 and Open Innovation—A systematic literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 4.
- Ranjbari, M., Esfandabadi, Z. S., Zanetti, M. C., Scagnelli, S. D., Siebers, P. O., Aghbashlo, M., ... & Tabatabaei, M. (2021). Three pillars of sustainability in the wake of COVID-19: A systematic review and future research agenda for sustainable development. *Journal of cleaner production*, 297, 126660.
- Rao, N., Ranganathan, N., Kaur, R., & Mukhopadhyay, R. (2021). Fostering equitable access to quality preschool education in India: challenges and opportunities. *International Journal of Child Care and Education Policy*, 15(1), 9.
- Razak, A. A., Ramdan, M. R., Mahjom, N., Zabit, M. N. M., Muhammad, F., Hussin, M. Y. M., & Abdullah, N. L. (2022). Improving critical thinking skills in teaching through problem-based learning for students: A scoping review. *International Journal of Learning, Teaching and Educational Research*, 21(2), 342-362.
- Rebouças, P., Falcão, I. R., & Barreto, M. L. (2022). Social inequalities and their impact on children's health: a current and global perspective. *Jornal de pediatria*, 98, 55-65.
- Reshi, I. A., Sudha, D. T., & Dar, S. A. (2022). Women's access to education and its impact on their empowerment: a comprehensive review. *Morfai J*, 1, 446-450.
- Rochmah, T. N., Rahmawati, I. T., Dahlui, M., Budiarto, W., & Bilqis, N. (2021). Economic burden of stroke disease: a systematic review. *International journal of environmental research and public health*, 18(14), 7552.

- Rodrigues, C. M., & Plotkin, S. A. (2020). Impact of vaccines; health, economic and social perspectives. *Frontiers in microbiology*, 11, 1526.
- Ruggerio, C. A. (2021). Sustainability and sustainable development: A review of principles and definitions. *Science of the Total Environment*, 786, 147481.
- Ruhle, S. A., Breitsohl, H., Aboagye, E., Baba, V., Biron, C., Correia Leal, C., ... & Yang, T. (2020). "To work, or not to work, that is the question"—Recent trends and avenues for research on presenteeism. *European Journal of Work and Organizational Psychology*, 29(3), 344-363.
- Salim, A., Rustam, A., Haeruddin, H., Asriati, A., & Putra, A. H. P. K. (2020). Economic strategy: Correlation between macro and microeconomics on income inequality in Indonesia. *The Journal of Asian Finance, Economics and Business*, 7(8), 681-693.
- Salmi, J., & D'Addio, A. (2021). Policies for achieving inclusion in higher education. *Policy Reviews in Higher Education*, 5(1), 47-72.
- Shela, V., Ramayah, T., & Noor Hazlina, A. (2023). Human capital and organisational resilience in the context of manufacturing: a systematic literature review. *Journal of Intellectual Capital*, 24(2), 535-559.
- Smith, S. G., & Sinkford, J. C. (2022). Gender equality in the 21st century: Overcoming barriers to women's leadership in global health. *Journal of Dental Education*, 86(9), 1144-1173.
- SoleimanvandiAzar, N., Kamal, S. H. M., Sajjadi, H., Ardakani, H. M., Forouzan, A. S., Karimi, S. E., & Harouni, G. G. (2021). Outpatient health service utilization and associated factors: a cross-sectional population-based study in Tehran in 2019. *Medical Journal of the Islamic Republic of Iran*, 35, 71.
- Sudarmo, S., Arifin, A., Pattiasina, P. J., Wirawan, V., & Aslan, A. (2021). The Future of Instruction Media in Indonesian Education: Systematic Review. *Al-Ishlah: Jurnal Pendidikan*, 13(2), 1302-1311.
- Sulisnaningrum, E., Widarni, E. L., & Bawono, S. (2022). Causality Relationship Between Human Capital, Technological Development and Economic Growth. *Journal of Management, Economics, & Industrial Organization (JOMEINO)*, 6(2).
- Suryawan, A., Jalaludin, M. Y., Poh, B. K., Sanusi, R., Tan, V. M. H., Geurts, J. M., & Muhardi, L. (2022). Malnutrition in early life and its neurodevelopmental and cognitive consequences: a scoping review. *Nutrition Research Reviews*, 35(1), 136-149.
- Tambare, P., Meshram, C., Lee, C. C., Ramteke, R. J., & Imoize, A. L. (2021). Performance measurement system and quality management in data-driven Industry 4.0: A review. *Sensors*, 22(1), 224.
- Tamers, S. L., Streit, J., Pana-Cryan, R., Ray, T., Syron, L., Flynn, M. A., ... & Howard, J. (2020). Envisioning the future of work to safeguard the safety, health, and well-being of the workforce: A perspective from the CDC's National Institute for Occupational Safety and Health. *American journal of industrial medicine*, 63(12), 1065-1084.
- Tang, Y. M., Chau, K. Y., Kwok, A. P. K., Zhu, T., & Ma, X. (2022). A systematic review of immersive technology applications for medical practice and education—trends, application areas, recipients, teaching contents, evaluation methods, and performance. *Educational Research Review*, 35, 100429.
- Thurstans, S., Sessions, N., Dolan, C., Sadler, K., Cichon, B., Isanaka, S., ... & Khara, T. (2022). The relationship between wasting and stunting in young children: A systematic review. *Maternal & Child Nutrition*, 18(1), e13246.

- Timilsina, G. R., Hochman, G., & Song, Z. (2020). Infrastructure, economic growth, and poverty: A review. World Bank Policy Research Working Paper, (9258).
- Tricarico, J. M., Kebreab, E., & Wattiaux, M. A. (2020). MILK Symposium review: Sustainability of dairy production and consumption in low-income countries with emphasis on productivity and environmental impact. *Journal of dairy science*, 103(11), 9791-9802.
- Vargas-Martínez, A. M., Romero-Saldaña, M., & De Diego-Cordero, R. (2021). Economic evaluation of workplace health promotion interventions focused on Lifestyle: Systematic review and meta-analysis. *Journal of advanced nursing*, 77(9), 3657-3691.
- Vergunst, F., & Berry, H. L. (2022). Climate change and children's mental health: a developmental perspective. *Clinical Psychological Science*, 10(4), 767-785.
- Wenger, N. K., Lloyd-Jones, D. M., Elkind, M. S., Fonarow, G. C., Warner, J. J., Alger, H. M., ... & American Heart Association. (2022). Call to action for cardiovascular disease in women: epidemiology, awareness, access, and delivery of equitable health care: a presidential advisory from the American Heart Association. *Circulation*, 145(23), e1059-e1071.
- Wibangga, W. A. M. P. (2022). Impact And Influence Of Inflation, Economic Growth, And Inflation In Indonesia: VECM Analysis: English. *Jurnal Akuntansi Jayanegara*, 7(1), 28-34.
- Wickramasinghe, K., Mathers, J. C., Wopereis, S., Marsman, D. S., & Griffiths, J. C. (2020). From Lifespan to Healthspan: The Role of Nutrition in Healthy Ageing. *Journal of Nutritional Science*, 9, e33.
- Widarni, E. L., & Bawono, S. (2023). Investigating the role of education in stability of work participation in economic shocks from the Asian financial crisis to the Covid 19 pandemic in Indonesia. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 8(1), 3.
- Xue, X., Cheng, M., & Zhang, W. (2021). Does education really improve health? A meta-analysis. *Journal of Economic Surveys*, 35(1), 71-105.