

# Human Development Index in Indonesia: Are We in Line with SDGs and How Much Have We Grown?

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**Abstract:** Human development index encapsulates the attainment of health, education, and living standards of one nation. We posit that the progress towards the 2030 sustainable development goals is vital in ensuring positive achievement in HDI, especially in a developing country such as Indonesia. In this study, we aim to investigate the relation between the current fulfilment of the 2030 agenda and HDI in Indonesia and examine the growth Indonesia has made in 2016 thru 2020. By using national data gathered by Statistics Indonesia, we carefully selected relevant indicators of the 2030 agenda to run regression model on HDI. Additionally, we employed latent growth modelling to show the growth of HDI in Indonesia. Controlling for provincial minimum wage, our regression analyses show that partnership for the goals, represented by the percentage of individuals using internet, is the strongest predictor for positive attainment of HDI. Further, there is a small positive increment of HDI annually within each province as well as between provinces. On average, the growth model demonstrates a significant difference in measurement years between provinces, with year 2020 being the peak among other years. These novel findings shed light on Indonesia's human development, which echoes the progress of national development.

## 1 INTRODUCTION

Human development index (HDI) was put forth in the human development report in 1990 and since then marked the shift in perspective of human development; involving not only economic terms but also health and education (Conceição, 2019). In brief, HDI is a composite index composed of life expectancy at birth, educational attainment (via expected years of schooling and the mean years of schooling), and gross national income (GNI) per person (in US dollar) at purchasing-power parity (Lind, 2019). Based on these four country-specific statistics, HDI then classifies a country into three ranks of development: developed, still developing, and under developed (Hou, Walsh, & Zhang, 2015). Although development rank is not the solely primary objective of HDI, this rank is useful to indicate the progress of national development of a country and allows for cross-country comparison.

HDI treats humans as the source of development of a country. The United Nations Development Programme (UNDP) expressed a clear view on this, "People are the real wealth of a nation" (UNDP, 1990, p. 9). Further, HDI was much needed amid a country's financial growth. According to UNDP, a nation's development, should create a conducive environment for its citizens to flourish and enjoy "long, healthy, and creative lives" (p. 9). By providing such environment, people are expected to live with dignity, lead a productive work life, and maintain a positive well-being. It is important to note, however, that HDI is a simplified measure of human development and limited to only objective well-being, such as income and health. Other dimensions which explain individuals' well-being such as social connections are not as straightforward because of its subjectivity. Although both categories are necessary to provide the overall quality of individual's life, this article specifically is focused only on the objective

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dimensions of well-being captured through the HDI measure.

One of the main weaknesses in HDI revolves around its statistical calculations. First, the combination of expected years of schooling and mean years of schooling makes it difficult to analyse the individual impact on HDI (Herrero, Martínez, & Villar, 2012). Second, employing geometric mean poses a two-fold risk in the interpretation. On the one hand, geometric mean normalizes values given in the dataset. Thus, it is difficult to justify a country's educational attainment when such index is obtained through the combination of two variables. On the other hand, geometric mean clears out the scaling issue. But it is heavily affected by the choice of minima for each HDI dimension (Klugman, Rodríguez, & Choi, 2011). If any of the dimension falls at the minimum bound, the whole index then approaches to zero bringing down the other dimensions. Third, from its birth HDI undermines the importance of ecological domain (Biggeri & Mauro, 2018). During the current pandemic times that we live in, this issue has become more apparent and urgent than ever before. Even in the 2020 human development report, UNDP argues that human development should also address the assurance to protect the planet to ensure sustainable development for future generations (UNDP, 2020).

In detail, in 2015 all members of the United Nations (UN) have agreed to pursue 17 sustainable development goals (SDGs) to end poverty, protect the planet, and enable people live with peace and prosperity by 2030 (Conceição, 2019; UNDP, n.d.). The goals include eliminating poverty in all forms, providing good health and well-being, and ensuring gender equality. These SDGs are directly (and indirectly) related to human development, represented by HDI. Although the relation seems obvious (see Conceição, 2019), there is still lack of evidence to support a consistent relationship between SDGs and HDI. Indonesia provides such interesting case.

The fourth largest country in population is ranked high in human development index (UNDP, 2020). However, Indonesia is still struggling with many societal as well as ecological issues. In terms of civil and political rights, Indonesia is ranked at 64 globally and thus, considered a nation with flawed democracy (Prasetya, 2021). In terms of health, (World Health Organization, 2017) reports there is still high inequality in health access in the country. Moreover, in terms of ecology, Indonesia is the world's largest concentration of seagrass (UNDP, 2020). However, most of their seagrass is unhealthy. In addition, there

are numerous SDGs' indicators that are indirectly related to the HDI but might play a big role in enhancing HDI. For instance, given the importance of internet in financial and education sectors, having access to the internet may predict a higher level of HDI than not having it (Setiawan & Suhartomo, 2019). In addition, although there exist many reports of HDI in Indonesia from time to time, there is none that offers growth prediction. Even though having such information gives an overview of the nation's human development over the years. Moreover, the knowledge provides a vital insight for policy makers and scholars in proposing the direction of the country's development. All this echoes the necessity to carefully look at the relation between the achievement of SDGs and the HDI level of a nation, in this case Indonesia.

In addition, currently a large number of research focused solely on improving the assessment of SDGs and the HDI measure (Klugman et al., 2011; Nguefack-Tsague et al., 2011), whereas few to none studies the empirical link between the two concepts. Even though the theoretical link between some of the SDG's indicators, e.g., built environment, and the HDI, e.g., health indicator, has been drawn by many research, the investigation has not involved the real index obtained from the SDG's indicators operationalization and the HDI measures. In this study, we use the figures obtained from the SDGs and the HDI assessments available by Statistics Indonesia.

By using real figures, we aim for a two-fold goal. One, providing evidence for the relation between SDGs and the HDI level. Two, providing a better estimate for the relation between decent living environment and empowerment, on the one hand, and objective well-being on the other. Living environment has been shown by Dean and colleagues (2018) to affect mental health of the residents. More importantly, this investigation demonstrates that studying the theoretical link of interest should never address environment as only the physical form, and instead should take into account all the necessary components, such as food availability for the residents, water and energy availability, and housing options (Sayles et al., 2019). Further, empowerment is equally important mainly because it indicates that people have an option and the freedom to choose. This knowledge gives valuable insight into the role of empowerment in developing a sense of unity among the people and later can turn into a collective action to promote better welfare for everyone in the community (Drury et al., 2015).

Taken together, we aim to investigate *to what extent the relevant SDGs indicators are related to the HDI in Indonesia* and *to what extent the HDI in Indonesia have progressed in the last five years (2016-2020)*. As echoed earlier, providing a secure and healthy place for individuals to grow allows people to expand their capabilities (Conceição, 2019; UNDP, 1990, 2020). Therefore, we expect that the progress towards SDGs is related to the growth of HDI. Moreover, with the achievement of SDGs in Indonesia in the past five years, we also expect to see an increment of the HDI within that period.

## 2 CONCEPTUAL FRAMEWORK

### 2.1 Human Development

Human development is an effort to expand opportunities of the population to achieve a decent life (UNDP, 1990). At the practical level, increasing the basic capacity involves increasing the productivity of the population through enhancing knowledge, a decent standard of living and a decent health so that they can live a healthy long life. In detail, human development should be based on the following basic premises: (1) human as the centre of growth, (2) human development is intended to enlarge the options available to citizens, not only to increase their income, (3) human development is intended to improve human capabilities, (4) human development involves productivity, equity, sustainability and empowerment, and (5) human development is the basis to determine development goals and ways to achieve them.

Based on the premises, we can conclude that human development is about people's quality of life. Indeed, human development has now progressed from solely economic indicators to people's well-being indicators, in which economic is one of them (Stiglitz, Sen, & Fitoussi, 2009). The notion of well-being encompasses a wide array of human necessities. Several studies show the importance of well-being in various life domains, such as health (Marcinko, 2015; Steptoe, Deaton, & Stone, 2015), education (Chen, 2011), and society (MacIlvaine, Nelson, Stewart, & Stewart, 2013). Over time, the measurement of well-being evolved with the inclusion of psychological indicators. Individual's subjective perception of their well-being is an important indicator of the quality of human life.

Thus, the notion of well-being should be treated as multi-dimension concept. Standing on the shoulder of previous scholars, well-being should, at least,

include economic living standards (i.e., income, consumption), health, education, personal activities (e.g., work, leisure activities), political participation, social life and interpersonal relationships, living environment, and insecurity (e.g., economically, physically, or psychologically). Dimensions such as living standards, health, and education can be objectively captured through the notion of human development proposed by the UNDP (1990). It is important to reiterate that this study relies on the HDI measure to capture individual's well-being and therefore, only accounts for the objective nature of well-being.

### 2.2 The Relation between SDGs and HDI in Indonesia

HDI is put forth as a composite single-number indicator that captures the basic dimensions involved in human development, which are health, education, and income (Conceição, 2019). Meanwhile, all UN member countries, including Indonesia, have agreed to set up goals or development targets to pave the way for a positive human development. These development targets are summarized in 17 SDGs with 169 targets and 232 indicators. The goals are ending poverty, having zero hunger, ensuring good health and well-being for the population, providing quality education, ensuring gender equality, providing clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation, and infrastructure, reduced inequalities, sustainable cities and communities, supporting responsible consumption and production, climate action, life below water, life on land, and finally peace, justice and strong institutions (UNDP, n.d.). SDGs officially replaced the Millennium Development Goal's (MDG's) concept which ended in 2015.

As a follow-up action by Indonesia, in 2017, the government passed the Presidential Regulation (Perpres: *Peraturan Presiden*) No. 59 of 2017 with the tagline "no one left behind". If the goals can be carried out comprehensively, it is believed that there will be a positive change in individuals' well-being as well as their behaviours in caring the environment. Thus, the progress towards the fulfilment of SDGs can ensure the improvement of HDI (Haryanto, 2018).

Efforts to achieve the SDGs target are a priority for Indonesia's national development, requiring synergy of planning policies at the national level and at the provincial and district/city levels. Several SDGs indicators worth mentioning to support HDI

include an increase in minimum consumption below 1,400 kcal/capita/day, increase in number of individuals having a birth certificate, and decrease in unmet need for health services. Due to these improvements, a person is expected to be in good health and thus, can survive longer. If they are sick, they can easily make arrangements with the health service provider to speed up their recovery. Further, having a birth certificate is the first step towards a decent living in Indonesia (Badan Pusat Statistik, 2021a). With the certificate, individuals can be registered officially to obtain social security (known as BPJS), to be registered in the tax department, school, to work in the formal sector, to buy property or land, to be eligible for voting, and to be able to obtain a passport. Thus, ensuring the achievement of SDGs can help improve the rank of HDI of Indonesia. Most importantly, achieving SDGs means allowing Indonesian citizens to lead a productive and healthy life in a sustainable environment, both ecologically as well as institutionally.

Given numerous indicators of SDGs, we carefully select relevant indicators to be included in the study. Two main criteria for selection are the immediate impact on the people's welfare and the availability of the latest data provided by the Statistics Indonesia (*Badan Pusat Statistik*). The following SDGs indicators are involved in the study: the calory intake below 1400 kcal/day (zero hunger SDG), unmet need for health services (good health and well-being), knowledge and understanding about modern contraception (gender equality SDG), level of unemployment (decent work and economic growth SDG), access to decent and affordable housing (sustainable cities and communities SDG), having a birth certificate (peace, justice and strong institutions SDG), democracy index (peace, justice and strong institutions SDG), and access to the internet (partnership for the goals SDG).

Based on the aforementioned above, we hypothesize that (H1) calory intake below 1400 kcal/day, (H2) unmet need for health services and (H4) unemployment level are expected to be negatively related to the HDI. Whereas (H3) the knowledge and understanding about modern contraception, (H5) access to decent and affordable housing, (H6) having a birth certificate, (H7) democracy index, and (H8) access to internet are positively related to the growth of HDI. Furthermore, with the current achievement of SDGs we expect to see a yearly positive growth of HDI from the period of 2016 to 2020 (H9).

### 3 METHOD

This study used secondary data provided by Statistics Indonesia. The data was laid out according to province, enabling us to do cross-province comparison in later analysis. In specific, we obtained the HDI numbers from the Statistical Yearbook of Indonesia from 2016 thru 2020. For the SDGs indicators, since the latest record of the achievement of SDGs in 2020 has yet been published, we obtained the latest SDGs indicators numbers from the official site of Statistics Indonesia. The quality data were gathered through reliable surveys, such as National Labor Force Survey (*Sakernas: Survei Angkatan Kerja Nasional*) and National Socioeconomic Survey (*Susenas: Survey Sosial Ekonomi Nasional*). The followings are measures used in this study:

#### 3.1 Dependent Variable

HDI is a composite measure consisted of three dimensions, which are (1) life expectancy at birth for assessment, (2) the education uses number of years of schooling for adults aged 25 years and above and the expected number of years of schooling for children of school-entering age, and (3) the standard of living by gross national income per capita (Klugman et al., 2011). Each dimension is assigned equal weighting and normalized to attain a range from zero to one. The HDI is then obtained by calculating a geometric mean of all three dimensions.

#### 3.2 Independent Variables

There are eight SDGs indicators that were treated as independent variables and the following descriptions were taken from the 2019 report of SDGs progress by the Statistics Indonesia (Badan Pusat Statistik, 2019).

*Calory intake below 1,400 kcal/day* is a straightforward measure capturing the proportion of individuals with calory intake of individuals minimum below 1,400 kcal/day. This number is set as a minimum suggested for each individual that is adjusted to their age range (Badan Pusat Statistik, 2019).

*Unmet need for health services* is the percentage of individuals who suffer from health complaints but do not seek outpatient treatment (Badan Pusat Statistik, 2021d). In order to get the percentage, BPS compares the number of people who experience health complaints and their activities that are disturbed but do not seek outpatient treatment to the number of the outpatient treatment. The activities that are disturbed can involve work, school or other daily



activities. Reasons why people do not seek outpatient treatment can vary from having no medical saving to having no means of transportation. This data was gathered by the Statistics Indonesia itself.

*Knowledge and understanding about modern contraception* measure the percentage of knowledge and understanding of couples of childbearing age about modern contraception, such as birth-control pill (Badan Pusat Statistik, 2019). This data was provided by Indonesian Demographic and Health Survey (*Survei Demografi dan Kesehatan Indonesia*).

*Level of unemployment* measures the percentage of the total unemployed to the total labour force. BPS (Badan Pusat Statistik, 2021c) extended the concept of unemployment to accommodate the revision of the term proposed by the international labour organization (ILO). Currently, unemployment term covers those who are looking for work, those who are starting up a new business/firm/establishment, those who are not looking for work due to the discouraging presumption, and those who are not looking for work because having already secured a job but yet to start (future starter). The data was gathered by Sakernas.

*Access to decent and affordable housing* measures the percentage of households with access to decent and affordable housing. According to BPS (Badan Pusat Statistik, 2021b), a decent housing is the one that meets the following criteria: 1) sufficient area of at least 7.2 m2 per capita 2) available access to proper drinking water, 3) available access to proper sanitation, and 4) durable housing.

*Having a birth certificate* refers to the percentage of individuals aged 0-17 with a birth certificate. This birth certificate should be issued by the Civil Registry in each region, and not the one from a hospital or doctor (Badan Pusat Statistik, 2021a). This document holds high importance in ensuring the recognition of a child lawfully and thus, protecting their rights. On the contrary, children without an official birth certificate will face difficulties in accessing health and education services.

*Democracy index* measures the index of free and fair elections, the role of Regional People's Representative Assembly, the role of the political parties, local government bureaucracy, and independent judiciary (UNDP, 2010). It ranges from 0-100, with higher score indicating higher index.

*Access to internet* measures the proportion of individuals using the internet. The use includes accessing social media, such as *facebook*, *twitter*, and *whatsapp*.

### 3.3 Control Variable

We employed province minimum income as a control variable to ensure that any relation found was not spurious due to the difference of province minimum income.

### 3.4 Strategy for Analyses

First, we performed multilinear regression in a stepwise fashion to test hypothesis 1 thru 8 on SPSS

Table 1: Bivariate Correlations Between Variables.

Measure	1	2	3	4	5	6	7	8	9
1. HDI	-	<b>-.52</b> (.002)	<b>-.29</b> (.094)	<b>.59</b> (.000)	<b>.48</b> (.004)	<b>.38</b> (0.03)	<b>.72</b> (.000)	<b>.48</b> (.004)	<b>.85</b> (.000)
2. Calory Intake	-	-	<b>-.18</b> (.305)	<b>-.56</b> (.000)	-.09 (.617)	-.22 (.221)	<b>-.58</b> (.000)	<b>-.43</b> (.011)	<b>-.51</b> (.002)
3. Unmet need for health services	-	-	-	.26 (.136)	<b>-.37</b> (.030)	.08 (.631)	-.11 (.532)	.03 (.875)	-.30 (.080)
4. Modern contraception	-	-	-	-	.17 (.339)	<b>.44</b> (.009)	<b>.74</b> (.000)	<b>.42</b> (.014)	<b>.48</b> (.004)
5. Unemployment level	-	-	-	-	-	-.10 (.572)	.11 (.520)	-.01 (.964)	<b>.61</b> (.000)
6. Access to housing	-	-	-	-	-	-	<b>.38</b> (.025)	-.01 (.953)	.21 (.225)
7. Birth certificate	-	-	-	-	-	-	-	<b>.49</b> (.004)	<b>.62</b> (.000)
8. Democracy index	-	-	-	-	-	-	-	-	<b>.44</b> (.009)
9. Access to internet	-	-	-	-	-	-	-	-	-

Bold indicates significance at level  $p < .05$ .

25. To do this, we took the latest HDI figures (year 2020) and test it on the latest SDGs indicators numbers provided by Statistics Indonesia. Each model is built upon each SDG indicator following the order of SDGs according to UNDP, e.g., as we did not include SDG 1, calory intake as SDG 2 became the first indicator to be included in the model, unmet need health services became the second and continued until the last SDG (UNDP, n.d.). Prior to calculation, we performed preliminary tests to ensure that all predictors have linear relationship with the HDI and that there is no multicollinearity between predictors. We ran normality tests by calculating the residuals, that is difference between the measured value and the predicted value, for each predictor in the regression model. The Shapiro-Wilk for normality test indicated that access to housing, knowledge about modern contraception, the level of unemployment, and unmet needs for healthcare services deviate from normality. However, their skewness and kurtosis values did not exceed 2 and 7, respectively. Therefore, as suggested by Kim (2013), we may still consider the data to be acceptable. Next, we found that all predictors were linearly related to the HDI. Further, all predictors had variance inflation factor (VIF) values ranging from 1.58 to 4.26 with tolerance statistics above .2, which

indicated no multicollinearity (Field, 2009). The correlation matrix in Table 1 also supports the finding.

Looking closely at Table 1, we found that the HDI level is correlated with all of the predictors, except with the percentage of people with unmet needs for healthcare services. The strongest correlation found with the percentage of people having a birth certificate. While, surprisingly, the lowest coefficient was found between the HDI level and access to housing and democracy index.

Second, we ran growth curve modelling using SPSS 25 to test whether there is a positive growth of HDI in Indonesia in the past five years, from 2016 thru 2020 (H9). In doing so, we started with a null model using provinces to predict HDI over the five-year period. Next, we set up a model using time as a predictor for the fixed effect. By this, we allowed the province's intercepts to randomly vary but the slope for the time is fixed. Subsequently, we set up a model allowing time to vary at level 2. Here, we allowed the province's intercepts and the slope for the time to randomly vary. By doing this we can identify increment of HDI across provinces as well as across years.

Table 2: Regression model of HDI on independent variables.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	<b>74.32</b> (.000)	<b>79.85</b> (.000)	-10.15 (.657)	-3.71 (.867)	10.10 (.658)	<b>46.50</b> (.085)	<b>44.37</b> (.076)	<b>38.51</b> (.091)	<b>38.52</b> (.110)
Calory Intake	<b>-31</b> (.002)	<b>-.35</b> (.000)	<b>-.17</b> (.040)	<b>-.17</b> (.034)	<b>-.18</b> (.025)	<b>-.11</b> (.140)	<b>-.08</b> (.251)	-.03 (.676)	-.03 (.682)
Unmet need for health services		<b>-.98</b> (.007)	<b>-1.21</b> (.000)	<b>-.95</b> (.004)	<b>-.88</b> (.006)	<b>-.44</b> (.202)	<b>-.39</b> (.219)	<b>-.31</b> (.278)	<b>-.31</b> (.301)
Modern Contraception			<b>.90</b> (.000)	<b>.79</b> (.001)	<b>.61</b> (.017)	<b>.10</b> (.742)	-.00 (.987)	.10 (.699)	.10 (.704)
Unemployment Level				<b>.45</b> (.064)	<b>.55</b> (.026)	<b>.70</b> (.004)	<b>.78</b> (.001)	<b>.32</b> (.245)	.31 (.256)
Access to Housing					.06 (.088)	.06 (.083)	<b>.08</b> (.016)	.06 (.054)	.06 (.074)
Birth Certificate						<b>.12</b> (.026)	<b>.10</b> (.053)	<b>.06</b> (.240)	<b>.06</b> (.074)
Democracy Index							<b>.16</b> (.024)	.10 (.165)	.10 (.175)
Access to Internet								<b>.15</b> (.017)	<b>.15</b> (.020)
Province Minimum Income									.00 (.974)
F test	<b>11.69</b>	<b>11.28</b>	<b>16.43</b>	<b>14.36</b>	<b>12.95</b>	<b>13.46</b>	<b>14.41</b>	<b>16.12</b>	<b>13.76</b>
Adjusted R <sup>2</sup>	.24	.38	.58	.62	.64	.69	.74	.79	.77

Note. Bold indicates significance at level  $p < .05$ .

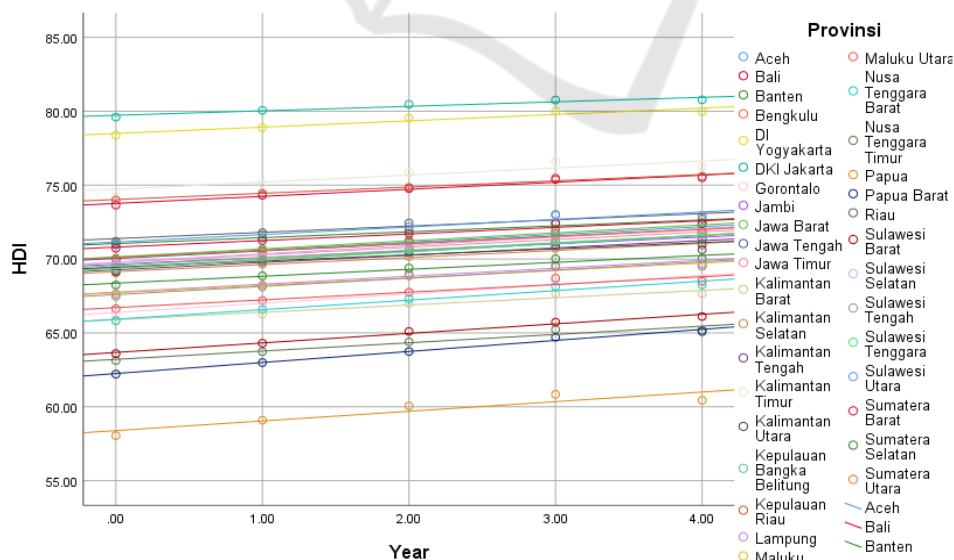
### 4 RESULTS

In Table 2, we start with the proportion of individuals with calory intake below 1400 kcal/day into account. The results if Model 1 confirm hypothesis 1, in which the proportion of individuals with 1400 kcal/day calory intake is negatively related to the level of HDI ( $b = -.31, p = .002$ ). In Model 2, we also expected that there would be a negative relation between the percentage of individuals with unmet need for health services and the HDI. The results supported hypothesis 2 ( $b = -.98, p = .007$ ). Next, we expected that the knowledge and understanding of young productive couples on modern contraception would be positively related to the HDI. The results in Model 3 support hypothesis 3 confirming a positive relation between variables of interest ( $b = .90, p = .000$ ).

Further, Model 4 takes into account the level of unemployment. Contrary the expectation, the results disconfirm hypothesis 4 that there is no significant relationship between the percentage of the total unemployed to the total labour force and the HDI. Model 4, however, still demonstrates significant relationships between the previous indicators and the HDI. This indicates that by keeping deficiency of calory intake and unmet need at low level and with the help of knowledge of the use of modern contraception among young couples, human development can progress in the right track even though unemployment may seem competitive. Model 5 tests hypothesis 5 that is the percentage of households with access to decent and affordable

housing would be positively related to the HDI. Here, we find that there is no significant relationship between the variables of interest. However, we find that by including the variable of access to housing makes the knowledge and understanding of the use of modern contraception significant ( $b = .61, p = .017$ ). Next, Model 6 includes birth certificate to test hypothesis 6. As expected, the percentage of individuals aged 0-17 with a birth certificate is positively related to the HDI ( $b = .12, p = .026$ ). Considering the importance of such document, this shows that registration of a child’s birth paves the way for a growth of human development.

Furthermore, Model 7 includes democracy index to promote positive human development. The results confirm hypothesis 7 that the higher the democracy index the higher the level of HDI ( $b = .16, p = .024$ ). The inclusion of democracy index makes birth certificate no longer plays a significant role in the HDI progress. Subsequently, Model 8 considers the proportion of individuals using the internet. We find that there is a significant relation between using the internet and the HDI ( $b = .15, p = .020$ ). Interestingly, the role of the internet use makes the other significant relations in the previous model insignificant. The results seem to be in line with the increasing embeddedness of internet use in individual’s daily life. Finally, we included province minimum wage in Model 9 to test whether previously found relations were spurious due to the inclusion of province minimum wage. We found that there was no significant relationship between province minimum



Note. .00 = 2016; 1.00 = 2017; 2.00 = 2018; 3.00 = 2019; 4.00 = 2020

Figure 1: Predicted growth of the HDI throughout 2016 to 2020.

Table 3: Latent growth model of HDI from 2016-2020.

	Model 0	Model 1	Model 2
Intercept	<b>70.28</b> (.000)	<b>69.26</b> (.000)	<b>69.14</b> (.000)
Level 1 (fixed effect)			
Year		<b>.51</b> (.000)	<b>.62</b> (.000)
Variance of the residuals (within province across time)	<b>.72</b> (.000)	<b>.06</b> (.000)	
Level 2			
Year 2016			.01 (.105)
Year 2017			.00 (.274)
Year 2018			<b>.00</b> (.035)
Year 2019			<b>.01</b> (.024)
Year 2020			<b>.36</b> (.000)
Variance of the means (between provinces)	<b>15.43</b> (.000)	<b>15.56</b> (.000)	<b>16.61</b> (.000)
Variance of the means (between years)			<b>.01</b> (.001)

Note. Bold indicates significance at level  $p < .05$ .

wage and the HDI and, moreover, the relations found in Model 8 remained the same in Model 9. Furthermore, we conducted growth curve model to test hypothesis 9 that there is increment of the HDI in Indonesia from 2016 to 2020. Figure 1 plots the growth of HDI over the five years. As expected, DKI Jakarta province shows the highest growth of all provinces while Papua is shown to have the lowest growth.

In relation to the predicted growth across provinces and years, we first start with Model 0 or null model (see Table 3). Here, the grand mean of the HDI is 70.28 ( $p = .000$ ). We find that there is a significant variance of the HDI within provinces across time ( $b = .72, p = .000$ ). In addition, there is also a significant variance of the HDI between provinces ( $b = 15.43, p = .000$ ), which indicates a possible random effect of provinces. Therefore, in Model 1 we set time as a fixed-effect predictor and allow the province's intercepts to randomly vary. The results show that, at level 1, time is positively related to the HDI ( $b = .51, p = .000$ ). Although reduced, the variance of the HDI within province also remains significant ( $b = .06, p = .000$ ). Whereas the variance of the HDI between provinces is slightly changed ( $b = 15.56, p = .000$ ). To further test the increment during the five years, we set time as a level 2 random-effect predictor. The results show that, at level 1, time's relation with the HDI is slightly increased ( $b = .62, p = .000$ ). At level 2, we find a low variance of

the HDI across years ( $b = .01, p = .001$ ). Taken together, these results show that there is a slight significant growth of the HDI in the period of 2016 to 2020. However, the difference of the HDI between provinces across time is still significantly substantial ( $b = 16.61, p = .000$ ).

## 5 DISCUSSION AND CONCLUSION

The current study explores the progress of the HDI in Indonesia by testing the relations between SDGs indicators and the HDI in Indonesia and looking at the growth of HDI from 2016 to 2020. Being ranked at a high development country, Indonesia seems to be struggling with its own societal and ecological problems (see BPS, 2019; UNDP, 2020). Some of our findings are consistent with the expectations, while others provide alternative explanations.

First, we find that the fulfilment of minimum daily calory intake is related to the growth of HDI in Indonesia. This finding shows that by eliminating hunger, one of which through minimizing the percentage of individuals with calory intake below 1,400 kcal/day, helps individuals to have a healthy life and support their education. The fulfilment of calory intake does not stand alone in providing a healthy life. Our finding also shows that by lowering the number of people with unmet health services



strongly helps the increment of the HDI in Indonesia. This somewhat corroborates the report of the state of health inequality in Indonesia (World Health Organization, 2017). Due to health inequality that still widely exists across the nation, the rank of HDI in Indonesia will be most likely to increase only slightly from year to year.

Similarly, the knowledge and understanding among couples of childbearing ages about modern contraception highly supports the growth of HDI. This finding corroborates the notion that personal autonomy, captured through gender equality, provides options that expand people's capabilities (Stiglitz et al., 2009). In addition, having a birth certificate and high democracy index also support growth of the HDI. This shows that people's well-being is largely determined by access to vital knowledge, sense of security in the community, and more importantly, being able to choose freely (UNDP, 1990).

In contrast, our finding shows that unemployment level is not associated with the growth of HDI. Furthermore, access to housing is also found not to be a significant predictor to the HDI. These findings contradict the notion that economic indicators, through means of employment and housing, support individuals' well-being. However, given the condition that other indicators, e.g., minimum daily calory intake and healthcare service are met, this finding validates the claim by Stiglitz et al. (2009) that the measure of subjective well-being should also be considered to accompany the objective well-being captured in the current HDI.

Further, the number of people having access to the internet is found to be associated with the HDI. Most interestingly, the inclusion of this predictor weakens all the other variables. Given the high importance of internet in people's daily lives, this finding suggests that being able to access the internet empowers people with knowledge necessary to improve their health and socio-economic conditions. A program such as e-health has been shown to promote information exchange among health professionals, even in the war zones (Eyesenbach, 2007). In addition, internet enables people in less developed areas to receive the same knowledge as others in more developed areas. Thus, internet empowers people with the same quality of education and skills needed for higher education and labour opportunities (Johnson, 2016). In sum, having access to information and communications technology (ICT), part of Goal 9, will significantly affect the choices and opportunities available to people. Inexpensive and reliable access to the internet enables other

capabilities in the areas of education, work, and political participation, among others. However, it is worth noting that the use of internet can also bring detrimental impact on human development. It is shown that higher internet use is related to higher crime incidence in Indonesia (Setiawan & Suhartomo, 2019).

Regarding the growth of HDI in Indonesia, we find that there is a slight increment of the HDI from 2016 to 2020. A plausible explanation for this is due to the apparent variance of the HDI across provinces. Indonesia still experiences widespread unequal development in many domains. Take internet for instance, although internet has given positive impacts on human development, the existence of internet divide exacerbates the inequality in education and human capital in rural and remote islands in Indonesia (Sujarwoto & Tampubolon, 2016).

There are, at least, two limitations notable in this study. One, due to the availability of data this study cannot include subjective well-being measure. Therefore, the current study solely relies on the HDI measure, although we are aware that human development cannot be captured by only four measures and simplified into one index measure. Two, SDG indicators employed in this study may oversimplify the real problems. Indicators such as political participation and religious freedom are rarely captured perfectly in a democracy index. Therefore, future studies are encouraged to explore human development further by including other relevant indicators claimed to associate with subjective well-being. Three, due to the availability of the data our statistical analysis cannot compute the progress of SDGs in 2016 to 2020 and the growth of HDI altogether in the same model. However, our findings can still provide a nuanced description of the relation between SDGs and the HDI as well as the growth of HDI in Indonesia.

In conclusion, this study shows that relevant SDG indicators are related to the growth of HDI in Indonesia. Given the embeddedness of internet in people's daily life, having access to the internet is shown to be the strongest predictor for the growth of HDI (see Puspitasari & Ishii, 2016; Setiawan & Suhartomo, 2019; Sujarwoto & Tampubolon, 2016 for internet impacts and divides in Indonesia). Additionally, we show a glance of optimism in the growth of HDI in Indonesia. Although the disparity between provinces is still substantial, the HDI in Indonesia has shown to keep growing. Overall, despite criticisms directed towards the measure of HDI and the operationalization of SDGs, both concepts still provide a useful yardstick to gauge the

human development of a country relative to others and allow for cross-province comparison within one country (Adam, Kammas, & Lapatinas, 2015; Blum, 2013; Hák, Janoušková, & Moldan, 2016). Moreover, the link between SDGs and the HDI paves the way for further investigation on the importance of well-being towards the development of a nation, considering its objective and subjective nature. This study is expected to encourage future research to build upon the current impact of the Covid-19 pandemic on the growth of HDI in the next few years.

## REFERENCES

- Adam, A., Kammas, P., & Lapatinas, A. (2015). Income inequality and the tax structure: Evidence from developed and developing countries. *Journal of Comparative Economics*, 43(1), 138–154. <https://doi.org/10.1016/J.JCE.2014.05.006>
- Badan Pusat Statistik. (2019). *Indikator tujuan pembangunan berkelanjutan Indonesia 2019 [Indicators of Indonesia's 2019 sustainable development goals]*.
- Badan Pusat Statistik. (2021a). Persentase penduduk usia 0-17 Tahun dengan kepemilikan akta lahir (40% Terbawah).
- Badan Pusat Statistik. (2021b). Persentase rumah tangga yang memiliki akses terhadap hunian yang layak dan terjangkau menurut provinsi.
- Badan Pusat Statistik. (2021c). *Statistik Indonesia*.
- Badan Pusat Statistik. (2021d). Unmet need pelayanan kesehatan menurut Provinsi, 2015-2018.
- Biggeri, M., & Mauro, V. (2018). Towards a more 'Sustainable' Human Development Index: Integrating the environment and freedom. *Ecological Indicators*, 91(March), 220–231. <https://doi.org/10.1016/j.ecoind.2018.03.045>
- Blum, M. (2013). The influence of inequality on the standard of living: Worldwide anthropometric evidence from the 19th and 20th centuries. *Economics & Human Biology*, 11(4), 436–452. <https://doi.org/10.1016/J.EHB.2012.12.002>
- Chen, W. (2011). How education enhances happiness: Comparison of mediating factors in four East Asian Countries. *Social Indicators Research* 2011 106:1, 106(1), 117–131. <https://doi.org/10.1007/S11205-011-9798-5>
- Conceição, P. (2019). *Human development and the SDGs* (pp. 24–26). pp. 24–26. The World Bank.
- Dean, J. H., Shanahan, D. F., Bush, R., Gaston, K. J., Lin, B. B., Barber, E., ... Fuller, R. A. (2018). Is nature relatedness associated with better mental and physical health? *International Journal of Environmental Research and Public Health*, 15(7), 9–11. <https://doi.org/10.3390/ijerph15071371>
- Drury, J., Evripidou, A., & van Zomeren, M. (2015). Empowerment: The intersection of identity and power in collective action. In D. Sindic, M. Barreto, & R. C. Lopes (Eds.), *The intersection between power and identity* (pp. 1–36). Psychology Press.
- Eyesebach, G. (2007). Poverty, human development, and the role of eHealth. *J Med Internet Res*, 9(4)(e34). <https://doi.org/10.2196/jmir.9.4.e34>
- Field, A. (2009). *Discovering Statistics Using SPSS* (3rd ed.). California: Sage Publications.
- Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable Development Goals: A need for relevant indicators. *Ecological Indicators*, 60, 565–573. <https://doi.org/10.1016/J.ECOLIND.2015.08.003>
- Haryanto, J. T. (2018, September). Isu SDGs dan perbaikan kualitas IPM. *Investor.Id*.
- Herrero, C., Martínez, R., & Villar, A. (2012). A Newer human development index. *Journal of Human Development and Capabilities*, 13(2), 247–268. <https://doi.org/10.1080/19452829.2011.645027>
- Hou, J., Walsh, P. P., & Zhang, J. (2015). The dynamics of Human Development Index. *Social Science Journal*, 52(3), 331–347. <https://doi.org/10.1016/j.soscij.2014.07.003>
- Johnson, K.-A. (2016). Do internet and human capital matter for economic growth in developing countries? Empirical evidence from WAEMU Countries. *Modern Economy*, 07(11), 1186–1197. <https://doi.org/10.4236/me.2016.711116>
- Kim, H.-Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry & Endodontics*, 38(1), 52. <https://doi.org/10.5395/rde.2013.38.1.52>
- Klugman, J., Rodríguez, F., & Choi, H. J. (2011). The HDI 2010: New controversies, old critiques. *Journal of Economic Inequality*, 9(2), 249–288. <https://doi.org/10.1007/s10888-011-9178-z>
- Lind, N. (2019). A Development of the Human Development Index. *Social Indicators Research*, 146(3), 409–423. <https://doi.org/10.1007/s11205-019-02133-9>
- MacIvaine, W. R., Nelson, L. A., Stewart, J. A., & Stewart, W. C. (2013). Association of strength of community service to personal wellbeing. *Community Mental Health Journal* 2013 50:5, 50(5), 577–582. <https://doi.org/10.1007/S10597-013-9660-0>
- Marcinko, I. (2015). The moderating role of autonomous motivation on the relationship between subjective well-being and physical health. *PLOS ONE*, 10(5), e0126399. <https://doi.org/10.1371/JOURNAL.PONE.0126399>
- Nguefack-Tsague, G., Klasen, S., & Zucchini, W. (2011). On weighting the components of the human development index: A statistical justification. *Journal of Human Development and Capabilities*, 12(2), 183–202. <https://doi.org/10.1080/19452829.2011.571077>
- Prasetya, A. (2021, February). Indeks demokrasi 2020 turun, KSP jelaskan upaya pemerintah cegah intoleransi. *Detik.Com*.
- Puspitasari, L., & Ishii, K. (2016). Digital divides and mobile Internet in Indonesia: Impact of smartphones.

- Telematics and Informatics*, 33(2), 472–483.  
<https://doi.org/10.1016/j.tele.2015.11.001>
- Sayles, J. S., Mancilla Garcia, M., Hamilton, M., Alexander, S. M., Baggio, J. A., Fischer, A. P., Pittman, J. (2019). Social-ecological network analysis for sustainability sciences: A systematic review and innovative research agenda for the future. *Environmental Research Letters*, 14(9). <https://doi.org/10.1088/1748-9326/ab2619>
- Setiawan, T., & Suhartomo, A. (2019). The relation between internet use and societal development in Indonesia. *ICSECC 2019 - International Conference on Sustainable Engineering and Creative Computing: New Idea, New Innovation, Proceedings*, 133–137. <https://doi.org/10.1109/ICSECC.2019.8907127>
- Stephoe, A., Deaton, A., & Stone, A. A. (2015). Subjective wellbeing, health, and ageing. *The Lancet*, 385(9968), 640–648. [https://doi.org/10.1016/S0140-6736\(13\)61489-0](https://doi.org/10.1016/S0140-6736(13)61489-0)
- Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2009). *Report by the Commission on the Measurement of Economic Performance and Social Progress*.
- Sujarwoto, S., & Tampubolon, G. (2016). Spatial inequality and the internet divide in Indonesia 2010–2012. *Telecommunications Policy*, 40(7), 602–616. <https://doi.org/10.1016/j.telpol.2015.08.008>
- UNDP. (n.d.). Sustainable development goals.
- UNDP. (1990). Human Development Report 1990. Concept and measurement of human development. In *United Nations Development Programme*.
- UNDP. (2010). *Indeks demokrasi Indonesia 2010: Kebebasan yang bertanggungjawab dan Substansial*.
- UNDP. (2020). *Human Development Report 2020 -The Next Frontier: Human Development and the Anthropocene*.
- World Health Organization. (2017). *State of health inequality Indonesia*. Retrieved from <https://apps.who.int/iris/handle/10665/259685>