

# The Effects of Social, Cultural, and Internet Access on Labor Productivity

Raina Linda Sari<sup>1</sup>, Sirojuzilam Hasyim<sup>1</sup>, Inggrita Gusti Sari Nasution<sup>2</sup>,  
Herfita Rizki Hasanah Gurning<sup>2</sup>

<sup>1</sup>Doctoral Program in Economics, Universitas Sumatera Utara, Jl. Prof. T.M Hanafiah, SH,  
Kampus USU, Medan, Indonesia

<sup>2</sup> Department of Development Economics, Universitas Sumatera Utara, Jl. Prof. T.M Hanafiah, SH,  
Kampus USU, Medan, Indonesia

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Abstract: Human resource development is a part of the focus of Sustainable Development Goals (SDGs). Indonesia relates most targets and indicators SDGs into Indonesia's development plans. Productivity is one of the problems of human resource development that needs to be resolved by the government. This paper aims to analyze the effects of education and health (social factors), crime (cultural factor), and internet access on labor productivity in Indonesia. This paper uses panel data which is estimated using the Fixed Effect Model (FEM). This research can prove that to increase Indonesian labor productivity can be achieved by improving health, reducing crime, and increasing internet access. Meanwhile, this paper has not been able to prove that education affects Indonesian labor productivity.

## 1 INTRODUCTION

Over the past three decades, Indonesia has benefited tremendously in human development. With the value of the human development index (HDI) of 0.68 Indonesia is in the group of countries with "medium level in human development". From the data obtained on the page of the Human Development Report (2017), Indonesia as a whole is ranked 113th out of 188 countries in 2015, where the ranking has increased three times from 2010. Meanwhile, the growth of HDI slowed in 2010 to 2015 (only increased by 0.92 percent).

The problem of human resource development is one of the focuses of the Sustainable Development Goals (SDGs). One of the objectives of the 17 SDGs is to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. (<https://sdg2030indonesia.org/>). Signing of Presidential Regulation No. 59 of 2017 concerning the Implementation of Achievement of the Sustainable Development Goals is one form of Indonesian government support for the SDGs. The government connects most SDGs targets and

indicators into the national mid-term development plan (RPJMN) and follows up on the strong convergence between the SDGs and the president's nine priority agenda "Nawa Cita".

Research on labor productivity has been widely studied. However, some of the existing studies such as. (Wahyuni, 2019); (Muslim et al, 2019); (Kumala et al, 2018); (Ganau & Pose, 2018); (Naidah & Hermansyah, 2017); (Grimes et al, 2012); (Fleisher et al, 2011); (Hanson et al, 2010) and (Boles et al, 2004) have not conducted a thorough research on the effects of social, cultural, and internet access simultaneously on labor productivity. In addition, this study examined all workers in the country of Indonesia, while some previous studies only examined labor in a company not a country.

This study aims to analyze the influence of social, cultural, and internet access on labor productivity. The social factors in question refer to education and health, while the cultural factor refer to the level of crime that occurred in Indonesia.

The findings of this study are expected to be able to provide policy proposals to the government to increase labor productivity in Indonesia. Furthermore, increasing labor productivity is

expected to improve people's welfare and then be able to increase economic growth.

## 2 LITERATURE REVIEW

### 2.1 Human Resources

Capital accumulation, population growth, and Technological Advancements are the main components in the economic growth of every nation (Todaro & Smith, 2004). Capital accumulation includes investment and improving the quality of human capital to increase output in the future. Population growth as a factor of production and their involvement in technological advancements will also spur economic growth.

Therefore, the quality of human resources is an important aspect that needs to be considered by the government. Quality human resources will increase productivity and will further increase economic growth in a country.

### 2.2 Labor Productivity

Pindyck & Rubinfeld (2012) He describes the production function as the output relationship (Q) of its inputs, namely technology (A), capital (K), and labor (L). As in the following function:

$$Q = f(A, K, L) \quad (1)$$

The aggregate output is written as an endogenous variable (Y) which can be valued by the amount of money from the output value produced. If the labor is moved to the left section as an output divider, the labor productivity function is obtained as follows:

$$Y/L = f(K/L), A \quad (2)$$

According to Greeberg in Mathis & Jackson (2001) labor productivity is a comparison between the totality of expenditure at a given time divided by total input during that period. In other words, productivity is defined as the ability of the workforce to produce output.

#### 2.2.1 Social Infrastructure and Labor Productivity

The World Bank divides infrastructure into three types. First, economic infrastructure which is the physical infrastructure needed to support economic activity. Second, social infrastructure, including

education, health, housing, and recreation. Third, administrative infrastructure, including law enforcement, administrative control, and coordination.

This study will discuss social infrastructure that refers to the second classification that is education and health. Because both of these are forming human capabilities as elements of human resources to achieve economic growth.

Muslim et al (2019) make a research about Analysis of Labor Productivity at Wall Façade Works on POP Hotel Development Projects in Pekanbaru. This study analyzes the influence of age, work experience, level of education, suitability of wages, health of workers, relations between workers, managerial, and composition of working groups on the level of labor productivity. The results of the study show that education and wage levels can affect productivity. In this study it can also be concluded that the level of education has a dominant influence on productivity with a beta value of 0.993.

The influence of this level of education on productivity has also been examined by Naidah & Hermansyah (2017) and Fleisher et al (2011). Their research found that the higher the level of education the higher the labor productivity.

In addition, Boles et al (2004) conducted research on The Relationship Between Health Risks and Work Productivity. This research was conducted on 2264 employees of a large national employer located in the Northeast. The results showed that reduced productivity occurred in labors who had diabetes and stress. In other words, health can affect labor productivity. The lower the quality of health, the lower the productivity of the labor.

In this study the level of education was proxied by variable School Life Expectancy (HLS). While the level of health is proxied by the variable life expectancy (AHH).

#### 2.2.2 Culture and Labor Productivity

Romer (2012) Romer stated that in addition to human capital, there are other variables that can affect worker productivity, namely geography and culture. In this study the variable used to capture the cultural effect on productivity is crime. In this case, criminality is considered a variable that is thought to reduce labor productivity. This makes sense, because crime is related to comfort. A good work environment will make workers more comfortable in doing their jobs.

Crime affects people's quality of life. Victimization of crime affects many things,

including disruption of work functions and higher unemployment rates (Hanson et al, 2010). Ganau & Pose (2017) conduct research about industrial clusters, organized crime, and productivity growth in Italian SMEs. The results found that firms' productivity growth affected by the negative direct effects of organized crime. It also shows that the negative effect on productivity growth from organized crime is greater for small companies than for large companies.

Thus, an increase in crime is thought to be able to influence the productivity of individual workers. This study uses a variable in the number of criminal incidents reported to the Police Station to proxy crime rates.

### 2.2.3 Internet Access and Labor Productivity

According to Romer (2012) Developing countries are currently poor because the population does not have access that is used by developed countries to create economic value. The technology gap is in the form of physical object gaps (factories, highways, and modern machines) and idea gaps (information and processing of transactions and generating motivation for labor).

Berg (2001) argued that in order to realize economic growth, one that is needed is technological advancement which has the role of finding new production methods that are more productive and efficient. The development of the Internet is one part of technological progress.

A study of convergence and the influence of the internet and capital on industrial labor productivity in Indonesia has been carried out by Wahyuni (2019). By using dynamic panel data from the extended GMM approach, this study concludes that capital increases and increased internet use can increase industrial labor productivity and accelerate convergence so that the time needed to reduce industrial labor productivity gaps can be shortened..

Similar research has also been carried out by Grimes et al (2012). This paper uses a large micro-survey of firms to determine the impact that broadband access has on firm productivity. The results found that firm productivity boosted by 7-10% due to broadband adoption. This results are consistent across urban versus rural locations and across high versus low knowledge intensive sectors.

The development of information technology, especially the use of internet access, is thought to be able to increase effectiveness and efficiency in a job so as to increase labor productivity. This study uses

the percentage of residents who access the internet to proxy the internet access variable.

## 3 METHOD

This study uses panel data, namely a combination of cross-section and time series data. The data used are data from 33 provinces in Indonesia with a period of 2013-2017. The variables used in this study are productivity variables as dependent variables. While the independent variable is School Life Expectancy Life Expectancy Crime, and Internet Access.

The data used in this research is secondary data. Data was obtained from the Central Statistics Agency (BPS), World Bank, Human Development Report (HDR), and the United Nations Development Program (UNDP).

To analyze the influence of social, cultural, and internet access on labor productivity, the method used is panel data regression with the following equation:

$$Y/L_{it} = \alpha + \beta_1 HLS_{it} + \beta_2 AHH_{it} + \beta_3 Crime_{it} + \beta_4 Aksin_{it} + \varepsilon_{it} \quad (3)$$

$Y / L$  is labor productivity,  $HLS$  is School Life Expectancy,  $AHH$  is Life Expectancy,  $Crime$  is a crime rate, and  $Aksin$  is Internet Access. Whereas  $i$  is the province in Indonesia (33 provinces), and  $j$  is the time studied (2013-2017).

Equation (3) is estimated by the Chow Test and Hausman Test to get the appropriate model. Some of the models to be chosen are Pooled Least Square (Common Effect), Fixed Effect, or Random Effect. It is estimated by using Eviews 9.

Pooled Least Square (Common Effect) estimates panel data with ordinary OLS, there is no similar character between province A in 2013 and province A in 2014. In contrast, Fixed Effect Model has a constant slope coefficient, whereas intercept is different - different between times. Meanwhile, in Random Effect Model, variations in values and direction of relationships between subjects are assumed to be random specified in residual form (Gujarati, 2009).

## 4 RESULTS AND DISCUSSION

### 4.1 Choosing Appropriate Model

Choosing the appropriate model whether using Pooled Least Square/PLS (Common Effect) or Fixed

Effect Model (FEM) is by using the Chow Test. While choosing a model whether using the Fixed Effect Model (FEM) or Random Effect Model (REM) is by using the Hausman Test.

Table 1: Estimated Results of Chow Test and Hausman Test.

Test	Hypothesis	P-Value	Conclusion
Chow Test	Ho: PLS H1: FEM	0.000	Reject Ho (Using FEM)
Hausman Test	Ho: REM H1: FEM	0.000	Reject Ho (Using FEM)

From the estimation results as shown in table 1, it can be concluded that the most appropriate model to use is the Fixed Effect Model. This study assumes that all variables (Productivity, HLS, AHH, Crime, and Internet Access) change at a constant level over time.

### 4.2 FEM Estimated Results

Table 2 is the specification effects of Fixed Effect Model. R-squared value of 0.9676 means that variations in the amount of labor productivity in Indonesia can be explained by the variable School Life Expectancy, Life Expectancy, crime, and internet access by 96.76%, while the rest are explained by other variables outside the model. In this case, the model used in this study is appropriate.

Table 2: Effects Specification of Fixed Effect Model.

Specification	Value
R-squared	0.967674
Prob(F-statistic)	0.000000

Table 2 also shows that the probability of a F-statistic value of 0.00 is smaller than alpha 5%, rejecting Ho. This indicates that the School Life Expectancy, Life Expectancy, crime and internet access variables simultaneously affect labor productivity in Indonesia.

Based on the estimation results as found in table 3, School Life Expectancy does not significantly affect labor productivity in Indonesia. This indicates that formal education alone is not enough to increase labor productivity. However, it also requires an increase in competence and skills through non-formal education and training.

This study can prove that each variable, namely the level of health, crime, and internet access has a significant effect on labor productivity. The Life Expectancy coefficient of 3.0077 indicates that for every 1 year increase in life expectancy, labor

productivity in Indonesia will increase by Rp 3 billion, ceteris paribus.

Table 3: Productivity Fixed Effect Model

Dependent Variabel: Productivity	Parameter Estimates	
	Coefficient	SE
School Life Expectancy	0.1856	1.0957
Life Expectancy	3.0077*	1.7050
Crime	-0.0001**	6.74E-05
Internet Access	0.0428***	0.0144
Constant	-200.27*	108.4331

Note: \*Significant at 10%, \*\*significant at 5%, \*\*\*significant at 1%

The Crime coefficient of -0.0001 indicates that every increase in the number of incidents of crime reported to the police by 1 event, labor productivity in Indonesia will decrease by Rp 100,000 ceteris paribus. Meanwhile, the internet access coefficient of 0.0428 indicates that each 1% increase in the population who access the internet, labor productivity in Indonesia will increase by Rp 42.8 million, ceteris paribus.

## 5 CONCLUSIONS

This research is able to prove that each variable of Life Expectancy, Crime, and Internet Access significantly affects labor Productivity in Indonesia. This research can prove that to increase Indonesian labor productivity can be achieved by improving health, reducing crime, and increasing internet access. Meanwhile, this paper has not been able to prove that education affects Indonesian labor productivity.

Therefore, the government needs to create a program that is able to encourage workers to improve their competencies and skills, for example through informal education and training assistance programs in certain areas of expertise. In addition, the government must also be able to run programs that support sustainable health improvement. Equity for the advancement of information technology also needs to be considered so that all levels of society are able to enjoy convenience due to technological developments, especially internet access. Finally, the government needs to improve the security and order system to maintain the comfort of the community.

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