The Influence of R & D Investment & Human Capital towards Indonesian economic Growth Rate to Address the ASEAN Economic Community

Nur Fatwa

Doctoral Candidate, Postgraduate Faculty of Economics
Halu Oleo University, Indonesia
email: Nurfatwa17@gmail.com

BuyungSarita

Professor, Faculty Of Economics
Halu Oleo University, Indonesia

ZainuddinSaenong

Doctoral, Faculty Of Economics
Halu Oleo University, Indonesia

Muh. YaniBalaka

Doctoral, Faculty Of Economics
Halu Oleo University, Indonesia

Gamsir

Doctoral, Faculty Of Economics
Halu Oleo University, Indonesia

Abstract- This research aims to find out if there is a positive and significant influence among Research & Development (R&D) investment and Human Capital (HC) towards Indonesia's economic growth rate. This research is quantitative research, where research data used are secondary data in time-series about the amount of R&D investment, HC and Indonesia's economic growth data that comes from the Central Bureau of statistics, Indonesia's financial data that is already published by the Ministry of finance, the Ministry of research & technology, Ministry of agriculture, the Ministry of education, the Ministry of industry and BKPM data, as well as the published data by others financial institutions in Indonesia. The methods used in the analysis of data using multiple linear regression analysis using E views 8.0. The results showed that investment in Research & Development (R&D) and Human Capital has a positive and significant impact on the growth rate of the Indonesia's economic in 2000-2013.

Index Terms— Research& Development (R&D) Investment, Human Capital (HC), Indonesia's Economic Growth (GDP)

I. Introduction

The process of economic development is highly complex. Such complexity was marked by efforts to increase productivity through process of production as determined by the input factors such as capital, labor, technology and raw materials, as well as aspects of the place where such activities take place, the social aspects that affect the society behavior at both the production process and on consumption behavior.

Developed countries such as the United States and Japan can be successful mostly sustained by his ability in terms of technology. Countries with success stories such as that described above approaches understand The New Growth Theory. This understands a technology as an endogenous factor in respect of. Technology transfer is viewed only as a part of the process even the mere increase in the technological capability development. The process itself is not stopped until there, but rather continues the process of adaptation, assimilation and creation technology by such countries. The process continues from this technology transfer requires a deliberate planning, transparent strategy, and the cost prohibitive. This process became known as the learning technologies.

In applying the technology required system and the concept that technology or innovation can actually encourage the growth of competitiveness that can manifest prosperity for society. One of the concepts for improving competitiveness through the mastery of technological capabilities is to use the approach to the concept of "Innovation Systems through R&D". With regard to this question, the development issue of the technological capabilities in Indonesia towards endogenous economic growth with innovation systems approach, through the R&D and the quality of human capital.

Indonesia post reform is the momentum of economic growth returns had slumped due to the national economic crisis because of a crisis of liquidity so it made the monetary sector slumped. Signs of the economic crisis recovery began in 1999 that the era of President B.J. Habibie. At that time, Indonesia's GDP level was already growing positive though still weak at

0.79 percent. The level of GDP starting conditions turn over in 1.341.330 .5 billion.

The movement of increasing growth in the period 2000 to 2012 of Indonesia GDP can be seen from Indonesian National Income per Capita (Indonesia's Economic Growth Rate, BPS, 2013). Growth in 2000 with a GDP value of 4,92 percent higher than the initial projection of Bank Indonesia about 3.0 – 4.0 percent. Some progress was also achieved in the process of Government foreign debt settlement, the recapitalization of banking as well as an agreement between the Governments of BLBI with Bank Indonesia. Indonesia's economic growth continued to improve until it reaches the highest value of 49 per cent of GDP in 2011. But a little bit downhill again in 2012 to 6,29 percent. The occurrence of positive growth in 2009, in which the same Countries of Asia, Europe and the Americas experienced a negative growth (Indonesia, China, India there was a positive growth) because the population of Indonesia are a large domestic consumption and the value of imports of consumer goods has not been too great. However, the recovery of growth to its normal position is still slow compared to other Asian countries (South Korea, Japan, Malaysia, Singapore, Thailand, Viet Nam and Filiphina).

Approval and realization of capital investment, either seen from the invested money value or based on the amount of its activities illustrate the achievements of the performance realization of capital investment in Indonesia during the period from 2000 to 2012 (Realization of PMA and PMDN at Enterprises Field in 2000-2012 (BKPM, 2013). This achievement is so fundamental to be analyzed because of the strength of economic structures related are already achieved. Influence of capital composition in pushing economic production in Indonesia become an interesting discussion if associated with the realization of economic development policies that have generated economic growth rates in the meantime.

Furthermore, data from BKPM (2013) shown that investment value on the enterprises field sector above produces a very different investment amount. This is the difference in the Indonesia's economic development. The PMA investment to agriculture sector only 10 percent of the PMA industry investment value in 2012. Although investing value in 2011 and 2012 for tertiary sector was down below the primary sector, but for 10 years, the achievement of tertiary investment in trade, the hotel and restaurant took the second rank of PMA investment after secondary sector. From 2008 to 2012, the total value of PMDN approvals amounting to IDR 22.3242.876.000 with 54 projects, and PMA valued at USD 2.674.770.540 with 66 projects. If the total value of PMA and PMDN investment approvals in 2012 was combined, the total becomesIDR 49.090.581.421.434 with 113 projects.

Based on the above conditions, it can be concluded that it is very important for Indonesia to analyses more specifically the impact of economic growth results that have been produced related to the investment structure which became a major force in economic production to support workforce absorption and performance as Indonesia's economic growth parameters. Economic growth and expansion of employment opportunities that lead to increased employment through increased investment and the welfare of society, is the goal to be achieved in the economy of Indonesia.

The role of Human capital in economic growth has become an important study in economics. It is based on the consideration that the most efficient way of doing a country's national development lies in the improvement of the people's ability. Human Capital theory assumes that education is the most important instrument for making society which has a high productivity. According to this theory, the growth and development of two terms, namely the utilization of high technology efficiently and the presence of human resources who can take advantage of existing technology. Such human resources generated through the process of education. Therefore, investment in Human capital is a very important role to boost the economic growth.

The importance of the role of Human Capital to economic growth confirmed by Lester Carl Advisory, a Professor of the Sloan Management School, Massachusetts Institute of Technology (MIT), United States. At a meeting with NSF (National Science Foundation) in the United States, he stated that, the role of natural resources, labor and past glory of a nation's economic growth will be reduced.

While the role of creativity and innovation in human resources will be increasingly on the rise.WhileM. HattaRajasa initiated 'a Creative Human Resources in Build the Nation and the Future.(http://www.setneg.go.id). This opinion is very reasoned look at the experience of United States in improving their economy. E.F. Denison had been doing research on the sources of economic growth in the United States economy in the period 1909-1957. The results showed that education contributed 0.35 percent of Gross National Product in the United States in 1909-1929. Whereas the period of 1929 – 1957, produces educational donation is about 0.57 percent.

Macro-economic indicators reached Indonesia is still unstable with respect to economic fundamentals due to the structure of labor quality is inversely proportional to the success of achieving economic growth above 6.0 percent. The Government of Indonesia should be able to undertake a restructuring of the quality of human capital inequality on the quality of the Labor Group's primary, secondary and tertiary.

Economic growth tends to still rely on from the success of the industrial sector, causing a weak absorption of the work force. Central Government fiscal policy against the commitment in preparing public facilities as an expenditure aggregate factors of economic production related to the development indicators technology are still far from needs. This research is very important to see how the quality and commitment of the Indonesia Government in implementing the technology development strategy for the national economic development.

Based on the above phenomena and to prove the results from research that has been done before, this research aims to carry out an analysis of the influence of Research & Development (R&D) investment and Human Capital (HC) on Indonesia's economic growth from 2000 to 2013 in an endogenous growth model.Economic growth is then, become the foci of our research issues, how the positive economic growth that Indonesia gained in twelve years should be able to obviously give an impact back in the regional economy and welfare.

The position of Indonesia as a country that has the potential of natural resources capital through agriculture, marine and the support of a large labor force as a major factor in production are the main capital in Indonesia's economic growth. The importance of addressing the readiness of Indonesia entered the era of global competition, namely the ASEAN Economic

Community in 2015 became a special note for researchers in theming and issues the economic growth.

II. REVIEW LITERATURE

2.1 Endogenous Economic Growth Model

Conceptually a country's economic growth showed a growth of economic activity from one period to the next period. Economic activity is going to produce outputs (revenue). So, economic growth essentially shows the development of the output of the following period. In order to achieve the required output rate of capital accumulation that corresponds to the desired output level. Economic growth in this sense mathematically can be derived from the following equation (Meier and Rauch, 2000): the output is assumed to be a function of capital (physical capital and human capital), then: $Y = f(k)$. A special form of the equation can be written to: $f(k) = Ak$.

Based on the above formula, the economic growth is a process of increase in output per capita in the long run generated by the economy of a region. Based on the understanding, there are three aspects to note in economic growth, i.e. the growth process, per capita output, and a long period of economic growth (Boediono, 1999).In order to achieve a level of economic growth as expected, there are three things to note, such as: there is accumulation of capital, population growth, especially the growth of the labor force and technological advancement (Todaro, 2000).

The theory of growth model began by Ricardo and Malthus that try to analyze the economy of United Kingdom in the early 19th century (Snooks, 1998). The model many garnered criticism because it didn't fit with the reality of the world development. Ruttan (1998), has the view that the development of the theory the most interesting growth after the mid-20th century with the advent of new literature. In his paper reporting said that the development of the theory of growth are grouped in three waves. The first wave was initiated by the work of Harrod (1939 and 1948) and Domar (1946 and 1947) at the end of the 1930's to 1940's. Second wave is the development of the neoclassical model of economic growth by Solow (1956) and the Swan (1956) in the mid-1950s. Third Wave initiated by Römer (1983 and 1986) and Lucas (1988) in the mid-1980s.

The theory of the development of endogenous growth models trying to explain that the sources of growth are the increasing accumulation of capital in a broad sense. Capital in this case not only in physical but also a non-physical form of science and technology. The development of this technology will develop innovation so as to increase productivity and lead to an increase in economic growth of a region.

The new discoveries were derived from the process of learning by doing, which can bring up new discoveries that increase the efficiency of production. Endogenous economic growth also incorporates factors Research & Development (R&D) as the leading edge of production inputs in optimize output through the inception of the technology products that support the production process. This efficiency can increase productivity. So in this case, the quality of human resources is vital and influential factors of economic growth. The following are some of the growth model:

AK Model

Barro and Martin (1995) made the endogenous production function model with a diminishing return yet still impose the assumptions for the variable eksogenus. The production function is: $Y = AK$. This model does not have convergences characteristics of Solow-Swan model. However, by doing the transformation of the production functions can be achieves the convergence of the asymtotis towards a fixed growth rate. The simplest example is $Y = F(K, L) = AK + BK^\alpha L^{(1-\alpha)}$, which has the nature of $f(k)/k = A + Bk^{-(1-\alpha)}$ and when $k \to \infty$, $f(k)/k \to a$. Then, from the equation $Y = AK$, steady state growth rate of capital is A, and is greater than zero. In the AK model, the government can influence the growth rate if increase the savings rate.

Romer Model

Early models of endogenous growth by Römer (1983, 1986) stated that the long-run growth is generally determined by the accumulation of knowledge. Despite the addition of a new science of diminishing returns in a company, but the creation of the science on a firm is assumed to have a positive impact on the technological production of externally to other companies. Similarly, the production of consumer goods indicates increasing returns. Production Company function i can be:

$Yi = F(Ki, Li, K)$ where:

Ki = level physical capital company

K = level aggregate capital of an economy that is concerned with the level of technology,

Li = level of employment on i company.

The value of K will increase if every company increasing the Ki and occur over technology-spill at other companies as well as diminishing returns to capital will not happen as a whole. Assuming constant returns for capital, profit maximization and zero profit condition, will be producing at the time the growth rate of per capita consumption reaching equilibrium, i.e.:

$\gamma c = (1/\theta) [f(L) - b. f'(L) - \delta - \rho]$ where:

$f(L) = f(ki, K)/ki$ and $f(ki, K)$ is a function of the production per worker.

This model is the same as the basic AK models. If we assume the assets per household is the equivalent of capital per worker, then there is no transitional dynamics and economics have always reached the long run equilibrium where $\gamma c = \gamma y$.

On these models the community can achieve a higher rate of growth due to externality factors from the effects of spill-over. By put the external into the internal factor, we can achieve a higher growth rate with derivation inter-temporal optimization: $\gamma c (optimal) = (1/\theta) [f(L) - \delta - \rho]$ to consider policy implications include investment-tax credit or a production subsidy.Some researchers suggest that the effects of spill-overs technology may not be demarcated politically, but keep noticing effects within regional or global scale (Barro and Martin, 1995).

Lucas Model

Other endogenous growth model was developed by Lucas (1988). He did a Two-Sector model of Learning-by-Doing and Schooling models that incorporate the factors of human capital as a factor driving economic growth. On the first model, the growth of human capital depends on how worker between current production and human capital accumulation, whereas

the second model, the growth of human capital is a positive function for the production of new goods. As in the RÖMER model, Lucas model had an internal effect to the worker productivity and the external effect on sources of scale economies and increase productivity in addition to the factors of production. However, the accumulation of human capital would be at the expense of utility consumption in the current moment.

On the first model, the sacrifice comes from the reduction in current consumption, whereas in the second model, derived from a combination of current consumption goods with human capital. Lucas argues that the importance of the fundamental policy to raise the welfare level by providing subsidies on the school. Similarly, the subsidies on R&D cost to improve operations in the industry.

*TheSecond*Romer Model

Römer (1990) developed a second model about the implications of the human capital development on the growth rate of the economy in which he introduces the endogenous growth by assuming the technology as a non-rival and partially excludable good (externalities and effects spill-over will be heading on endogenous growth model).

Romer had developed his research and had contributed about major sources of economic growth (Römer, 1994 & 1996). New growth theory is divided in two different fundamental types of productive inputs i.e. ' ideas ' and ' things ' (Ruttan, 1998). "Things" are rival goods while "ideas" are non-rival goods are produced and distributed such other items. Later Römer (1996), effect of scale is important for "ideas" (non-rival goods) are expensive to develop but not expensive to use. Its value increases with the market size and implies large economies (large internal markets) have a greater incentive to produce "ideas" as more profit to innovation compared to the small countries. Furthermore, it is estimated that major countries will grow faster than small countries.

Todaro (1998) said that rapid economic growth became the main work and the object of the economic expert main concern, planners, decision makers and politicians in developing countries over this past three decades. This happens because economic growth is considered to be the main prerequisite in achieving a higher standard of life for all members of society in the countries concerned. That is why economic growth is the central to the development of shares held. Amir (2006) suggests that economic growth is one of the important indicators in assessing the performance of an economy, particularly to conduct an analysis of the economic development results that have been carried out of a country or a region. The economy is said to be experiencing growth if the production of goods and services increase from the previous year.

2.2 Research and Development

The latest economic growth Model is a model of growth that is capable of explaining the contribution the development of technology by taking action against a country's economic growth. The basic idea of this growth model is capital investment in both human and machine, and creates positive externalities. This means that investment not only increases the productive capacity of the companies investing or labor but also the productive capacity of the enterprise and other related

labor. The point of emphasis from technological innovation and the formation of human capital are seen as a major source of productivity growth, where growth is the productivity itself in turn becomes its driving force of economic growth. With the development of technological innovation through research and development (R&D) will provide optimization of productivity on production function, ultimately creating increased economic growth in the long term period (Römer, 1994).

As for the production function in the new growth model, has included technological elements/productivity in the models, so that new growth model is also known as an endogenous growth model, which is as follows: $Y = F (K, N, A)$

The above equation States that the output level depends on the level of capital stock (K), the number of Labor (N), and the level of the R&D technology. In this model, where the level of development and technological advancement is no longer considered as exogenous factors (factors that are outside the model), but it is assumed as an endogenous factor (Froyen, 1996).

If the equation above becomes $Y = F (K, R\&D, N)$, then the obtained relationships from the effects of technological change (R&D) to economic growth (output), capital and labor. So the resulting technological development related:

1. Development/advancement of technology reduces the amount of labor needed to acquire a number of outputs. By doubling technology via R&D then the result will be the same amount of output produced by using only half of the original amount of power.
2. Improvement in technology development with R&D which shows the number of effective labor in the economy.

A company that has recently acquired a new machine does not need to worry that other companies will use a particular machine. Whereas, a company that has discovered and developed a product could not gives assumptions (Blancard, 2003). This statement indicates that the level of expenditures for research and development activities relies not only on the level of fertility ' research ' (how spending for research and development activities transformed the new ideas and new stuff) but also relies on the results of R&D, a level which the company benefits are from the R&D activities.

The progress of research and development (R&D) by Matheos r. Corinus (2007) will last is determined by two factors, namely the process of R&D fertility research and the accuracy of the R&D results. Associated with R&D fertility, then the company will have plenty of incentive to issue in the field of research and development so that the R&D as well as the level of technological advancement will be high. While the accuracy of the R&D if the company or government agency can not benefit from the accuracy of the development of new products, then the company or government agency will not do the research and development of research activities and the impact to the R&D is the level of technological advances that progressively slows and imposes economic productivity slowdown. Ultimately, economic growth will have a constant condition.

R&D is the research and development activities that have commercial interests in relation to pure scientific research and the development of applicable technology (Soraya, 2013). Financial accounting standards no. 20 of 1994 states that original research is research that is planned and implemented in

the hope of gaining knowledge and understanding of new scientific or technical, while development is the application of research results or other knowledge into a plan or design to produce materials, devices, products, processes, systems, or services, prior to the start of commercial production or use.

Companies must be careful when investing in R&D. The R&D on the market's first investment is still in a State of uncertain expectations had an impact on the owner of the company at a high rate of success. But if the investment is successful then the company can lead the market or taking the majority of the market share of their industry (Kulatilaka and Lin, 2007). In many cases the result of R&D investment cannot be known in advance, as a result the level of uncertainty of the output to be very high. A high degree of uncertainty into the causes of external funds to finance expensive projects R&D and agency problems between managers and stockholders (Aoun and Hwang, 2008).

During the last 10 years of academic researchers,it has provided evidence of the importance of R&D (Jones, 1995 et al 2006 in Pindado et al., 2010). Pindado et al (2010) found that positive R&D is significantly to the value of the company on the company in Europe in 1986-2003. These findings are supported by Lu et al (2010) who finds a positive R&D significantly to the value of the company on the company in Taiwan.

R&D investment may affect the company's ability to make and or develop new products and adopt innovative technologies that improve productivity (Block,2009). But in many cases the investment yield on R&D not known before, as a result the level of uncertainty regarding the magnitude of the output is very high (Aoun and Hwang, 2008 and Block, 2009). The uncertainty of the results led to a conflict between the Agency owners (shareholders) and managers (Block,2009).

Companies that are able to innovate will earn a patent. The company that owns the patent of can introduce their products to the market. The Information in the form of patents is accessible to competitors to develop products (Harabi, 1995 in Block, 2009). But companies that are able to innovate have a significant advantage; the first company may precede a new competitor or potential competitor to enter the market, the two companies may block a strong contender with the use of a permit or license for innovation. Examples of chemical company that use license or cross-linking license for their innovations result (Kulatilaka and Lin, 2007). R&D has a positive influence on the company's value.

Company's competitiveness should be enhanced due to the increasingly competitive industrialization competition (Hardiyanti, 2012). Because competitiveness not only lies in the ownership of tangible assets, but more on innovation, information systems, the management of the Organization and the resources that it owns (Pratiska, 2012). Determinants of increased innovation very note on research management, because a lot of empirical evidence that shows that the investment in R&D has a positive influence on economic growth (Yanghua, 2010).

During the last 10 years, academic research has provided evidence of the important role of R&D in economic growth (Jones, 1995; Bowns et al, 2003; Arnold, 2006 in Pidado, de Queiros, and Torre, 2010). The R&D loss caused a decrease in the company's performance in the U.S. in 1980 and 1990s Japan (Nagoka, 2005). As a result, the researchers increased the attention on spending on R&D, which is no longer considered as a cost but an investment to enhance the value of the R&D in turn a profit above normal (Pidado et al., 2010). But research on R&D investment is still a little bit compared to investments in capital (Li, 2011).Pidado et al (2010) states that the R&D effect on the company value with moderated by company characteristics (the size of the company, the company's growth, free cash flow, market share, external financial dependence, labor intensity, and capital intensity).

The size of the company is an important factor which affects the R&D relationship on the company value. Big companies tend to spend the R&D fund in large numbers compared to smaller companies in economies of scale. Large companies tend to have stable capital amounting to the value of the company becomes high and so contrary to smaller companies. A steady capital large firm obtained due to the easy access of companies on the capital market (Pidado et al., 2010). In line with the statement that Gerhaeusser (1991) large companies excel in economies of scale in research, the efficiency in the implementation of research, diversification of risk and the ability to mobilize adequate financial resources. Company size influence on the relationship of R&D to the value of the company becomes interesting because the last few years a number of large and small companies involved in innovative activities (Shefer and Frenkel, 2005).

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R&D has an important role in increasing the value of the company (Pindado et al., 2010), because R&D is an intangible asset that has a focus on technology and science-oriented industries (Chan et al, 2001). The R&D investment is done to deal with the high uncertainty on the demand for innovation where needed (Kulatilaka and Lin, 2007). Companies that invest in the R&D trust that it would produce a superior product or service and deliver competitive advantage. R&D investment used to develop new products before competitors do it, to improve the quality of the product, or to improve the production process so that it can push the cost (David, 2009).

Investment in R&D make the company earn a significant advantage; the first company may precede a new competitor or potential competitor to enter the market, the two companies may block a strong contender with the use of a permit or license for innovation. As an example, chemical companies that use license or Crosslinking for their innovations result (Kulatilaka and Lin, 2007).Companies must be careful when investing in R&D, the first R&D investment in an uncertain market had an impact on the owner's expectations. They expect a high rate of success, but if the investment getting success the company can lead the market or taking the majority of the market share of their industry (Kulatilaka and Lin, 200).

In many cases the result of R&D investment cannot be known in advance, as a result the level of uncertainty of the output to be very high. A high degree of uncertainty causes the external funds of R&D projects become too expensive and the

problems between managers and stockholders (Aoun and Hwang, 2008). Based on the above review that the company has no other choice but to continue to develop new products and improve existing products due to consumer tastes and needs change, new technologies, the life cycle of the product, as well as increasing competition retracts domestic and foreign (David, 2009).

2.3 Human Capital

The importance of human capital in development had begun in the 1960s by Theodore Schultz about his investment in human capital. He said education is a form of investment in development and does not constitute a form of investment. In the process, Schultz showed that the development of the education sector by positioning humans as the focus in development have contributed directly to the economic growth of a country. This can be achieved through the enhancement of expertise/skills and production capabilities of the workforce.

Empirically,there is a differences in Human Resources (HR) conditions in developed countries with developing countries differ in both quality and quantity. Developing countries are faced to a reality that the low workforce productivity. This is because the quality of human resources is still low, whereas in the developed countries, education can be as investment in human capital (human capital investment). As result of high quality human resources is that the productivity of the workforce are also high.

There are two approaches are important in the theory of human capital approach, they are: Nelson-Phelps (1966) and Lucas (1988) approach. Approach by Nelshon-Phelps, Aghion and Howitt (1966) concluded that human capital is a very important factor in the economic growth of a country. The emergence of differences in growth rates in many countries are more due to the differences in human capital stock.

Aghion and Howitt's approach to support Nelson-Phelps about stock human capital which concluded that the work force is more skilled and educated will be better able to fill specified employment qualifications. In other words, workers who have higher education will be able to respond to innovations that will further enhance the economic growth of a country (and Meir Rauch, 2000: 216). While Lucasapproach(1988) emphasizes the significance of the accumulation of human capital to economic growth. According to him, there are two factors which are the cause of the human capital formation in a country. Both of these factors are education and learning by doing.

Barro (1998) analyzed the effect of education on economic growth in 100 countries during 1960-1995. These variables include: Government Consumption/GDP, Years of schooling (as proxies of human capital), Life Expectancy, Inflation rate, the Rule of Law Index, the Democracy Index, Fertility Rate, Investment/GDP, Growth rate of trade Terms. While the variable was bound in this research was the growth of GDP per capita.

By using multiple linear regressions analysis of model results of such research gives the conclusion of significant influence between education and economic growth. In more detail the human capital variables had a greater role to the economic growth than the physical capital variable.

2.4 Investment on Research and Development and Economic Growth

R&D has an important role in increasing the value of the company (Pindado et al., 2010), because R&D is an intangible asset that has a focus on technology and science-oriented industries (Chan et al, 2001). The R&D investment is done to deal with the high uncertainty on the demand for innovation where needed (Kulatilaka and Lin, 2007).

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Investment in R&D impact on the company in gaining a significant advantage; the first company may precede a new competitor or potential competitor to enter the market, the two companies may block a strong contender with the use of a permit or licence for innovation. As an example, chemical companies that use license or Crosslinking for their innovations result (Kulatilaka and Lin, 2007).

Companies with high growth have more funds for invest in R&D though a sizable percentage is derived from assets which have not been placed (and Ryan Wiggins, 2002 in Pidado et al., 2010). Other accounts mention that companies with high growth have a desire to invest in R&D (Manjon and Marino, 2012). A high level of company growth allowed the company to make a profit above normal from the R&D project that will ultimately increase the level of economic growth (Pidado et al., 2010).

Therefore, it can be formulated as follows:

Hypothesis, H1: R&D investment positively effect on economic growth

2.5 Human Capital and Economic Growth

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education will be able to respond to innovations that will further enhance the economic growth of a country (and Meir Rauch, 2000: 216). While Lucas approach (1988) emphasizes the significance of the accumulation of human capital to economic growth. According to him, there are two factors which are the cause of the human capital formation in a country. Both of these factors are education and learning by doing.

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Hypothesis, H2: Human Capital positively effect on economic growth

III. RESEARCH METHOD

Research data on each of these variables are as follows:
a. R&D investment (X1) as the independent variable is a program for the realization of investment expenditure on Research and Development in Indonesia's 2000-2013 as a form of new technological innovations included in it are physically capital, provision of laboratory machines, proto type that supports the research and development of new technological innovations in the production function.
b. Human Capital (X2) as the independent variable is the human capital by using the Average Years of Schooling (AYS) the data for the population aged 15 years and over 2000-year 2013 according to the highest Education that was finished by calculating the proportion of the old education for each level of education.
c. Economic growth (Y) as the dependent variable is defined as the gross domestic product (GDP) Indonesia per year according to constant prices 2000. Describe the level of advancement of the economy

which is the amount of the aggregate output generated through increased GDP in 2000-2013.

IV. RESULTS AND DISCUSSION

Descriptive Analysis

Herewith, in this section, we discussed the descriptive research variables respectively i.e. Economic growth (GDP), R&D, investment and Human Capital are discussed briefly below. The average GDP in Indonesia isIDR 1.968,64 Trillion from 2000 to 2013. The highest amount of GDP occurs in 2013 of IDR 2,770,345 Trillion. The amount of the lowest GDP occurred in 2000 amounted to IDR 1.389,769 Trillion. The total number of total GDP in Indonesia during the period 2000-2013 was IDR 27.804 Trillion. Based on the graph above, it was concluded that the economic growth (GDP) increased in 2000 to 2013.

Furthermore, Indonesia R&D investment as a developing country for real is far from proportionate. For 14 years, R&D expenditure was about IDR 2,653 trillion in 2000-2013. The highest R&D expenditure occurred in 2013 by number of IDR 6,694 Trillion, whereas expenditure of the lowest R&D expenditure occurred in the year 2000 amounted to IDR 846,4768 Billion.

Human Capital measurement started from ever taking the time and labor cost in turn increased production. Proxy period of the education level which conducted by labor in getting jobs become an endogenous variables. The average Length of education in Indonesia was 7.64 years from 2000 to 2013. This means an average labor is absorbed in the formal work force numbers, having a level of education equivalent to junior high school. The period of the highest education in 2013 was 8,45 years from 2000 to 2013. In 2013, more labor give importance in improving the quality of education assessments with mastery of skills. So in the process of production, labor was not too overwhelmed in innovating and adapting.

The lowest educational period in 2000 was 7.03 years from 2000 to 2013. The Government's policy to encourage secondary education and higher education are still not optimal, so the more dominant of labor educational background is on the basic levels. Connected with the production, the labor skill level are still standard. Still need government policy in multiply education means more evenly in the territory of Indonesia as well as providing the ease of acceleration access to get the higher education.

Regression Analysis

Test to determine the influence of actual R&D expenditure, and HCtowards Indonesia's economic growth is carried out by multiple regression analysis using the program *E-Views8.0* as shown below:

Dependent Variable: PDB
Method: Least Squares
Date: 01/26/15   Time: 01:21
Sample: 1 14
Included observations: 14

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26.30207	0.459553	57.23397	0.0000
RD	0.127030	0.052201	2.433477	0.0332
HC	2.595330	0.568541	4.564897	0.0008
R-squared	0.986451	Mean dependent var		35.19217
Adjusted R-squared	0.983987	S.D. dependent var		0.226670
S.E. of regression	0.028683	Akaike info criterion		-4.077598
Sum squared resid	0.009050	Schwarz criterion		-3.940657
Log likelihood	31.54319	Hannan-Quinn criter.		-4.090274
F-statistic	400.4238	Durbin-Watson stat		1.024412
Prob(F-statistic)	0.000000			

Table 1. Results of the Regression Analysis

Table 1shows that the actual R&D expenditure and HC each have a positive and significant impact on economic growth in Indonesia. This is indicated by the value of probability (significance) 0,0332 and 0,0008 where both value are smaller than the value of 0,05 (α = 5%). The coefficient regression result is positive in 0,127 and 2,595 which shows that the higher of R&D expenditure and HC, then the growth of Indonesia's economy will be getting better (improved). The results of the both hypothesis of the research can be accepted.

RegressionModel Test

To find out whether the regression model result is a regression model that produces the best linear unbiased estimator (BLUE), then it needs to test the model assumptions deviation classic symptoms. If the classical substance assumption is not met then the explained variables would be inefficient. This research was conducted on some classic assumption test towards the regression models which have been processed using *E-views8.0* (Santoso, Singgih 2000).

Test of normality was done to ensure that the residual model used has been distributed normally. The data distribution normally indicates that the sample studies have described the overall population. This normality test used the Jarque-Bera Test, the following analysis:

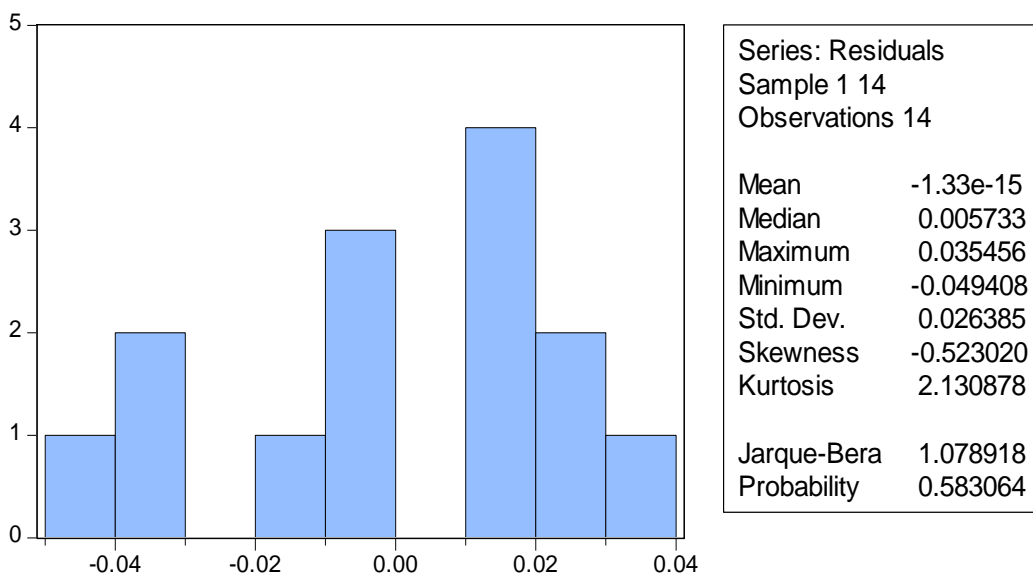| Series: Residuals	
Sample 1 14	
Observations 14	
Mean	-1.33e-15
Median	0.005733
Maximum	0.035456
Minimum	-0.049408
Std. Dev.	0.026385
Skewness	-0.523020
Kurtosis	2.130878
Jarque-Bera	1.078918
Probability	0.583064

Table 2.Jarque-Bera Test Results

Based on the Jarque-Bera test results,it can be inferred that the residual regression model result has been distributed normally.This is indicated by probability Jarque-Bera's value 0,583 where the value is greater than 0,05 (α = 5%).

Autocorrelation test shows whether a linear regression model shows a correlation between residual on the time period with residual in previous time periods. Good regression model is independent of the autocorrelation. Whether or not there is autocorrelation detection can be performed using the Durbin Watson test (DW-test). An observation is said does not occur if the value of autocorrelation Durbin Watson lies between -2 and 2 (Ingram, 2000). Based on the results in table 5 can be known that Durbin Watson earned 1,024, where the value lies between -2 and 2, so that it can be concluded that no residual autocorrelation occurred on the regression model result.

Heteroskedasticity test aimed at testing whether in the regression model will be occur the residual variance inequality from one observation to another. It can be examine by using White test. Heteroskedasticity model does not occur in its residual if the value of significance/probability of R^2 in White test is above 0.05 ($\alpha = 5\%$). Based on the White test results, it can be concluded that heteroskedasticity does not occur on the residual model regression. This is indicated by the value of probability Obs*R-squared on 0,4502 where the value is greater than 0,05 ($\alpha = 5\%$).

The determination coefficient is used to know the Goodness-of-Fit of the regression model which was produced from previous model in Table 1. Note that the value of the coefficient of Determination (R2) is 0,986 that has a meaning that the effect percentage of R&D actual expenditure and HC towards the Indonesia's economic growth (GDP) is 98,6 percent while the rest 1.4 percent is affected by other variables which not examined.

Based on the results of the analysis and the research findings,it can put forth some suggestions as follows:

1. Indonesia's economic growth should involve the seriousness and active participation from the Indonesia government through the political wild on the policy of allocating State budget that finance the R&D, so that Indonesia's economic growth is not too dependent on the competitiveness of the natural resources and abundant labor. Global economic competition inevitably requires the Government to protect the national economy by presenting a strong economic fundamental by creating a foreign country by high productivity.
2. The structure of the education level has not been balanced between basic education level, which is still more dominant compared to the level of secondary education that fills the structure of production, so the need for breakthrough gives broader access and convenience for the individual citizen to get human capital quality improvement so capable to be accepted by the market.
3. Endogenous economic growth was the right strategy for Indonesia in catch-up and make changes the basic national economic strategy, so that long-term economic growths and sustainable can be achieved.
4. Although the quantity of labor force contributed to high economic growth in Indonesia, should be accompanied by efforts to improve the quality of investment by the Government of Indonesia, for example, by amplifying the entrepreneurial education through non-formal paths

V. CONCLUDING NOTES

1. Testing the influence of investment spending on R&D towards Indonesia's economic growth gave results that R&D gave the positive and significant influence on Indonesia's economic growth. These results are consistent with previous research that found much influence of R&D as the influence of economic growth as the implementation of the development model of endogenous economic growth which is more able to answer the economic development challenges based on Knowledge-Based Economy (KBE). Indonesia must inevitably increases the ratio of R&D to the budget target of 1 percent of GDP R&D as recommended by the World Bank. After the directly intensive research related to the value of Indonesia's R&D, if the release of the results of the 2009 World Bank survey for Indonesia's R&D only about 0.08 per cent of the Indonesia GDP then after intensive research, the researcher found the results of the increasing in the expenditure ratio on R&D in Indonesia during the last 14 years from 2000 to 2013. The Indonesia's R&D position rose to 0.13 percent of the Indonesia GDP. A drastic increase in R&D expenditure was in 2010 to 2013, this last 4 years being a major contribution of the 0.13 percent achievement of the Indonesia GDP. But the result is still far from the target ratio of Indonesia R&D expenditure. Indonesia National Research Council has set a target ratio of R&D for the realization of Indonesia RPJM 2025. It must reach 1 percent of the GDP of Indonesia. South Korea success recommendations in the achievement of long-term economic growth with quality and consistent with the strategy of flushing out the really big Research and Development budgets on the above 3 percent. Starting 2006 (3.01 per cent of GDP); 2009 (3.56 out percent GDP); 2010 (3,84% GDP) and 2011 (4.04 per cent of GDP). The result put South Korea in the G7 countries Plus Group.
2. The determination of the influence of HC on Indonesia's economic growth is giving results that Human capital gave a positive and significant impact on economic growth in Indonesia. These results support previous research, which has made the influence of human capital as an essential production inputs in addition to R&D, through the quality of the education of the individual labor as the maximum capitalization of capital in improving productivity as endogenous economic growth model, while affirming the importance of human capital, together with R&D which has a complementary relationship. R&D will be optimal with respect to economic growth, while the qualities of human capital are getting a good deal. Obligation for the Government of Indonesia overhaul a massive financing structures related policies provide more qualified education of the work force so that it can be obtained at competitive labor and high competitive power

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