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INDUSTRY SUPPORT AND SOCIAL ECONOMIC OF THE COMMUNITY ON EDUCATION QUALITY

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Abstract : *The objective of this research is to examine several economic factors which have been proved as influencing the quality of graduates of educational unit, that is vocational high school, in East Java. This research applied quantitative approach, with variables examine in this research are the support of industries, social economic, and the quality of learning process. The result of this research shows that the quality of graduate of educational unit is affected by the support of the industry, social economic condition, and quality of learning processed. The conclusion of this research is that in orderto improve the quality of productive resource of graduates of educational unit or vocational high school, the support of the industry needs to be improved with programme partnership, the social economic condition of the society should be improved by increasing the allocation of public fund for education., especially to improve the quality of graduate, and the job opportunity should be improved, the society should be urged to obtain higher education. The spending budget for the improvement of the quality of learning process should be improved, including training cost, incentives and stationery.*

Keyword*: Industry Support, Social Economic, Education Quality.*

INTRODUCTION

Human capital investment is a long-term investment. Through human capital investment graduate quality of education unit can be improved. High and low graduate depends on human capital investment. Higher graduate quality of education unit, it is increasingly more productive than those not qualified.

Government as the main actor does not providing scale of priorities on education, which resulted in the Indonesian human resources quality low compared with neighboring countries. The low quality of Indonesiangraduates is a classic problem in education. It is measured from the low minimum threshold mastery of competencies that pass standard value above 6.00. While in neighboring countries such as Malaysia is 7.00 and Singapore 8.0. Graduate student's ability level of secondary vocational education units are generally located under high school

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graduatesability, and more or less meet the minimum standards of work place competence. Capability of academic secondary school vocational education units in 2014, on average of 6.5 is above the pass limit value for 6:00 and were under average of high school education units as 7.60.

The low quality of graduate education unit as a reflection of the low level of human resourcesproductivity, and productivity as an indicator of the productive labor ability also means lower income. Controversy on education budget is also the cause of the education discourse low quality. One side claimed low quality of education due to lack of funds for education, others low said the educationquality is not solely due to a lack of budget, but due to other factors such as teachers productivity are less professional. Economic factors are not the only cause but there are other factors in this case strategy factor and teachersfactor.

Governments is necessary to put on scale of priorities of education, the main reason is human capital as the most important element of economic development. Investment in education is an activity that can increase human stock value, in the form of an increase in individual income, labor productivity and social benefits compared to prior educated individuals (Elfrendi, 2008). The stock value is increases, mean that individual's income, labor productivity, social benefits are increases and other will provide benefits to the human development index.

Human Capital Investment has Two Values

Economic values and non-economic values. The economic value associated with the income earned came from investment that planted on education. Non-economic values, values related to working conditions, job satisfaction, and better future satisfaction.This future conform with the approach of human capital investments, which states that investment will raise high labor productivity and high productivity would raise revenue (Cohn 2006). According to Tamora (2008), the beginning of human capital are individual differences in skills and productivity to explain individual differences in income (Tommasi and Jerulli, 2005). On the basis of these studies, then income differences income emerge due to the productivity of a person is different, and productivity rises because human capital investment. The return value of human capital investment is important significance for developing countries. In developing countries indicates the return value of education investment to physical capital investment that is 20% to 15%, while in developed countries the return value of educational investment is lower than physical investment is 9% to 13% (Nurkholis, 2009).

To achieve high return value of human capital investment, education in Indonesia must produce workforce that has academy competence and productive

that has knowledge capability, skills and critical attitude values and constructively in accordance with economic development. Cause graduates quality should have a scale priority in the development and implementation of educational responsibility therefore not only the government but also the community. Government as an educationprovider, can give a major priority in education through education budget. While community to distinguished between industrialworld, household and education units as organizer of educational institutions.

The role basis of government and community, then discussion dimension in the research here is focused on industrial support, socio-economic conditions of society and learning quality process in an effort to improve the quality of education.Industrial support, as an external factors affecting education quality outside of the school. Indicators of industrial support in its role improving the quality of vocational secondary school education, through industrial workforce ratio and industrial GFP sector ratio. Socio-economic conditions of society, as an external factors that are outside of educational institutions. Roles dimension of the government through education budget ratio, and the family community through dimension of population employment ratio and higher education population.

The learning process qualitycomprise internal factors in school. However education quality will be affected by external and internal factors. Dimensional role of the education quality as internal factors viewed from economic aspect, namely cost of improving learning processquality. Along the way, financial education is not only government burden but the public components also play in education role. It is based on principle that education essentially to meet the needs in all fields of life. Education for the needs of economic, political and social.Other supporting sources are religious groups, private companies, trade organizations and agricultural enterprises, social organizations: groups of alumni, civic, professional, individual or household (Zymelman, 2003).

Fund education in Indonesia is a shared responsibility between government and public. Government and local government must ensure the funds availability in order to provide education for every citizen. But in reality people still need to provide funding for education in the specific education strata. Community role in education essentially as Community support, as participation in organizing educational activities.

Community support, demonstrate support that given by community for the development of infrastructure and education. Community support is complementary education funds allocated by both central and local government.

Higher community support for education, higher educational level success. Conversely lower public support for education, lower the rate of success.

To create a competence that is ready to enter workforce there are a number of factors that will determine graduates quality of vocational high school education units, namely economic factors. Economic factors are contributing factors include industrial support and socio-economic conditions of society. The economic factor is the motor driver in education unit organizing.Community support related to user interests of education in this industry.

Statement of the Problems

Problems in this study was formulated as follows:

1. What are the industry support with labor ratio indicator and GDP industrial sector affect the graduates quality?,
2. What are socio-economic conditions of society with education budget indicators ratio, employment population ratio and high education population ratio affects the graduates quality?

Research Purposes

The purpose of this study was to determine industry support with labor ratio indicator and GDP industrial sector affect the graduates quality. In addition, to determine socio-economic conditions of society with education budget indicators ratio, employment population ratio and high education population ratio affects the graduates quality.

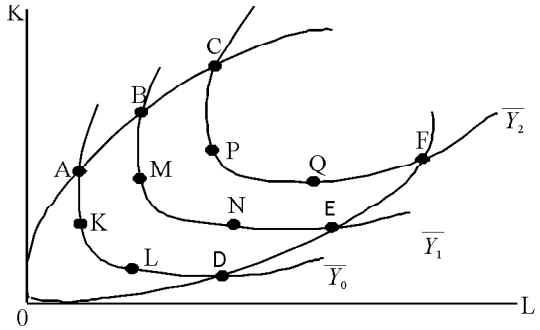
THEORETICAL REVIEW

Production Theory

Production theory become the ground of educational production theory. Production theory is actually a theory that explains relationship between input and output. Relationship between inputs and outputs described in function of the production. The output is a function of the input, $Q = f(K, L)$. Cobb Douglas function of the production, $Q = AL^{\alpha}K^{1-\alpha}$, explained relationship of input and output (Mankiw, 2007). The magnitude of output depends on a number of inputs used in production, amount of capital input and labour. Function of production contains several benefits, including amount of resources that can be seen used in production, and the magnitude of the output produced.

Production functions differentiated for short-and long-term. Short-term production function there is fixed input and long term of all variable input. Short-term production, $Y = f$(C.L). In the short term assuming specific capital

Figure 1: Long-Term Production Function Curves



input, then output depends on labor input. Relationship between input and output is explained by the Law of Variable Proportions (Doll and Orazem, 1978). The legal implication is use one of the inputs are added continuously while the other input is fixed, then causing marginal product of the input will be negative.

Long-term production function $Y = f(K, L)$. In the long term, assuming Y, then output is dependent on all input variables, both capital input and labor input. The relationship between inputs and outputs in long-term production function, described in Figure 1.

The Curve Explained

(a) Combination use of number of capital inputs and labor inputs indicated by point *K*, *L* with output indifference in Y_0.

(b) Y_0 can be increased to Y_1, because the use of a combination of a number capital inputs and labor inputs more increased indicated by point *M*, *N*. The increase of number of input due to budget is increase and output obtained indifference to Y_1.

(c) Points *A*, *B*, and *C* show the marginal product of capital input is equal to zero. If capital input plus continued, then the capital product marginal will be negative.

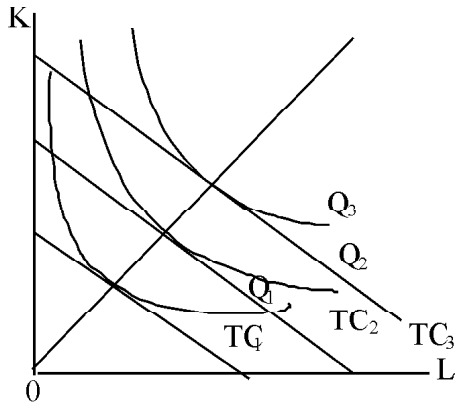
(d) Point *D*, *E*, and *F* shows the marginal product of labor input is equal to zero. If labor input plus continued, then the labor product marginal will be negative.

(e) Rational area if the products marginal from both inputs in this case capital and labor are positive, indicated by the lines *AD*, *BE*, and *CF*.

Its application toward function of education production, are:

(a) If both inputs in this regard outside school inputs (industry support and socio-economic conditions of society) and school input (learning processquality) plus marginal product keeps both positive input.

Figure 2: Expansion Line Curves



(b) If both inputs in this regard outside school inputs(industry support and socio-economic conditions of society) plus continued then marginal product of the input outside of school would be negative.

(c) If the school input (learning processquality) plus continued then school input product marginal in this case quality of graduate education unit to be negative.

If all input into a variable, then increase the use of these inputs in the production process will lead to an increase in output. Input use be optimal when isoquant transverse isocost, in other words when technical aspects equal with financial aspects. If both inputs plus proportionately then output will be same proportion, with constant scale. This is explained by the expansion of lines can be seen in figure 2.

The Curve Explained

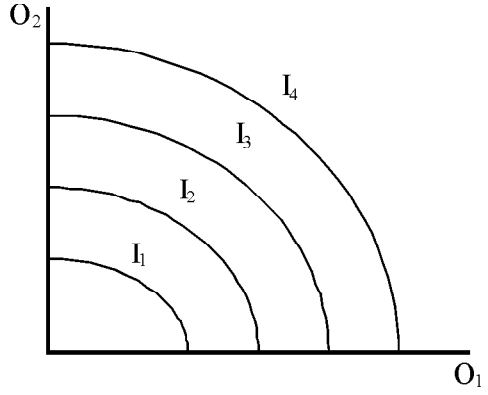
(a) Optimum input achieved at points *A*, *B*, and *C*; means more inputs used both fixed input and variable input proportionally then more output unit produced.

(b) Line connecting the balance points-called line expansion.

(c) Input use proportionally, then marginal productivity of input equally positive.

Application to function of productioneducation, is the quality of graduate education unit will increase proportionally if outside schools factors (industry support and socio-economic conditions of society) and school factors (learning process quality) both added continuously. But if in production process there is an input only produces two outputs, it seemed production function can been seen in figure 3.

Figure 3: Single Production Function Curves



The curve describes single production process to produce two outputs, namely O_1 and O_2. The higher of single input is used, the higher output produced. Application in educational production function, is if school factors(learning process quality) improved continuously will be gained productive ability and academic ability is increasing.

Besides capital and labor, human capital is one important element of the other elements. Romer (1990), shows four basic inputs that affect economic growth is capital, labor, human capital and technological level, so $Y(H_A, L, x) = (H_Y A)^{\alpha}(LA)^{\beta} K^{1-\alpha-\beta}\eta^{\alpha+\beta-1}$ (Sengupta, 1998). The function of production education is basically similar to production function.Mathematically sources correlation that used in education can be transformed into educational output. In general, education output is a function of a number of inputs.

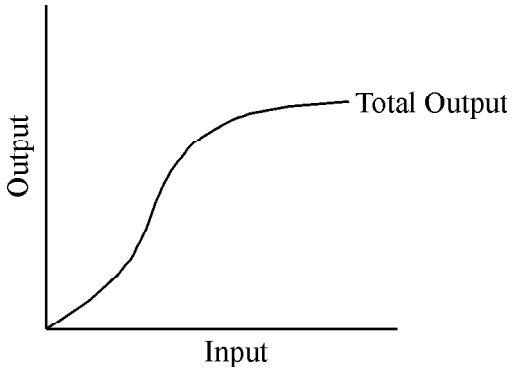
Education Output

School Output divided into consumption and investment. Output of education units within the meaning of consumption related to enjoyment, pleasure or profit that earned learners, families and communities. Meanwhile, in the sense of investment associated to individuals productive skills and society and the future benefit. Education units output can take form of cognitive, affective and psychomotor. Cognitive is the learner' sability in the form of their knowledge level, while affective or non-cognitive mean attitudes that related to self-learners, families and communities.

Education Production Function

Based on output frame work of education, then education production function according to Cohn (1975), is $Y = f(Fk, Fm, Fs)$,

Figure 4: Function of Educational Production Curves



Where :

Y is the education unitoutput

Fk is the characteristic factor of learners

Fm is the factor of society and *Fs* is the schoolfactor.

Function of Educational production, described in the equation, $f(Q, X/S) = 0$, where:

Q is the output of education,

X is outside school factors and

S is schoolfactor.

The meaning of these functions is out school assumption factor given, then factors that determine educational outcomes is input coming from school factors.

The function of educational production, presented in Figure 4.

This curves explained by using school factors which are variable, while other factors remain constant, then the output result of education is increasing. And in accordance with the enactment of the law of diminishing marginal productivity, the marginal product of the education unit input is decrease. With linearity assumption all variables and multiple outputs in addition to qi has a different coefficient of zero, so linear model as follows:

$$q_i = a_i + \sum_{g=1}^{n} b_{ig} q_g + \sum_{h=1}^{k} c_{ih} x_h + \sum_{j=1}^{m} d_{ij} s_j + e_i ,$$

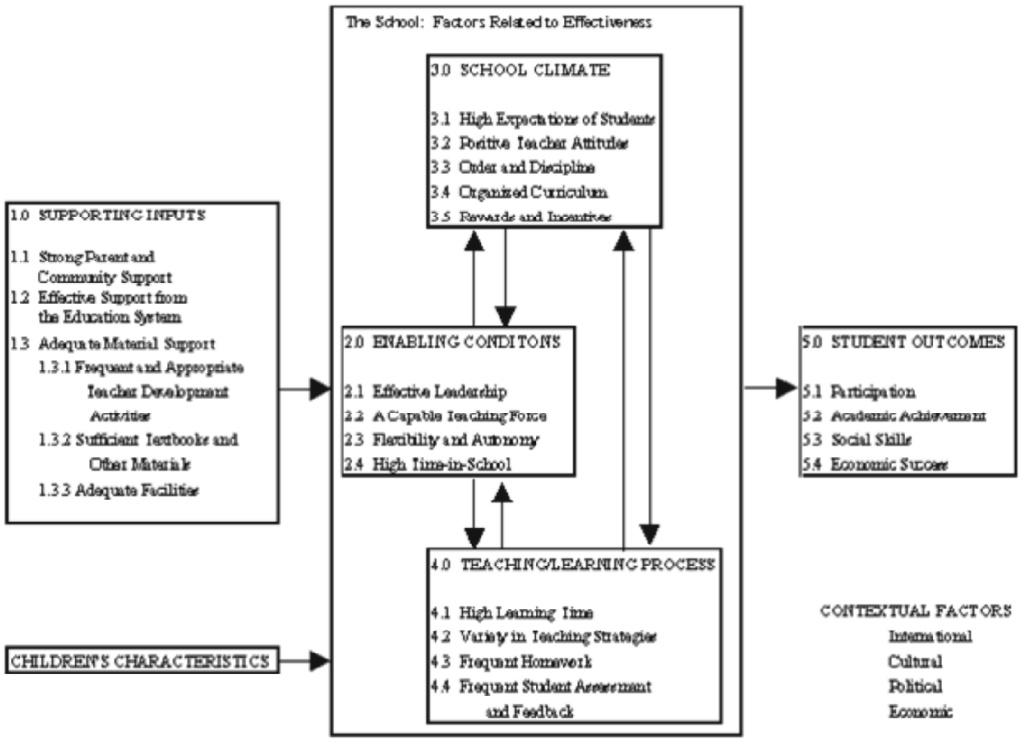
Where :

a_i is a constant

b_{ig} s, c_{ih} s and d_{ij} is the coefficient

c_{ih} is marginal productivity of school inputs

Figure 5: Input output transformation Model of the World Bank



q is education output

x is a school factor

s is school outside factor

e is a confounding factor or residual

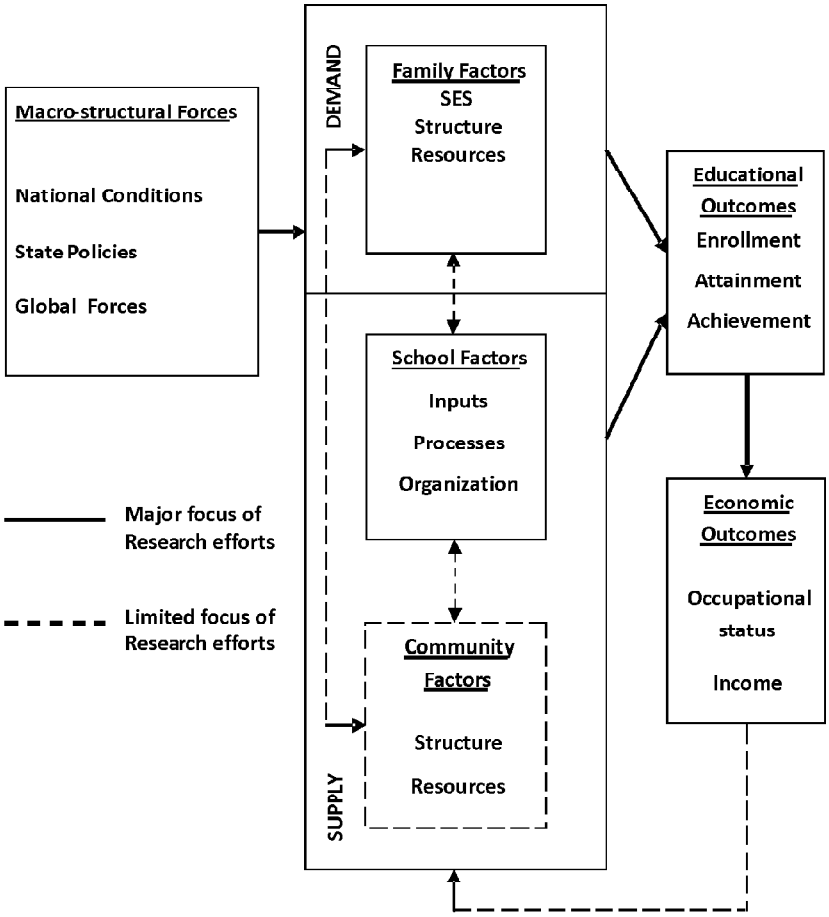
Based on function of educational production above, empirical studies here emphasizes educational output unit models in this case the quality of vocational high school graduates that promotes productive competence than academy competence. Input that affecting quality of graduate education units include socio-economic variables, school and environment.

Education Input-Output TransformationModel

World Bank Model

A number factors determine education qualities are supporting input, individual characteristics of learners, school climate, conditions that can be used and teachers learning process (Word Bank, 1994). Model input output transformation described in figure 5.

Figure 6. Input Output Transformation Model of Buchmann and Hannum



Supporting input and individual characteristics of learners have indirect influence on educational outcomes while direct influence through school climate, conditions that support and learning process. Supporting input, are all factors that support education of both funds and materials. Supporting input includes parents and community support, effective support schools through the school system and equipment are sufficient.

Buchmann and Hannum Model

There are a number of factors that influencing output besides education school factors and factors outside the school. Structure macro, factors beyond the school and school factors affecting educational and economic outcomes (Buchmann and Hannum, 2001). This is explained by the model input-output transformation can be seen figure 6.

The curve illustrates

(a) Macro-structure affecting school and outside school factors, an indirect influence on educational outcomes.

(b) Educational outcomes are determined by demand and supply. Demand is acting as a family and as a supply in school factor and community factors. The influence of school and outside school factorson educational outcomes is direct.

(c) Education outcome determines economic results.

Macro structure includes national conditions, state policy, and global establishment. State through education policy can define provision of educational opportunities and education systemstructure. As said by Fuller and Rubinson (2002), the state may also provide signals on education demand by improving education quality through compulsory school laws or emphasis on educational benefits (Buchmann and Hannum, 2008).

Based on input-output transformationmodel, in developing countries the success from quantity and quality of education inseparable from the government role through educational policy. Government as an education policy makers affect educational outcomes through family factors as demand and supply factors as a school. Model transformation of input output over a greater emphasis on the role of school factors and outside schoolfactors, but takes into account the role of macro structure in determining educational outcomes.

Economic and Non-Economic Factors

Based on the empirical study above there are a number of economic and non-economic factors affect education output unit. Identification education unit output including academicability, vocational ability, social skills, attitudes and appreciation. Identification of economic factors including income, teacherssalaries, teacher incentives, family income, learning infrastructure and educational facilities. While non-economic factors associated with schools and non-school factors. School factors including physical, human and learning process. Non-school factors including public education, and public service facilities.

Education Institutions Income

For education arrangement required support that is income either from government, community and education provider institutions. Income is essentially a financial source for education arrangement, including improving the graduate education unit quality. Sources of financial support for education is not just the

government as the main supporting source, but also come from society (Zymelman, 1973). The society here are all people strata both households and support from industrialdomain, social organizations, professions, and alumni.Income empowerment as a public funds source both from the government and public is used to provide education primarily focused on learning process as an effort to improve quality of unit education result.

Revenues sourced from government and society was essentially to finance education arrangement both for providing input related to learning process inputs that are directly or indirectly learning process but related to institutional. Input which mobilize learning process increase among them are teachers training, incentives and rewards for teachers as well as equipment related to direct and indirect learning. Input related to institutional, aimed to mobilize school activities through providing better input regarding school institutions and institutional services.

Government Budget

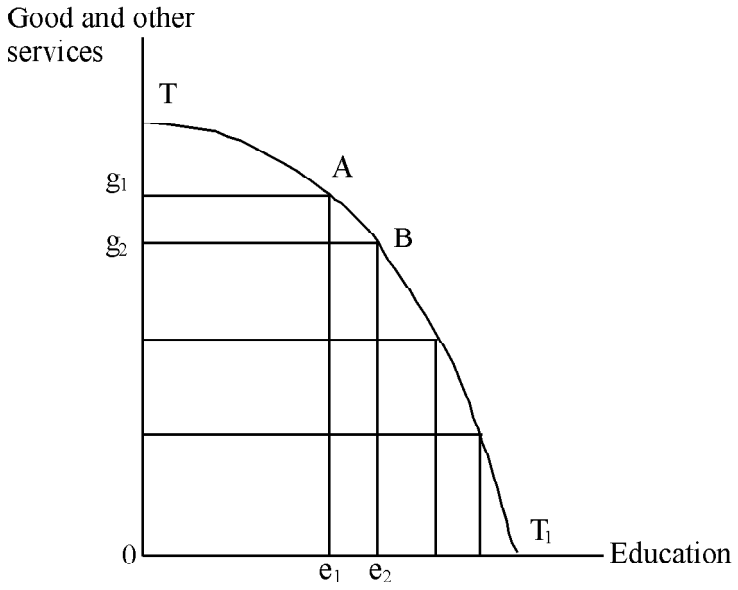
Government obligation are to educate nation of children become educated nation. This is similar to some research findings about education role. Education is the key to move individuals and more effective agents against violence, injustice and poverty around the world (Chung, 1995); family welfare education eradicate the poverty of individuals and families as well as a mirror to better human kind formation (IFHE, 2003); and the government's task is to make quality education for all children (UNICEF, 2002).

The main problem in education sector is low quality education and high cost of education. Funds source gained from State budget and funds concentration. In 2004 budget allocations for education including for:

1. PSBMP (Minimal Cost Subsidies of Education),
2. school subsidy/allowance,
3. GTTsubsidies,
4. awarding educational facilities assistance as well as improving educationquality,
5. education and training in order to improve educationquality, and
6. improvement of infrastructure and facilities (Bapeprop East Java, 2004).

With education budget as contained in State Budget and it is essentially a financial support for the school. It is use for construction and development of physical and non-physical.

Figure 7: Principles of Alternative Cost



The higher educational outcomes will be achieved both quantity and quality, the greater costs of education should be provided. Sources used in their production can be used to produce other goods and services, and the value of goods and services will into a high economic cost in education (Leftwich and Sharp, 1980). That theory is better understood as a theory of opportunity cost. There are three meanings contained in this theory:

1. low cost with same return alternative,
2. same cost with high alternative high return, and
3. higher costs associated with higher returns.

The application of the above theory in education, if we want higher quality of education, then sacrificed higher cost of other sources. The curve shows law of increasing cost be in force, which is necessary for increasing government budget to improve quality of graduate education unit. The curve also shows that there is a tradeoff between education spending with spending of other goods and services in addition to education.

In relation to empirical studies, higher quality of graduates increased the higher of industrialsupport should be reserved for educational services to learners. Similarly, higher the quality of graduates increased higher of socio-economic

conditions of the people who sacrificed for education. There is a tradeoff between quality of graduates with industrysupport and socio-economic conditions of society.

Industrial Support

Society support is one of the determinants of quality of input graduate education unit. Society support, demonstrate community participation in the broadest sense of educational activities, originating from households, industry, social and professional organizations as well as from industrial domain. Society support in this case is financial assistance will improve quality of teaching and learning, and in the long run will raise learning achievement (Boediono, 1999).

Industrial domain support in providing services to learners apprentice from an economic point namely the ratio labor of industrial sector and GDP ratio of industrial sector.

The success of a policy, among others, can be seen from the extent or degree of public participation getting parts in it.

The relationship between industrialdomain support and quality of graduate education unit, described in the function of school quality is Y = f(In) where: $\frac{\partial M}{\partial D_i} > 0$.

Y is the quality of graduates of vocational high school education units, and in support of the industrialdomain both labor and GDP per capita. There is a functional relationship between industrial supports with quality graduate education unit.

Meaning of $\frac{\partial M}{\partial D_i} > 0$, higher industrial support that is higher quality of education. Industrial support as perceived labor ratio of the industrial sector and GDP per capita industrial sector.

The greater labor sectorratio, the more workers who work in the industrial sector compared to workers who work in economysectors. The greater labor ratio, the greater industrial providing services to learners internship opportunities, thereby increasing the quality of graduates. Similarly, if industrial sector of GDP ratio is higher, it will also increase production and income of industrial sector. The higher production and industrial sector income will be increasingly available welfare incentives facilities for learners to encourage quality apprenticeship graduate education unit goes up.

Socio-Economic Conditions of Society

There is a positive and significant relationship between socioeconomic status with academic achievement of learners (Seginer, 1986), there is a relationship between cognitive abilities of learners with individual income and national growth (Hanushek, 2005). In addition to the income amount, number of family members who enjoying also affect education. Birth have a large and significant effect on children's education, children born later will get a little education (Black, 2004).

Demand and supply are forces that determining education quality.Socio-economic status as social economic forces in society and in reality not all members of society fell into this category. Economic status of the community as a reflection of communities and familieseconomic status. This is made clear by study's findings suggested that socioeconomic status strongly or weakly affect the school ability in developing countries (Buchmann, 2001).

Relationship between socio-economic conditions of society to graduate education unitquality, described in school quality function is $Y = f(Ks)$ where $\frac{\partial M}{\partial D_i} > 0$.

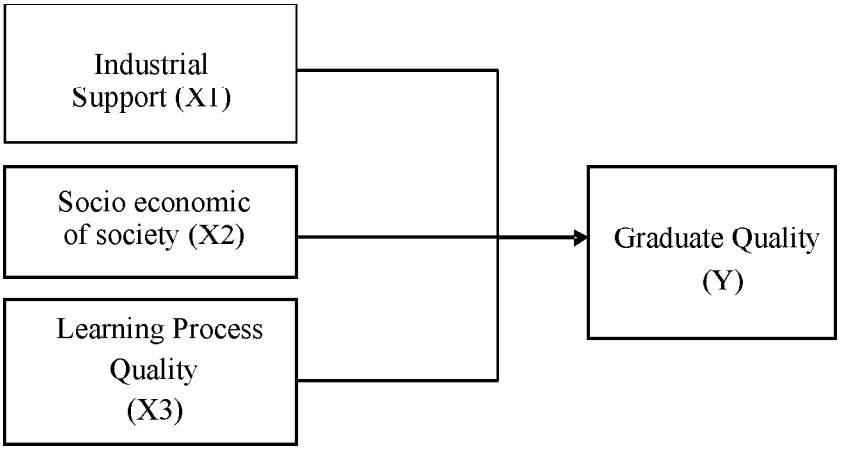
Y is graduates quality of vocational high school education units and Ks is socio-economic conditions of society. There is a functional relationship between socio-economic conditions to graduate quality education unit.

Meaning of $\frac{\partial M}{\partial D_i} > 0$, higher socio-economic conditions, higher graduate education unitquality. Socio-economic conditions of society, seen through the eyes of the education budget ratio, working population ratio and higher education ratio. Higher education budget ratio, meaning higher budget allocation for education from $APBN$ and $APBD$. Higher budget allocation for education, higher graduate education unitquality.

School Factors

School factors are internal factors, which have a direct impact on graduate education unit quality (World Bank, 1994; Williams, 2003; Cohn, 1979).Other empirical study findings done by Coleman Report (1976) in Uganda, which states that the family factor no less important than school factors in determining academic achievement. This is similar to Broaded (1997) findings in Taiwan and Baker and colleagues (1999) in developing countries is very poor, which found that effects of schools is large affecting educational achievement (Buchmann *et. al.* 2001).

Figure 8: Research Conceptual Framework



By emphasize direct contributions from the influence of industrial support, socioeconomic conditions, and learning process quality for the graduate education unitquality, the conceptual framework of the research presented in the image figure 8.

Research Hypothesis

Based on the problems and aims of the research as well as theory study and conceptual framework as described above, then the research hypothesis can be formulated as follows:

1. There is a positive influence of industrialsupport with ratio indicator of labor and industrial sector GDP ratio on graduate education unitquality.
2. There is a positive influence on socio-economic conditions of society with education budget ratio indicator, employment population ratio and higher education graduate population to quality education unit

RESEARCH METHODOLOGY

Based on frame work model had developed, model of graduates quality of vocational high school education units, becomes: $Y = f(Di, Ks, Mp)$. Where Y is graduate education unit quality, Di is industrial support, Ks is socio-economic conditions of society, and MP is learning quality. This model process lead to literature study and research findings that conducted among others by Cohn (1979), Hanushek (1979), World Bank (1994.1996) and Buchmann and Hannum (2001). Quality of graduate education unit in the model as dependent variable, while industrial support, socioeconomic conditions, and learning process quality as an independent variable.

Research Design

The approach used in the study using a quantitative approach. Methods using survey methods to phenomena associated with industrial support, socioeconomic conditions, learning processquality, and graduate education unit quality. Research is an explanatory research, search for the influence of explanatory variables through hypothesis testing. Thus the scope of the study, includes:

1. outside and inside school factors
2. graduate education unit quality.

Population and Sample Design

Population is a whole unit of analysis that has similar characteristics. Population in this research is area of the city/county of East Java province, covering 37 cities/districts are grouped into four Regional Coordinating Agency (Bakorwil) are Pamekasan, Bojonegoro, Malang and Madiun (appendix 1).

Design Samples

The sampling method using a non-probability sampling and probability sampling (Pasaribu, 1975; Soegiyono, 2003). Purposive sampling is used to determine sample area,by city which has figure per capita GDP and economic growth both high, per capita GDP and economic growth both low, per capita GDP is high and low economy growth, and GDP per capita is low and high economic growth.Unit analysis is districts /cities. Total sample of 20 districts / cities during two fiscal years 2004 and 2005. Number determination of the quota-based sampling, where each Regional taken as many as five districts /cities. Sample distribution, presented in table 1.

Table 1
Research samples in several Regionalof East Java

Number	*Regional*	*Cities/Districts*				
		1	*2*	*3*	*4*	*5*
1	Pamekasan	City of Surabaya	Districts Gresik	Districts Sidoarjo	Districts Pamekasan	Districts Sumenep
2	Bojonegoro	Districts Bojonegoro	Districts Tuban	Districts Lamongan	Districts Kediri	City of Kediri
3	Malang	City of Malang	Districts Malang	City of Batu	City of Pasuruan	Districts Pasuruan
4	Madiun	City of Madiun	Districts Madiun	City of Blitar	Districts Blitar	Districts Tulungagung

Data analysis technique

Data analysis using regression analysis. Regression analysis to examine the influence of socio-economic conditions of society, industrial support, and learning process quality for the graduate education units quality use natural logaritme regression model (*Ln*). Model of education production function, $\ln Y = A + \alpha \ln Di + \alpha \ln Ks + \partial \ln Mp + e$

Where :

Y is graduate education unitquality

A is a constant

α, β, ∂ is predictor variable coefficients

Di is industrial support

Ks is socio-economic conditions of society

Mp is learning process quality

When you enter a variable indicator in the model of education production function as follows:

1. $\ln Y = \ln A + \alpha_1 \ln Di_1 + \alpha_2 \ln Di_2 + \beta \ln Ks + \partial \ln Mp + e$, where $\alpha_1$and α_2 is coefficient indicator

   Di_1 is industrial sector work force ratio

   Di_2 is industrial sector work force ratio

2. $\ln Y = \ln A + \alpha \ln Di + \beta_1 \ln Ks_1 + \beta_2 \ln Ks_2 + \beta_3 \ln Ks_3 + \partial \ln Mp + e$, where β_1, β_2, β_3 is an indicator variable coefficients

   Ks_1 is education budgetratio

   Ks_2 is population workratio

   Ks_3 is higher educationratio

Data Interpretation of Estimation Model

In this study using panel data (cross-section and inter-time) which is a combination of cross section and time series. Panel data using for the purpose of amplification number of research observation, because if using time series data or cross section only, relatively little research observations.

The empirical estimation function using regression models with natural logaritme (*Ln*) after Mac Kinnon White and Davidson (MWD) test had done. Regression model including *ordinary linear regression* model (*Lin*), $Y = \alpha_0 + \alpha_1 X_1 +$

$\alpha_2 X_2 + \alpha_3 X_3 + Z_1 + U_t$ where as natural logarithm regression model (*Ln*), $LnY = \alpha_0 + \alpha_1 LnX_1 + \alpha_2 LnX_2 + \alpha_3 LnX_3 + Z_2 + V_t$. To see Lin models usage compared to ordinary *Ln* linear model by viewing variables Z_1 and Z_2. If Z_1 is not significant meaning lin models can be used, and when Z_2 is not significant mean ln models can be used. Z_1 and Z_2 are not significant when calculation probability > from statistics probability. If calculation probability is smaller than statistical probability, then Z_1 and Z_2 is significant mean *Lin* and *Ln* models unable to be used.

Further to estimate panel data model used three approaches

1. Pool Least Square (PLS)
2. Fixed Effect (FE)
3. Random Effect (RE)

To find out whether *PLS* or *FE* used *F* test calculation as follows:

$$F(n-1, nT-n-K) = \frac{(R_u^2 - R_p^2)/(n-1)}{(1-R_u^2)/(nT-n-K)}$$

If the Fcalculation larger than *F* table then used *RE* approach and if *F* calculation is smaller than *F* table then used *PLS* approach.

To determine whether *RE* or *PLS* used *LM* test calculation as follows:

$$LM = \frac{nT}{2\,(T-1)} \left[\frac{\sum_{i=1}^{n} \left[\sum_{t=1}^{T} e_{it} \right]^2}{\sum_{i=1}^{n} \sum_{t=1}^{T} e_{it}^2} \right] - 1 = \frac{nT}{2\,(T-1)} \left[\frac{\sum_{i=1}^{n} (|e_{it})^2}{\sum_{i=1}^{n} \sum_{t=1}^{T} e_{it}^2} - 1 \right]^2$$

If *LM* test is greater than chi-square is used *RE* method, and if *LM* test smaller than chi square is used *PLS* method.

To determine whether the use of FE or RE Hausman test used formula as follows:

$$Var\left[\hat{\beta} - \hat{\beta}_{GLS}\right] = Var[\hat{\beta}] + Var[\hat{\beta}_{GLS}] - Cov[\hat{\beta} \cdot \hat{\beta}_{GLS}] - Cov[\hat{\beta} \cdot \hat{\beta}_{GLS}]'$$

If Hausman test is smaller than chi square table value then the random effect is more appropriately used on assumption that each region is a random intercept and change its value throughout the method. If Hausman test is greater than chi square tablevalue, so the fixed effect model more precise is used, with assumption that intercept each different region and its value does not change throughout the method.

Further after *Ln* model set by using one of the methods approach (*PLS*, *FE*, *RE*) as appropriate, performed model test using 90% maximum confidence level. Testing steps includes first stage of classical assumption test and the second phase is hypothesistesting.

RESULT AND DISCUSSION

Selection of the appropriate regression model, used *MWD* test. Based on appendix 4, MWD test results shown in Table 2.

Table 2
***MWD* Test Results**

No	*Variable*	*Calculation Probability*		
		Model 1	*Model 2*	*Model 3*
1.	Z_1	0.4872	0.4639	0.2904
2.	Z_2	0.3997	0.4969	0.8510

Based on Table 2, probability calculation of Z_1 to model 1, 2, and 3, respectively amounting to 0.482, 0.4639 and 0.2904 is greater than the probability is above a probability of 10% (α = 0,10) means that usual linear model (*Lin*) can be used. Value of probability calculation Z_2 for model 1, 2, and 3, respectively at 0.3997, 0.4969 and 0.8510 is smaller than probabilities are under probability of 10% (α = 0, 10) means natural logarithm (*Ln*) model can be used.

All models were not significant either using Z_1 and Z_2. On the basis of these two models, both can be used as regression model. Researchers used a *Ln* model because it deals with concept elasticity coefficients concept.

Further to estimate panel data model used three approaches

1. Pool Least Square (*PLS*)
2. Fixed Effect (*FE*)
3. Random Effect (*RE*)

Table 3
Ln model of OLS and FE method

Fixed Effect	*Ln*		
	Model 1	*Model 2*	*Model 3*
F hitung	21.05	9.73	29.56
F statistik 1%	3.31	3.41	3.52
5%	2.31	2.35	2.41

LN model test results with *PLS*, *FE* and *RE* approachesin Appendix 5 and presented in Tables 1, 2, 3. To test whether Ln model used PLS or FE methods are presented in Table 3.

Based on Table 2, F calculation to model 1 at 21.05 while F statistics are 1% and 5% with *db*(19, 17) 1 respectively of 3.31 and 2.31, mean that *F* calculation is greater than *F* statistic. *F* calculation for model 2 of 9.73 with *F* statistic for degree of freedom (19.16) respectively 3.41 and 2.35 it means *F* calculation is greater than *F* statistic. Likewise, *F* calculationfor model 3 at 29.56 while *F* statistic for degrees of freedom (19.15) respectively at 3.52 and 2.41. Because *F* calculation for all models is greater than *F* statistic value, it can be used FEmethod.Ln test model with *OLS* and *RE* presented in Table 4.

Table 4
Ln Model of OLS and RE method

Random Effect	*Ln*		
	Model 1	*Model 2*	*Model 3*
LM tes	384.51	387.83	403.51
Chi Square 1%	11.344	13.27	15.09
5%	7.81	9.44	11.07

Based on Table 3, *LM* test model 1 at 384.51 and chi-square value of 1% and 5% for the *db*(3) 1 respectively 11.344 and 7.81, mean that *LM* test value is greater than chi square tablevalue. *LM* test model 2 at 387.83 and chi-square value of 1% and 5% for *db*(4) on each of 13.27 and 9.44, mean that *LM* test value is greater than chi square tablevalue. *LM* test model 3 at 403.51 with a chi-square value of 1% and 5% for *df*(6) respectively 15.09 and 11.07 mean that *LM* value test is greater than chi square tablevalue. *LM* tests for all models is greater than chi squarevalue, it can be used *RE* method. *Ln* test models with *FE* and *RE* methods presented in Table 5.

Table 5
Ln Model of FE and RE methods

Hausman	*Ln*		
	Model 1	*Model 2*	*Model 3*
Hausman hitung	14.062101	14.937816	15.14714
Chi square 1%	11.344	13.27	15.09
Chi square 5%	7.81	9.44	11.07

Based on table 5.4, Hausman calculationmodel 1 of 14.062101, while chi square value are 1% and 5% for the *db*(3) respectively 11.344 and 7.81 means

that Hausman calculation is greater than chi square tablevalue. Hausman calculation model 2 of 14.937816 and while chi square tablevalue is 1% and 5% for *db*(4) respectively by 13.27 and 9.44 means Hausman calculation is greater than chi square value. Likewise with Hausman calculation model 3 of 15.14714 and chi-square value of 1% and 5% for *db*(6) respectively by 15.09 and 11.07 mean that Hausman calculation is greater than chi square tablevalue. Hausman calculation for all models is greater than chi square tablevalue statistic, because it can use *FE* method.

On the basis of comparison of *OLS*, *FE* and *RE* are, the researchers used a *Ln* model with *fixed effect* method.

Normality Test

Based on the appendix 5, normality test results shown in Table 6.

Table 6
Normality Test Results

No	*Model*	*Jargue Bera*	*Chi Square* (α = *0,05*)	*Chi Square* (α = *0,01*)
1.	Model 1	2,195839	7,81473	11,3449
2	Model 2	1.716102	9,43773	13,2767
3	Model 3	1,720976	11,0705	15,0863

Based on Table 6, the value J-B model 1 of 2.195839, statistically chi square value for *db*(3) respectively 11.344 and 7.81, then JB test is smaller than chi square value of the statistics. J-B values for model 2 at 1.716102, chi-square value for *db* (4) at 13.27 and 9.44, JB test value is less than chi square value of statistics. J-B value for model 3 of 1.716102, chi-square value for *db*(6) at 15.09 and 11.07 so J-B test value is less than chi square value of statistics. J-B test value less than chi square value of statistics and therefore residual confounding normal distribution.

Multicolinearity Test

Under appendix 6, multicolinearity test results shown in Table 7.

Based on table 5.6, total value of $R^2 > R^2$ good partial for models 1, 2 and 3, means that model is free from multicolinearity variables. Correlations between independent variables between *X*1, *X*2 and *X*3; *X*11, *X*12, *X*2 and *X*3 and *X*1, *X*21, *X*22, *X*23 and *X*3.

Heteroscedasticity Test

Under appendix 7, shown heteroscedasticity test results in Table 8.

Table 7
multicolinearity test results

R2	*Model 1*	*Model 2*	*Model 3*
$R^2_{Y,X1,X2,X3}$	0.999996		
$R^2_{Y,X11,X12,X2,X3}$		0.999998	
$R^2_{Y,X1,X21,X22,X23,X3}$			0.999998
$R^2_{X1,X2,X3}$	0.999968		
$R^2_{X11,X12,X2,X3}$		0.999955	
$R^2_{X12,X11,X2,X3}$		0.999860	
$R^2_{X1,X21,X22,X23,X3}$			0.999956
$R^2_{X2,X1,X3}$	0.999794		
$R^2_{X2,X11,X12,X3}$		0.999114	
$R^2_{X21,X1,X22,X23,X3}$			0.999961
$R^2_{X22,X1,X21,X23,X3}$			0.999987
$R^2_{X23,X1,X21,X22,X3}$			0.999958
$R^2_{X3,X1,X2}$	0.999652		
$R^2_{X3,X11,X12,X2}$		0.999979	
$R^2_{X3,X1,X21,X22,X23}$			0.999493

Table 8
Heteroscedasticity Test Results

Uji		*Ln*	
White	*Model 1*	*Model 2*	*Model 3*
R^2	0.227111	0.233012	0.287468
N	20	20	20
T	2	2	2
χ^2_{hitung}	9.08444	9.32048	11.49872
χ^2_{tabel}	12.592	15.507	18.307

Based on table 7, chi square calculation model 1 of 0.227111, while chi-square value of 5% for *db* (6) amounted to 12.592; chi square value calculation is smaller than chi square value of statistics. Chi-square value calculation model 2 of 0.233012 while chi-square value of 5% for *db* (8) amounted to 15 507, chi square value calculation is smaller than chi-square value of statistics. Chi-square value calculation model 3 of 0.207468 while chi-square value for *db* (10) at 18 307 for chi-square value calculation is smaller than chi-square value of statistics.It is means no problem about heteroscedasticity.

Autocorrelation Test

Based on appendix 8, autocorrelation test results shown in Table 9.

Based on table 5.8, value du of model 1 = 1.338 < *d* = 2.209524 < 4 – *du* = 2.662, meaning it does not contain autocorrelation. Value du of model 2 = 1.285

Table 9
Autocorrelation Test Results

FE	*Ln*		
	Model 1	*Model 2*	*Model 3*
DW-stat	2.209524	2.209524	2.209524
N	40	40	40
K	3	4	5
Du	1.338	1.285	1.23
Dl	1.659	1.721	1.786
(α = 0,05)			
4-*du*	2.662	2.715	2.77
4-*dl*	2.341	2.279	2.214

< *d* = 2.209524 < 4 – *du* = 2,715, meaning it does not contain autocorrelation. Value du of model 3 = 1.23 < *d* = 2.209524 < 4 – *du* = 2.77 means it does not contain autocorrelation. Value *du* < *d* < 4 – du for all models, meaning it does not contain autocorrelation either positive or negative.

Hypothesis Testing

In accordance with hypothesis in this study there are three statements that need to be verifiable based on information of data analysis results namely industrial support, socio-economic conditions of society on graduate education unit quality in East Java area. Under the first hypothesis is supposed that there is a positive effect on industrial support with labor ratio and GDP industrial sector toward graduate education unitquality. Second hypothesis is supposed that there is a positive effect of socio-economic conditions of society with education budget ratio, population employment ratio and higher education graduate population toward education unitquality. Third hypothesis is supposed that there is a learning process quality effect on graduate education unitquality. The results of the hypothesis test study in appendix 8, is shown in Table 10.

On the basis of Table 5.9 all variables in this case that is industrial support, socio-economic conditions of society and learning process quality significantly positive. Likewise with labor ratio indicator, industrial sector GDP ratio, population employment ratio , and higher education population ratio significantly positive.

Industrial Support

From the results of hypothesis testing (Table 5.9) known that industrial support have significant effect on the productive value of vocational learners with a

Table 10
Hypothesis Test Results Model 1, 2, and 3

FE	*Ln*		
	Model 1	*Model 2*	*Model 3*
*X*1	0.052188 (118.4355)*		0.044097 (56.96464)*
*X*11		0.02347 (27.05069)*	
*X*12		0.022785 (0.674485)	
*X*2	0.1688 (5.462981)*	0.172155 (6.410792)*	
*X*21			0.001527 (1.386821)
*X*22			0.099384 (2.403174)**
*X*23			0.020272 (9.703695)*
*X*3	0.055333 (13.46212)*	0.051324 (7.817164)*	0.055961 (9.141792)*
*R*2	0.999996	0.999998	0.999998
DW-stat	2.209524	2.209524	2.209524

Note: * Significant at the 1% level and ** Significant at the 5% level

significance level of 0.0000 leading to positive direction is a regression coefficient of 0.052128. If there is an increase of 1% industrial support were other factors held constant then intensity of the graduate education unit quality increase of 0.05%. These findings suggest that industrial support is a factor to consider in establishing productive value learners. The existence of the industry support sustained by all indicators, namely labor ratio and GDP industrial sector ratio is significant and positive. Coefficient regression for labor ratio amounted to 0.023470 and industrial sector GDP ratio amounted to 0.022785.

Such findings support implies higher industrial support, higher quality of graduate education unit. Similarly, the higher labor ratio and GDP industrial sector ratio, the higher quality of graduate education unit. The higher industrial sector workforce ratio means that the higher population working in the industrial sector compared to total working population in the entire sector. The higher population working in the industrial sector, the higher knowledge abundance of the industrial sector to learners of vocational schools, and the higher knowledge abundance of learners received higher quality of graduates. Furthermore, the higher GDP industrial sector ratio, meaning the higher GDP contribution of the

industrial sector to total GDP. Higher GDP of industrial sector contributes to the production and greater income community. Higher production and incomes will increase people ability to invest in human capital, as well as higher graduates quality. Variable of industrial support, and all graduates quality indicators show a positive direction.

Socio-Economic Conditions of Society

The above table also shows that socio-economic conditions have a significant effect on the productive value formation of vocational learners with significant level of 0.0000 with positive direction that is a coefficient of 0.168800. If there is an increase of 1% socio-economic conditions being other factors held constant, the intensity of the graduate education unit quality increased by 0.16%. The existence of socio-economic conditions of society are not supported by all indicators. The indicators include education budget ratio with no significant effect, while population employment ratio and population education ratio is significantly positive. The regression coefficient for education budget ratio amounted as 0.001527, employment ratio as 0.099384, and education ratio amounted as 0.020272.

The finding implies that the higher socio-economic conditions of society, the higher quality of graduate education unit. Similarly, higher ratio of employment and higher education population, higher quality of graduate education unit. Higher employment population ratio, meaning higher working population compare to total working age. Higher working population, higher productivity and earnings too, then greater potential as a revenue source for education funding, increasing graduatesquality. Variable socioeconomic conditions with an indicator consisting of employment ratio and higher education ratio provide contribution with a positive direction, but education budget ratio which has contributed very small and therefore insignificant. These findings reinforce the existence of socio-economic conditions of the background for good education learners in terms of government and society itself.

Learning Process Quality

The table above shows that learning process quality in this case the cost of improving learning process quality that directly process of learning learners, as well as significant effect with a significance level of 0000 with a positive direction that is a coefficient of 0.055333. Improving the learning process quality by 1% will increase graduate education units quality of 0.05%.

The finding implies that the higher learning process quality, so higher quality of graduate education unit. The findings reinforce the existence of learning

process contributes to improving the graduate education unit quality. In internalterms, school is a determinant factor of improving graduate education unitquality. How strong external factors without contribution of internal factors will increase graduates quality is not optimal, because learning process is the essence of learning as a motor to improve graduate education unitquality. If the learning processis qualified then graduates education unit also qualified.

DISCUSSION

Industrial Support

Industrial support and all indicators include labor ratio and GDP industrial sector ratio is significant and positive impact on the graduate education unitquality. Industrial support in this study by researchers are power factors that are beyond pro-school education. Indeed, industrial domain with quality achievement relation is indirect, according to the study by Indrianto (2001) which suggested that industry community support providing services to learners that *R*support for teaching and learning, which ultimately improve learning achievement quality.

Industrial support that provide education facilities essentially supports the implementation of a dual system of education for students in vocational education unit. Obligations for vocational students to pursue productive capability in accordance with their competence and therefore students are taking practice in the industry through a dual system of education (PSG). Through PSG, the purpose of education competencies that took place outside the school, is expected to form skilled workers, systemized and standardized. Labor contribution of industrial sector to graduate education unit quality through learning by doing and knowledge spillover. Learning to work and an abundance of knowledge gained learners when undergoing dual system of education, a learning process competence in outside of school taken by learners before completing the study.

Socio-Economic Conditions of Society

Socio-economic conditions of society is positive significant, population employment ratio indicator and higher education ratio are also significantly positive for the graduate education unitquality, but education budget ratio is not significant. These findings support previous findings, stating that socio-economic conditions of society are external factors that affect productive value of learners. Previous findings proposed by Fotheringham (2001) which states family's socioeconomic status differences in a positive impact toward child's. If higher socio-economic status, graduate education quality of children is also high, and

otherwise if the lower socio economic status then quality of education graduates is low. Increased public spending on education is not significant to increase human resources quality. According to researchers education budget insignificant although it exceeds 20% but for the public education budget has not fulfilled the main target on improving graduate education unitquality, in addition to budget allocation for direct educational activity is relatively low.

Based on socio-economic conditions of society indicator, higher education budget for public services, employment and education will be increasing graduate education unitquality. In terms of macro dimension, socio-economic conditions of society indicator therefore educationbudget, employment and higher education is a tool of improvement of graduate education unit quality significantly.

Quality of Learning Process

Learning process quality has a significant positive impact on the graduate education unitquality. What mean by learning process quality in this study researchers used improving learning process cost as the variable quality of the learning process.

The rising cost for learning process is the cost that drives learning process can improve educational outcomesquality. Total cost of the learning process that includes costs of training teachers, teacher incentive fee and stationery tool learning cost significantly improve graduates educationquality.Input output unit model presented by World Bank (1994) and Buchmann and Hannum (2001), states that learning process is one of schools factors taken from several factors that directly determine educationoutput. School factor is determines supply of education outcomes through a learning process input and processed into educational outcomes and economic outcomes. Learning process includes time that spent on learning, methods of teachers, assessment, feedback, incentives and class sizes.

The education operational costs to improve learning processquality, essentially has same meaning with variable costs are always running through production activity increased. Increasing the variable costs led to an increase in production activities is not necessarily proportional. Empirical evidence suggests an increase cost of the learning process quality by 10% to raise graduate education unit quality at 0.55%, meaning the increase is less than proportional.

Industrial Support, Socio economic of society and Social Learning Process

Based on above discussion, factors which contributed significantly positive are all factors includesindustrialsupport, socio-economic conditions of society and

learning processquality. Based on appendix 8, *Fhit* = 1950243 > F (19,17) at α = 0.01 at 3.31 and α = 0.05 at 2.31, with the same meaning to these factors positively significant.

Model research findings, actually lead to input-output model of education Hanushek (1979) and economic input-output model of Romer (1990). Input-output model of education by Hanushek (1979) defined in equation $A_{it} = f(B_i^{(t)}, P_i^{(t)}, S_i^{(t)}, I_i)$. The model basically says that academic abilities of learners are determined by family background, peer groups, school factors and talents of learners. The model is conducting a study on school factors and out of school factors in determining educational output. Family background, peer groups and talents of learners are factors that are outside of the school.

Human capital quality is an indicator of income and productivity. According to Cohn (1979) and Tamora (1988), investments in human capital increase productivity and revenue. Thus higher quality of human outcomes produced by higher education outcomes. The existence of human capital as a determinant of output in tune with what was expressed by Romer (1990) in inputs model economic output, namely $Y(H_A, L, x) = (H_Y A)^{\alpha} (LA)^{\alpha} K^{1-\alpha-\alpha} \eta^{\alpha+\alpha-1}$. The model states that human capital, labor, capital and technology determine economic growth. Of some factors that play an important role are human capitalexistence. The quality of graduate education unit as an important area of human capitalquality, and graduate education unit quality are a common thread of educational outcomes with outcome economics. Human capital investment is a long-term, and education is not merely economic growth but as a tool of economic development. Therefore through contribution of secondary school vocational education units was crucial in order to equip learners acquire productive and competitive ability. Industrial support, socio-economic conditions of society, and learning process cost are a determinant factor in the significant economic, contributing positively to improving educational outcomes quality and their impact on economic outcomes. Quality resources become a source of potential production levels, revenues and high productivity.

CONCLUSION

Based on the results and the above discussion, put forward the following conclusions.

1. Industrialsupport has a significant positive impact on graduate education unitquality of. Higher industrial support, higher graduate education unitquality. Higher labor ratio so higher abundance of knowledge and working experience of the industrial sector through a dual system education

that also increase graduatesquality. Higher GDP industrial sector ratio, so higher public's ability to increase human capitalinvestment, thus higher graduatesquality.

2. Socio-economic conditions of society have positive significant effect on the graduate education unitquality. Socioeconomic condition variable is a determinant variable in determining quality of graduate education unit. Socio-economic conditions of society plays an important role in generating human resources have a productive competence. Higher socio-economic conditions of society, higher quality of human resources. Higher education budgetratio, education and employment, higher quality of graduate education unit.

3. Cost improvement of the learning process have positive effect on the graduate education unit quality. Increasing cost of the learning process quality includes costs of training, incentives and provision school stationery able to increase graduate educationquality. The greater cost improvement of the learning processquality, means higher operational costs for learning, so higher quality of graduate education unit.

4. Industrial support, socio-economic conditions of society and learning process quality significantly have positive effects on graduate education unit quality. Higher industrial support, socioeconomic conditions, and learning process quality cost has contributed in increasing productive value of graduate education unit. Both economic and non-economic factors altogether determine education output, both inside school and outside of school.

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