

**SUSTAINABLE DEVELOPMENT FACETS: FACTORS AFFECTING  
QUALITY OF EDUCATION**

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**Abstract.** Education is an inevitable aspect for any country and without it; no country can flourish and grow effectively. Therefore, the quality of education must not be compromised. As the impact of human development, public spending on education and trained teachers' availability is being studied in context of quality of education, a whole study and research plan has been prepared by the author. Data collection process involves the gathering of data from Asian countries for 25 years from reliable data bases. After data collection, several tests and approaches were used for the analysis of data. LLC unit root test was applied for order of integration and stationarity of data, Kao cointegration test was applied to find out cointegrated and long run relationships between the variables and finally DOLS estimation approach was used to measure the relationship between the variables. According to the results of these tests, it has been found that the variables that have significant impact on quality of education include human development, public spending on education, trained teachers' availability and literacy rate. In the last, several theoretical, practical and policy making implications have been discussed by the author. Different limitations have also been identified and future research recommendations have also been given for the assistance of other researchers.

**Keywords:** quality of education; human development; public spending on education; trained teachers' availability; Asia

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## 1. Introduction

There unanimous agreement among development economists that education is closely linked with sustainable development (Baltgailis, 2019; Humbatova, Gadim-Oglu Hajiyev, 2019). Education is considered as a main driver of human capital, as it assists in enhancing the productivity of labour, increasing efficiency and increasing the output of economy (Jermsttiparsert & Sawasdee, 2012; Ahmed, Arshad, Mahmood, & Akhtar, 2017; Rungrisawat & Jermsttiparsert, 2019). According to Akareem and Hossain (2016), education is a key driving force behind economic development of any country.

In almost all of Asian countries, it is believed that education results brining economic prosperity and growth. Due to this reason, it is important to design effective education policy and the key focus must be on teachers, investments and public expenditures (Zeichner & Bier, 2017). Ansell (2015) stated that nowadays, both public as well as government give much importance to spending on education. People have started giving importance to getting education and there is a high pressure on management of educational institutions to keep the quality

of education high (Zeichner & Bier, 2017).

In most of Asian countries, the quality of education is not that much high and there is a need of identifying those factors due to which quality of education gets reduced. The human resource plays a key role in education sector, so this study focuses on analysing the impact of human development and trained teachers on quality of education (Zein, 2016). In addition to this, another key factor which must be studied as a determinant of quality of education is public spending on education (Biersteker, Dawes, Hendricks, & Tredoux, 2016). It is not always possible to provide quality education to students through having highly skilled and talented teachers, but along with this, there is also a need of high spending from public on education. In order to get high quality education, it is the responsibility of general public to spend considerable amount of money on education of their children. When parents of students make payments and do some expenditure on their children's education, then this helps in enhancing overall quality of education. When public spends on education, then the financial resources provided by them can be used to enhance the overall education system (Birchler & Michaelowa, 2016; Jabarullah and Hussain, 2019). Previously, there has been no study conducted to examine the combine effect on human development, trained teachers and public spending on quality of education in Asian context. Hence, the current study has been carried out to fill this gap through specifically focusing on Asian context. The study is focused on achieving following objectives;

- To analyze the key influence of human development on quality of education.
- To study the effect of availability of trained teachers on quality of education.
- To examine the key impact of public spending on education on quality of education.

In order to ensure significant contribution towards economic growth, it is important for the government and management of educational institutions to provide high quality education to students. So, this research study is quite beneficial for Asian educational institutions in getting an understanding that how quality of education can be enhanced through giving importance to trained teachers and human capital. Along with this, general public can also understand that how they can get high quality education through giving importance to spending on education. As, no study has been carried out to analyse the relationship between effect of trained teachers' availability, human development as well as public spending on education on quality of education. So, the present research has significant academic implications, in terms of adding value to the literature. The present research project has been divided in to five main chapters; introduction, literature review, methodology, results and analysis and conclusion.

## **2. Literature Review**

### ***2.1 Availability of Trained Teachers and Quality Of Education***

In an education sector, poor quality is resulted because of the presence of untrained as well as uncertified teachers. In Asian countries, there are less number of trained and qualified teachers, particularly in rural areas due to which students are not provided with quality education (Boccanfuso, Larouche, & Trandafir, 2015). Due to lack of availability of skilled and trained teachers, they do not become able to provide quality education to students. Besides this, untrained teachers also have low motivation level, and they do not fulfill their job responsibilities effectively and efficiently (Zaman, 2015). It is not possible to bring improvement in learning outcomes of students, without giving importance to inadequacies faced by teachers regarding their talent and skills. The training of teachers on regular basis is considered to be highly important, because it helps in enhancing skills and competencies of teachers. In the academic field, there is a need of learning new concepts and things on regular basis, which is not possible without trainings. Hence, trained teachers play an important in ensuring quality of education (Bui & Nguyen, 2016). It has been argued by (Dutta & Sahney, 2016) that it is not possible to achieve learning for all children without having professional and talented teachers. The teaching style is also linked highly with talents of teachers. Some teachers do not engage their students during the class and this most commonly results in low learning level of students (You & Morris, 2016). The successful learning environment requires trained teachers and for ensuring high quality of education, it is important to equip teachers with content knowledge as well as knowledge of learning-promoting teaching methods (Hanushek, 2016). It is important

to revise teaching methods and make teachers completely trained. Being trained teachers, it is important for them to use innovative methods for enhancing overall quality of education (Tandon & Fukao, 2015). The success of education depends highly on teachers who are involved in providing education to students. Hence, it is important to have skilled and talented teachers, in order to provide quality education to students (Ganimian & Murnane, 2016). The skills and competencies of teachers depend on having opportunity of getting trainings on regular basis. The human development is crucial for successful provision of education to students. It is important to analyze the important role played by teachers in enhancing quality of education. It is not possible for an educational institution to provide quality education to teachers, if the teachers engaged in providing education to students are not properly trained. The training of teachers is considered to be highly important for ensuring success of educational institutions. The trained teachers play a key role in providing high quality education to students and they have the capability of making students capable of getting excel in their academic career and this in turn also makes them capable of excelling in professional career (Hakooma & Seshamani, 2017).

According to the research of Ifa and Guetat (2018), it has been found that teachers are an important facilitator of quality education in all educational institutions. As a result of expanding both primary and secondary level education, it has become highly important to attract and train highly talented teachers. The quality of education gets negatively influenced due to shortage of skilled and competent teachers, particularly in science and mathematics. Ip et al. (2016) claimed that one of the key challenges is that many teachers do not have required knowledge as well as professional environment for performing effectively and efficiently. The professionalism of teachers gets influenced through lack of teaching competencies as well as lack of availability of learning materials. Moreover, Kapur and Perry (2015) found that even if teachers have an ambition of teaching well, then they usually experience different personal limitations, like poor living conditions, due to which their performance at school gets reduced.

**H1:** There is a significant impact of availability of trained teachers on quality of education in Asia.

**Human Development and Quality of Education.** In the field of education, the human development is considered to be highly important. It is not possible for teachers to give their maximum input in enhancing quality of education, without giving importance to human development (Landry et al., 2017). Logli (2016) argued that when teachers are not provided with the chance of getting developed, then they most probably prefer to leave the profession. The development of teachers is considered to be highly important for ensuring increased learning of students. The human development of teachers gets affected through providing them training opportunities. According to Sulisworo, Nasir, and Maryani (2017), when teachers get training, then their capability gets enhanced and they prefer to continue this profession for longer time period. With the help of getting training and development opportunities, the skills and competencies of teachers get enhanced and they provide quality education to students. According to Masino and Niño-Zarazúa (2016) training of teachers is highly important in current environment, for coping with the changing demands of profession. Trained teachers get better position of educating the students. The knowledge of a teacher can be improved with the help of training. There can be no underestimation of development and growth of teachers. Training and development is highly important for development of students and this in turn has a positive effect on quality of education (Smith & Joshi, 2016). It is not possible to improve the quality of education system, without focusing on human development. It has been argued by (Mukminin, Rohayati, Putra, Habibi, & Aina, 2017) that teachers play an important role within the education system, that without teachers, it is not possible to successfully formulate and implement policies. Human development is important for ensuring high quality of education system. Moreover, (Mundle, 2017) claimed that training of teachers is highly important for those teachers who recently initiate their teaching profession. With the help of human development, the students' learning gets significant enhanced. Students get the most benefit through the human development in the field of education. When teachers are not provided with training, then their skills and competencies level' do not get enhanced and they do not become capable of bringing improvement in students' educational performance (Shimeles & Verdier-Chouchane, 2016).

**H2:** There is a significant impact of human development on quality of education in Asia.

## 2.2 Public Spending on Education and Quality of Education

Public spending is something which is considered to be highly important for bringing improvement within the education sector. When general public spends money on education, then that money can be used within the education sector for the purpose of development (Nowak & Dahal, 2016). Even though, spending from government is also important, but along with this, there is also a responsibility of public to make financial contribution in order to enhance overall quality of education (Ogundari & Awokuse, 2018). In addition to this, Phan and Coxhead (2015) argued that public spending on education is important in order to increase the availability of resources. Financial support from general public is important because it can make the resources available, which are required for providing quality education to students.

**H3:** There is a significant impact of public spending on quality of education.

## 3. Methodology

### 3.1 Data

Being an important step in a research process, data has been collected by the author in a very careful manner. This data has been collected in context of Asian countries such as Japan, China, Indonesia, Vietnam, Hong Kong, Thailand, Singapore and Malaysia. The period for which data has been collected is 25 years. Reliable and authentic databases such as World Bank and Global Economy have been used by the author to ensure quality of data and its results. The variables for which data has been collected include quality of education, human development, public spending on education and trained teachers' availability. Other than these variables, two control variables have also been used in this study i.e. literacy rate and population.

### 3.2 Model Specification

After the collection of data, the next step is to define the units of all the variables that have been involved in the study by the author. In the current study, we are investigating the impact of human development, public spending on education and trained teachers' availability on the quality of education in Asian countries in the presence of two control variables i.e. literacy rate and population. The measurement units and notations of all the above-mentioned variables are given here. The quality of education (EDU) will be measured by the satisfaction level of students. Human development HD will be measured in terms of an index, called as human development index. Public spending on education PSE will be measured in terms of the percentage of spending by people. In the same way, the measurement units of trained teachers' availability TTA are the percentage of total teachers. The first control variable, literacy rate LIT will be measured as the percentage of literate people in the country and finally the measurement units of population POP will be millions. In this way all the variables will be measured and by using them a regression equation has been developed by the author that is given below:

$$EDU_{it} = \alpha + \beta_1 HD_{it} + \beta_2 PSE_{it} + \beta_3 TTA_{it} + \beta_4 LIT_{it} + \beta_5 POP_{it} + \varepsilon_{it}$$

In this equation, EDU represents quality of education, HD shows the term of human development, PSE represents public spending on education, TTA shows trained teachers availability, LIT is the literacy rate, POP denotes population while  $\varepsilon_{it}$  is the term that represents error.

### 3.3 Estimation Procedure

#### 3.3.1 Panel Unit Root Test

In the estimation procedure, the first step is to recognize the order of integration of variables as well as the stationary and non-stationary state of the variables. Unit root tests are used for this purpose. The most commonly used unit root tests include ADF, DF, LLC, IPS etc. The importance of these tests is that they provide

better and accurate results as compared to the traditional unit root tests (Levin, Lin, & Chu, 2002). They also overcome the size and power related issues of the traditional tests and provide normal and standard distribution of the collected data as well. It must be noted here that unit root tests are based upon the existence of two kinds of hypotheses. The null hypothesis suggests that unit root exists while the data is nonstationary. On the contrary, alternate hypothesis suggests that unit root does not exist while the data is stationary. The results of these tests are evaluated on the basis of acceptance and rejection of these hypotheses. The most important tests in this regard are Levin Lin Chu LLC and Im Pesaran Shin IPS tests. The basic difference among these tests is that LLC shows homogeneous autoregressive process while IPS shows heterogeneous autoregressive system. Based on the type of data collected, the author has employed LLC unit root test in this study, the equation of which is presented below:

$$\Delta y_{i,t} = \alpha_i + \rho y_{i,t-1} + \sum_{j=1}^{pi} a_j \Delta y_{i,t-j} + \varepsilon_{i,t}$$

Here is the difference that  $\Delta y_{i,t}$  shows for  $i^{\text{th}}$  country for the specific time period of  $t$ .

### 3.3.2 Panel Cointegration Test

After the order of integration and stationarity of the variables has been identified, the author will then apply cointegration tests to the collected data. The basic aim of this test is to find out any cointegrating as well as long run relationship between the variables. Kao and Pedroni are the two most commonly used tests of cointegration. These cointegration tests are further divided into two approaches called as within dimension approach and between dimension approach (Im, Pesaran, & Shin, 2003). The within dimension approach involves four types of test statistics i.e. v-statistic, rho-statistic, PP-statistic and ADF-statistic. In the very same fashion, between approach also involves three types of statistics i.e. rho-statistic, PP-statistic and ADF-statistic. It must be noted here that PP statistic is nonparametric while ADF statistic is parametric. Just like unit root tests, cointegration tests are also based on null and alternate hypothesis. The null hypothesis in this regard shows no cointegration while the alternate hypothesis shows the presence of cointegration. Based on the acceptance and rejection of these hypotheses, the long run equilibrium relationships can be identified and investigated. As the authors has selected Kao cointegration test to be used in this study, its equation is given as follows:

$$y_{i,t} = \alpha_i + \delta_{i,t} + \beta_1 X_{1,i,t} + \beta_2 X_{2,i,t} + \dots + \beta_n X_{n,i,t} + \varepsilon_{i,t}$$

### 3.3.3 Coefficient Estimation Test

Once the order of integration and cointegration has been investigated in the variables, the author will then use the coefficient estimation techniques to measure the relationship between the variables. For this purpose, ordinary least square approach is usually used but OLS shows some issues such as serial correlation and existence of endogenous variable (Pedroni, 2001). These issues can be resolved by altering OLS and generating two forms from it i.e. dynamic OLS and fully modified OLS (DOLS and FMOLS). The results of these tests have certain coefficients of variables that represent the magnitude of the relationships existing between them. There are two specific conditions, which when fulfilled make these tests provide more accurate and authentic results. The first condition is that there must be only one cointegrating vector present among the variables of first order integration. The other condition in this regard is the there must be no cointegrating vector present among the explanatory variables. As the author has employed DOLS coefficient estimation test, its equation can be presented as follows:

$$\hat{\beta}_{FM} = \left( \sum_{i=1}^N \sum_{t=1}^T (x_{i,t} - \bar{x}_i)^2 \right)^{-1} \sum_{i=1}^N \left( \sum_{t=1}^T (x_{i,t} - \bar{x}_i) \widehat{EDU}_{i,t} - T \hat{\delta}_{\epsilon u} \right)$$

In this equation,  $\widehat{EDU}_{i,t}$  is the transformed variable of quality of education due to endogeneity correction while  $\hat{\delta}_{\epsilon u}$  represents the serial correlation correction by FMOLS.

#### 4. Empirical Analysis

##### 4.1 Results of Panel Unit Root Test

As discussed in the earlier portion of this study, the first step is to find out the order of integration of the variables of the study. The author had applied LLC unit root test for this purpose and its results are presented in table 1 below. This table shows that there are two different sections for which the test has been applied separately. These sections include level and first difference. The level series shows that all the variables have accepted the null hypothesis but public spending on education as well as population has rejected the null hypothesis. This acceptance of null hypothesis by more variables indicated that in level series the data is nonstationary because the unit root is present. When the variables were first differenced, it can be seen in the table that all the variables have rejected the null hypothesis. This rejection of null hypothesis by all the variables indicates that the data in first difference series is stationary. This shifting from non-stationary to stationary data is based on the concept of first difference. The results got from this test can be concluded by stating that the data is nonstationary in level series while it becomes stationary in the first difference series (see table 1).

**Table 1.** Panel Unit Root Test – Levin Lin Chu LLC

Variable	Level	1 <sup>st</sup> Difference
EDU	-2.8363 (0.334)	-5.5231*** (0.002)
HD	-3.2846 (0.826)	-7.2468** (0.013)
PSE	-4.2864** (0.042)	-12.423*** (0.000)
TTA	-2.0421 (0.536)	-11.421*** (0.000)
LIT	-5.6342 (0.532)	-13.634** (0.004)
POP	-4.7424** (0.032)	-14.874*** (0.000)

In this table, \* represents that the rejection is one percent significant, \*\* shows that rejection is five percent significant, \*\*\* shows that rejection is ten percent significant

##### 4.2 Results of Panel Cointegration Test

After finding out the stationary and non-stationary state of the collected data, the author then applied Kao cointegration test to find out the cointegrating and long run relationship between the variables in the study. The results of Kao Cointegration test have been presented in the table 2. The results of tests in both within dimension and between dimension approach have been given in the table. It can be seen that in within approach, three out of four statistics have rejected the null hypothesis of no cointegration. In the same way, the between dimension approach shows that two out of three statistics have rejected the null hypothesis of no cointegration. When these results are compiled, it comes out that total of five statistics out of seven have rejected the null hypothesis. As the null hypothesis suggested the absence of cointegrated relationships between the variables, so from the results it can be concluded that cointegrated relationship is present among the variables that have been under study in this research. In addition to cointegrated relationship, the long run equilibrium relationship has also found to be present between these variables. An important point that must be noted here is that ADF

(parametric) and PP (non-parametric) statistics have more significance in this context which further affirms the presence of significant relationship between the variables.

**Table 2.** The KAO Panel Cointegration Test

Alternative hypothesis: common AR coefs. (within-dimension)				
	Weighted			
	<u>Statistic</u>	<u>Prob.</u>	<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	-2.283472	0.7136	-5.283694	0.0000
Panel rho-Statistic	4.913768**	0.1638	4.162577	0.9932
Panel PP-Statistic	-12.13879*	0.0000	-8.842638	0.0001
Panel ADF-Statistic	-4.183691*	0.0003	-4.163768	0.0003
Alternative hypothesis: individual AR coefs. (between-dimension)				
	<u>Statistic</u>	<u>Prob.</u>		
Group rho-Statistic	6.286489*	0.0000		
Group PP-Statistic	-21.13689	0.0000		
Group ADF-Statistic	-2.813691**	0.0431		

In this table, \* represents that the rejection is one percent significant, \*\* shows that rejection is five percent significant

### 4.3 Results of Coefficient Estimation Test

Once the order of integration and the long run relationships have been found out, the next step is to measure the relationship that is present among the variable. The author has used DOLS coefficient estimation technique for this purpose. The results of DOLS technique have been given in the table 3 of the study. It can be seen in the table that the impact of human development is significant on quality of education by 5 percent significance level. In other words, quality of education will rise by 22.9% with increase in one percent of human development. In the same way, the impact of public spending on education has also been found significant is supposed to increase the quality of education by 28.4% with one-unit increase. The third variable, trained teachers' availability has also significant impact on quality of education and will raise it by 13.6% with one percent increase. Apart from these variables, the impact of control variable, literacy rate has also been found as significant. From these results, it can be concluded that human development, public spending on education, trained teachers' availability and literacy rate have significant impacts on quality of education.

**Table 3.** DOLS Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HD	0.227942**	0.2444	3.284689	0.0000
PSE	0.284797*	0.5634	4.283694	0.0004
TTA	0.136104**	0.1334	4.297247	0.0003
LIT	0.284697*	0.0032	1.497359	0.2774
POP	0.834968	0.3532	2.358799	0.0001
Constant	0.482319	0.6534	3.539739	0.0002
R-squared	0.284694			
Adjusted R-squared	0.137684			
F-statistic	32.28369			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	2.247924			

In this table, \* represents one percent significance level, \*\* shows five percent significance level

## **5. Discussion and Conclusion**

### **5.1 Discussion**

The basic aim behind this study was to find out the impact of human development, public spending on education and trained teachers' availability on quality of education in Asian countries. To achieve this aim, several hypotheses were developed and tested. The first hypothesis was that the human development has significant impact on quality of education. This hypothesis has been accepted by the results and is in accordance with the past study (Havighurst, 1953). The next hypothesis was that public spending on education has significant impact on quality of education. This hypothesis has also been accepted and this result is same as shown by the past study (Ablo & Reinikka, 1998). The last hypothesis was that the trained teachers' availability has significant impact on quality of education. This final hypothesis has also been accepted by the author on the basis of the results of data analysis. This result is in concordance with a past study (Sindelar, Daunic, & Rennells, 2004). In the last, the impact of a control variable, literacy rate has also been found as significant in context of quality of education. This same result has been seen in a previous study (Kickbusch, 2001).

### **5.2 Conclusion**

Being an important factor of the economic growth of a country, the importance of education has been increasing day by day. In the current study, the impact of human development, public spending on education and trained teachers' ability is being studied on the quality of education of Asian countries. For this purpose, a research was designed, and data was collected from different Asian countries for 25 years. This data was subjected to different tests such as LLC unit root, Kao cointegration and DOLS estimation test. The results of these tests showed that the impact of human development, public spending on education and trained teachers' availability is significant on quality of education. Similarly, the impact of control variable, literacy rate has also been found as significant. There are many theoretical, practical and policy making implications of this study.

### **5.3 Implications**

Several theoretical, practical and policy making implications and benefits of this study have been identified. Firstly, it will provide enough literature and information about human development, public spending patterns on education and trained teachers' ratio along with the quality of education. This will help them in their researches and studies. Apart from this, it will also provide guidance to the education department of the country to take certain actions to improve the quality of education in country, which is the need of the hour for almost every country in the world. Finally, it will also provide assistance to the policy making department of the government in order to devise policies that are favorable for education in the country. This will increase the quality of education in the country that will have an ultimate impact on the growth of the country.

### **5.4 Limitations and Future Research Indications**

Several limitations associated with this study have been discussed here. In addition, some future research indications and recommendations have also been given for the guidance of the future researchers. First of all, the sample size in this study is very small and it can be increased effectively by other researchers. The data has been collected from Asian countries. Other researchers may consider other countries or regions for data collection purpose. Moreover, the variables that are involved in this study are fixed which may be changed by the other researchers in their studies. The last point is that the future researchers may also apply tests other than those that have been used in this study. In this way, other and future researchers may improve the quality of their researches.

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