

# An Empirical Evidence of Human Capital Constraint towards Economic Growth

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## Abstract

Human capital plays a crucial role in enhancing sustainable economic growth. The aim of this study is to investigate the long run linkage between economic growth and human capital and explore the problems facing by education and health sectors in Pakistan, how to remove these problems in order to increase Human Capital, eminence of Human Capital and Economic Growth also. For this purpose, this study has been taken annual time series data from 1977 to 2014 and employed co-integration technique to find out the results. This study has been used the data from WDI, SBP, and Economic Survey of Pakistan (various issues). The results of this study revealed strong positive and significant long run association between human capital and economic growth in Pakistan. It is also found by the study that current status of health and education sectors in Pakistan is very poor. This study may be useful for health and educational policy making and human capital formation to boost up economic growth in Pakistan.

**Keywords:** Human capital, Economic Growth, Johansen Co-integration, Skilled Worker.

## 1. Introduction

Human capital plays a vital role in all aspects of an economy. Human capital is an essential ingredient of economic growth. It also strikes the socio-economic development of global world. The term human capital can be defined as the collection of knowledge, skills, good physical and mental condition and the natural abilities that persons attain, build up and expand throughout their life span to perform all economic activities. Some earlier economists was considered all working force as human capital even uneducated and unskilled labor. But the economists of present era considered educated, skilled, trained and physically and mentally fit working force as human capital. The main problems that are facing by the government are proper utilization of scarce resources across competing activities and different economic sectors. Since economists see education contributes more in enhancing human capital as a result economic growth, therefore, it is important to estimate its contribution on economic growth.

Before 1950, a number of economists exposed that the basic and key factor that can increase the wages of labor and can increase the economic growth is the investment in human capital. As for as human capital is concerned the choice of investment between alternative choices such as investment in education sector or investment on physical infrastructure depends on the social behavior of society, which is carried out by the government through its decision of policy about budget allocation.

According to Romer (1990), skilled and qualified workers can easily convert their knowledge and skills into quality products and services. Human capital is very important and expedient for individuals, organizations and the society of the country. An educated and trained worker can perform his duty more efficiently than an uneducated worker, so education increases the capability, productivity and income of worker as well.

Any organization of the country has two main objectives. Minimize firm's cost is the first objective and the second objective is to maximize the profit of the firm. To achieve these objectives, firm hire educated and trained workers. These workers utilize firm's resources in an efficient way and produce quality products. So, in this way cost of the product and total cost of firm minimizes and on the other hand profit of the organization also maximizes because there is no wastage of resources in the presence of trained workers.

Human capital is also the fundamental factor to increase the exports of the country and improve balance of payment record for an economy. Skilled and qualified workforce produce quality products and services and the demand of quality products are very high in the entire world. So, countries produce quality products and their exports will automatically increase. In this way, countries earn more and more profit.

Normally it is considered that human capital is all about education and knowledge. But health is also play a crucial part in determining human capital. Very recent economists conducted empirical studies to investigate the relationship between health and economic growth and proved that health is an important and significant factor that plays pivotal role in sustainable economic growth.

The major concern of this paper is to explore the education and health's contribution to economic growth. So it is justified that education and health are the major factor of human capital with the help of previous studies. Long term analysis of human capital and sustainable economic growth would be meaning full in explaining the volume of fully accumulated effects of education and health on economic growth. Hypothesis that is to be tested here is "human capital affects economic growth" is a long run phenomenon.

The sequence of this paper is as follows: Section 2 reviews of some previous studies piloted on the subject of the relationship between human capital and economic growth. Section 3 exposed the status of human capital situation in Pakistan along with brief comparison with few other Asians countries' condition with same subject matter. In section 4 shows econometric modeling and tell about data used in the study, which make the theoretical and conceptual framework of the paper. Section 5 Results and discussion of main findings and in Section 6 Conclusion drawn from combine emerge of previous and current studies' findings.

## 2. Literature Review

A number of researchers conducted different studies to consider the connection between economic progress and human capital. Following is an immediate review of some recent studies about growth and human capital.

Abbas (2000) tried to consider the relationship between economic development and human capital on two south Asian developing countries Pakistan and India. The results of both countries compared in this study. The overall empirical findings supported the idea that human capital performs an important role in economic growth for both countries.

Asteriou and Agiomirgianakis (2001) conducted a time series study to investigate the association between economic growth and human capital in Greece. This study employed Johansen co-integration technique to observe the long run link between GDP and human capital variables. The study found long run positive linkage between economic growth and human capital.

Khan (2005) investigated the relationship between human capital and economic growth of Pakistan. This study tries to analyze the major determinants of economic growth. The study used cross-sectional data of 72 developing countries including Pakistan (from 1980 to 2002) and employed OLS technique to find out the results. The empirical results of the study shows that investment and better institutional quality are the key factors of economic growth, but the results also shows that investment in human capital is also a key factor of economic growth.

Abbas and Peck (2008) examined the relationship between human capital and economic growth in Pakistan. Time series data (from 1960 to 2003) was used and found a positive relationship between human capital and economic growth by using co-integration technique. On the same year, Akram, et al. (2008) analyzed the impact of health human capital on economic growth of Pakistan. The study found positive and significant impact of both health and education on economic growth. According to the results, public health expenditures didn't have significant impact on economic growth. It is suggested that the policies regarding health should be directed in such a way that they should give more incentives to private sector for investing in health facilities. Pakistan can achieve the high level of economic growth by increasing and improving the stock of health human capital.

Chaudhary et. al. (2009) tried to investigate the role of higher education in economic growth of Pakistan. According to the results of the study, higher education has positive but insignificant impact on economic growth of Pakistan because education is most neglected sector in Pakistan and enrollment ratio in higher education is too low.

Afzal et. al. (2010) investigated the linkage between school education and economic growth in Pakistan. According to the study, General Enrollment Ratio (proxy for school education) has a positive and significant impact on economic growth of Pakistan. This study suggested that Govt. should control poverty and political instability in order to achieve rapid growth of country's economy.

Qadri and Waheed (2011) conducted a time series study to check the relationship between human capital and economic growth in Pakistan. The study found that human capital has a positive impact on economic growth in Pakistan. Lawal et. al. (2011) tried to investigate the relationship between education and economic growth in Nigeria and found that education has a significant and positive impact on economic growth in Nigeria. Kakar et. al. (2011) also examined the long run association between Govt. expenditure on education and economic growth in Pakistan and found the positive long run relationship between Govt. expenditure on education and economic growth in Pakistan.

Talha et. al. (2011) found a strong positive relationship between education and economic growth of peoples but this study also indicates a serious problem that generally faces by the developing countries. Mostly developing countries faces political instability. This political instability causes low job opportunities. So, in these countries the number of graduate students is greater than the number of job opportunities. This situation leads to educated unemployment and brain drain also.

Imran et. al. (2012) observed the relationship between human capital and economic growth in Pakistan. The study found that there exists a positive and significant relationship between human capital and economic growth and it is also found that human capital status in Pakistan remained very low during the selected time frame. Khattak and Khan (2012) investigated the relationship between education and economic growth of Pakistan. According to the results of OLS, education has a positive and significant impact on economic growth of Pakistan and the results of co-integration shows that there is long run association exists between education and economic growth of Pakistan.

Mostly developing countries like Pakistan have a large number of workers due to high birth rate but these countries do not provide facilities to educate these workers. On one hand, Pakistan's education system produces very low number of skilled persons every year and on the other hand Govt. of Pakistan does not provide reasonable jobs to these workers. So, this skilled person goes to the developed countries like America, England, UAE, etc. in search of jobs.

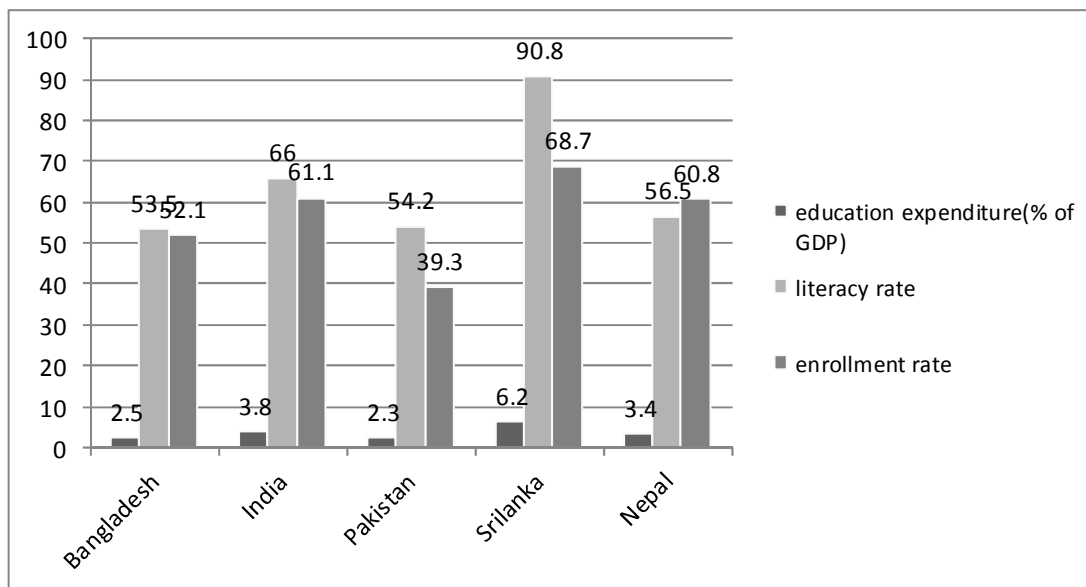
### **3. Human Capital Situation in Pakistan**

Every country in this world want to achieve persistent economic growth and it is the core objective of every county. In this perspective, human capital considered as important and main factor that plays very significant role to boost up economic growth of a country.

#### *3.1 Education*

It is truly said that education is the main factor that plays very significant role to raise the productivity and efficiency of workforce that is necessary of the economic growth of the country. In Pakistan, output of education sector is very low because of too little spending on this sector. Pakistan spends only 2.5% of its GDP on education that is the lowest spending on education in Asian countries. Literacy rate in Pakistan is almost 50%. 47% of total females are not going to school. 650000 children below the age of 9 are not enrolled in school. 35% of total primary students dropped out every year. Pakistan stands at 145<sup>th</sup> position out of 187 countries in HDI. On the Educational Development Index (EDI), the position of Pakistan is below than the other Asian developing countries. According to a UNESCO report (2010-11), the educational structure of Pakistan consists upon 260903 institutes and 1535461 teachers that providing facilities and services to 41018384 students. The number of public educational institutions is 180846 and private educational institutions are 80057. 66% of total students go to public institutions and 34% of total students go to private institutions because private institutions provide expensive education and mostly peoples in Pakistan cannot afford it. So, they preferred to public institutions for education. Pakistani population consists upon 51% females and 49% of males. But the ration of female students is smaller than males. Ratio of female students is 42.62% and the ration of male students is 57.38%. This gender disparity of education exists in Pakistan because mostly peoples of rural and northern areas do not allow females to get education.

Figure 1. Education Indicators of South Asian Countries



### 3.1.1 Flaws in the Educational System Of Pakistan

The educational system of Pakistan is affected by a number of issues. 23 policies have been introduced from 1947 to 2009 to solve the problems of educational system in Pakistan but the problems are same as before because there is no satisfactory system of policy implementation in Pakistan. There are more than one systems of education in Pakistan. There is separate education for rich peoples. The children of elite class go to the private English medium institutions and get international standard education in which offers international standard syllabus while the children of poor class go to the Govt. schools where poor quality of education provides.

There is shortage of trained teachers. Many policies have been introduced for the training of teachers but there are no implementation criteria in Pakistan. Increasing trend towards dropout ratio is the major problem of education system of Pakistan. Only 15% of total students who enroll in primary level of education reach to the matriculation examination. And only 7.5% of total primary enrolled students reach to the university level. The main reason of this increasing dropout ratio is low quality education and distasteful environment of educational institutes. Poverty and uneducated parents are also the main factors for this.

Examinations are the best way to check the ability of the students but fair examination structure is removed in Pakistan due to unfair practices. Students adopt unfair means to pass the examination because the purpose of mostly students is not learning but they look upon the degree to get employment. Some parents and even teachers also help the students in illegal activities and it is a catastrophic part of examination system of Pakistan. In Pakistan, only 2% of total GDP spends on education. This is the lowest spending on education as compare to the other Asian developing countries. Corruption is also the main reason of the failure of educational system. According to the educational records, there are many schools operating in the country but most of the schools are not exists actually. A large part of educational budget goes into the pockets of dishonest officers. It is due to the lack of accountability.

### 3.2 Health

Health is a most important and basic asset of human beings and is a key factor of economic growth. Poor health status in developing countries like Pakistan has an effect on economic growth in many ways. Poor health of children does not allow them to attend their classes regularly. Most of the students do not continue their education due to poor mind and physical health. So, they remain illiterate and they cannot earn more in the future as compared to educated individuals. On the other hand, those peoples who have poor health condition become a burden on the economy. Increasing dependency ratio decreases per capita income and harmful for the economy of the country.

Health sector of Pakistan is better than before but not adequate. Health improvements are not sufficient for the increasing population of Pakistan. Pakistan seems to be unsuccessful in achieving UN Millennium Development Goals (MDGs). 3 out of 8 MDGs are directly related to health. First one is “reducing child mortality”, second

one is “improving maternal health” and the third one is “removing HIV, malaria and other diseases.” If Pakistan wants to meet up the MDGs then it should condense infant mortality rate from 60 to 40 deaths (per thousand live births) and the under-five mortality rate from 74 to 52 deaths (per thousand live births) and maternal mortality rate should reduce from 260 to 140 deaths (per 1,00,000). In Pakistan, only 35% women delivered their children by doctor and 65% women delivered their children at residence. In this way, chances of maternal health increases.

Pakistan is also facing the double burden of diseases i.e. communicable diseases and non-communicable diseases. Communicable diseases are frequent in Pakistan such as HIV, tuberculosis, polio, malaria, etc. 208 cases of polio are reported in Pakistan during 2014. 8 patients are died due to dengue during 2014. 231 cases (per 1000) of tuberculosis reported every year in Pakistan. The ratio of non-communicable diseases is also very elevated such as diabetes, cancer and mental diseases. 25% of peoples above 40 years are suffering from heart diseases and 10% of adult population suffering from diabetes.

Private sector plays an imperative role in providing health facilities. Almost 75% of total patients go to private hospitals and only 25% of total patients go to the Govt. hospitals. Private sector provides better facilities than Govt. sector. There are 160289 registered doctors in Pakistan and the population of Pakistan is 184350000 in 2012 according to the National Institute of Population Studies (NIPS). It means that only one doctor is available for 1150 individuals. And there is only one bed accessible for 1786 patients in Pakistan. Education and health status of Pakistan is very poor. If Pakistan want to enhance economic growth then it is necessary to take steps for the improvement of these sectors.

Table 1. Health Indicators of South Asian Countries

Health Indicators	Pakistan	India	Srilanka	Bangladesh	Nepal
Expense on Health (% of GDP)	0.4	0.9	2.0	0.9	1.5
Life Expectancy (years)	65.7	65.8	75.1	69.2	69.1
Infant Mortality Rate (per 1000)	59	47	11	37	39
Under-5 Mortality Rate (per 1000)	72	61	12	46	48
Maternal Mortality Rate (per 1,00,000)	260	200	35	240	170
Fertility Rate (total births per woman)	3.4	2.6	2.3	2.2	2.7

Source: World development indicators

#### 4. Theoretical and Conceptual Framework

The question arises over here according to recent literature that what drives changes in economic growth? Is it only human capital? Obviously no, physical capital and others factors also play vital role in economic growth. As standard Cobb-Douglas production function  $Y_t = A_t f(L_t, K_t)$  that is significant to growth. “A” is generally considered as total factor productivity, “L” is the quantity of labor and “K” represents the Quantity of Capital. so

“A” total factor productivity should not be taken as only indicator of technical progress, and its can reflects the influence of other factors as well, like policies and institutions ( physical and human capital and good institutions as less input to produce comparatively more output ).

Other theories of economic growth discussed below only for the sack of, to show the significance of physical and human capital only. The growth theory of Harrod-Domar describes that the growth rate of gross domestic product (GDP) is depend upon the ratio of net national savings and the ratio of national capital-output. This theory states that there are two other elements of economic development, growth of labor force and technological progress. Solow growth model states that economic growth depends upon capital, labor force and technology. According to the model, technology is the cause to increase labor productivity. According to the Endogenous Growth Theory, those economies who accumulate more capital, invest more in peoples in the shape of education, training, nutrition and health care and due to this investment productivity increases. This theory also states that research and development activities increases new production techniques and generate technical know-how. So in this way, productivity increases. Romer (1990) also emphasizes on research and development activities. Research and development activities produce useful knowledge and this knowledge is the major cause of technological progress. Romer said that R&D activities depend upon human capital because only educated and trained peoples involves in R&D activities and produce useful knowledge.

Solow (1955), Endogenous Growth Theory and Romer (1990) proved that human capital have positive and significant impact on economic growth so this study is based upon these theories and tried to investigate that how can human capital affects output in Pakistan. Like the different growth theories and different studies about human capital, it is expected that the results of this study will also prove that human capital has a positive impact on economic growth in case of Pakistan.

## 5. Methodology of the Study

### 5.1 Data Sources

The main purpose of this study is to inspect the association between human capital and economic growth in Pakistan. Therefore, this study employed the secondary data of five variables from different sources. This study employed the data of “Real GDP”, “Primary Enrollment” and “GFCF” from World Development Indicators (World Bank). This study employed the data of “Infant Mortality Rate” and “Labor Force” from Handbook of Statistics (State Bank of Pakistan).

### 5.2 Econometric Methodology

This study used co-integration to explore the long run association between human capital and economic growth of Pakistan. But checking the stationary of the variables is the first step before applying co-integration.

#### 5.2.1 Unit Root Test

This test is used to check the stationary of the data. If probability distribution of data remains unchanged astime go on then data can considered stationary. There are different types of tests to check unit root such as Phillips Perron, Dickey Fuller GLS (ERS) and NG-Perron but Augmented Dickey Fuller (ADF) test is the most commonly used test to check the stationary of the data. So, the study employed ADF test.

#### 5.2.2 Co-integration Technique

Co-integration technique is used to check the long run association among variables. There are two approaches of co-integration technique. First one is Engle Granger (1987) co-integration approach and the second one is Johansen (1988) co-integration approach. Engle Granger approach is used to check long run association between only two variables while Johansen approach is used to check the long run association among more than two variables. According to the model of this study, Johansen co-integration approach is appropriate so this approach is used for this study. In Johansen co-integration technique, basic two types of statistics, Trace statistics and maximum Eigen value are to be calculated for observing the co-integration among the variables.

The trace test and maximum Eigen value test, shown in equations:

$$J_{\text{TRACE}} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i)$$

$$J_{\text{MAX}} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_{r+1})$$

Here T is the sample size and estimated is the  $i^{\text{th}}$  largest canonical correlation. The trace test tests the null hypothesis of r co-integrating vectors against the alternative hypothesis of n co-integrating vectors. The



maximum Eigen value test, on the other hand, tests the null hypothesis of  $r$  co-integrating vectors against the alternative hypothesis of  $r + 1$  co-integrating vectors.

### 5.3 Model Specification

The empirical analysis in this paper is based on a standard Cobb-Douglas production function.  $Y = AL^\alpha K^{1-\alpha}$  that is also mentioned earlier. A numerous measures are used to represent the quality of human capital, which includes literacy rate, average year of schooling, primary school enrolment, secondary school enrolment, and life expectancy. The purpose of the study is to explore the association between human capital and economic growth. Both education human capital (E) and health human capital (H) considered as human capital. So, this study used education and health variables in the model.

$$\text{Economic Growth} = f(\text{human capital, physical capital, labor force})$$

But the basic regression takes the following form:

$$Y = \beta_0 + \beta_1 \ln PE + \beta_2 \ln FM + \beta_3 \ln GFCF + \beta_4 \ln LF + u_t$$

Where,  $Y$  represents real GDP as a proxy of economic growth. Primary enrollment (PE) used as a proxy of education and infant mortality rate (FM) as a proxy of health condition; combine shows the sound indicator of human capital. Without labor and capital, production is not possible. So, gross fixed capital formation (GFCF) is considered as a proxy of capital and total labor force (LF) for presenting the labor as well.

### 5.4 Definition of Variables

#### 5.4.1 Real GDP (Dependent Variable)

Real GDP is an inflation-adjusted measure that reflects the value of all goods and services produced within a country in a certain period of time, expressed in base year prices. Real GDP shows what would have happened to expenditures on output if quantities had changed but prices had not.

#### 5.4.2 Primary Enrollment (Independent Variable)

It is defined as the number of pupils who are enrolled in primary education level as a percentage of the total children of official school age population. Here "primary enrollment" is used as a proxy for education that shows the education condition of the country. High rate of primary enrollment means high rate of enrollment in upper levels of education because primary level of education provides base for upper level of education. In this way, overall level of education in the country increases and affects economic growth positively.

#### 5.4.3 Infant Mortality Rate (Independent Variable)

It is the number of deaths under one year of age occurring among the live births in a certain geographical area during a given year. Infant mortality rate is used in this study as a proxy for health. It is negatively associated with economic growth. High rate of infant mortality indicates poor health condition in the country and poor health condition affects economic growth negatively.

#### 5.4.4 Gross Fixed Capital Formation (Independent Variable)

It includes land improvements, machinery and equipment purchases, and the construction of roads, railways, schools, hospitals, industrial buildings, etc. It is used in this study as a proxy for physical capital. More physical capital means more investment and more investment means more output. So, it has positively effect on economic growth.

#### 5.4.5 Labor Force (independent variable)

It includes employed peoples and those who are able to work and looking for a job. In other words, the sum of employed and unemployed peoples is called total labor force. It has positive impact on economic growth of the country. More labor force means high labor force participation rate and high labor force participation rate means high production of goods and services.

## 6. Results and Discussion

This study used co-integration to explore the long run association between human capital and economic growth of Pakistan. But checking the stationary of the variables is the first step before applying co-integration.

### 6.1 Unit Root Test

Unit root test is used to check the stationary of the data. If probability distribution of data remains unchanged as time go on then data can considered stationary. There are different types of tests to check unit root such as

Phillips Perron, Dickey Fuller GLS (ERS) and NG-Perron but Augmented Dickey Fuller (ADF) test is the most commonly used test to check the stationary of the data. So, the study employed ADF test.

Table 2. ADF Test Results (Level)

Variable Names	Level					
	Intercept	P-Value	Trend and Intercept	P-Value	Non	P-Value
Real GDP	1.2701 (-2.6143)	0.9980	-1.4893 (-3.2070)	0.8136	2.6322 (-1.6109)	0.9971
Primary Enrollment	-0.6829 (-2.6128)	0.8381	-2.5170 (-3.2046)	0.3185	2.8228 (-1.6110)	0.9985
Infant Mortality Rate	-1.0695 (-2.6158)	0.7159	-2.3751 (-3.2096)	0.3849	-0.8613 (-1.6107)	0.3353
Gross Fixed Capital Formation	-1.3507 (-2.6128)	0.5948	-3.2022 (-3.2070)	0.1009	1.6455 (-1.6110)	0.9716
Labor Force	3.1736 (-2.6143)	1.0000	-0.2638 (-3.2046)	0.9887	6.5919 (-1.6110)	1.0000

Values in parenthesis are the critical values at 10% level of significance



Table 3. ADF Test Results (1<sup>st</sup> Difference)

Variable Names	1 <sup>st</sup> Difference					
	Intercept	P-Value	Trend and Intercept	P-Value	None	P-Value
Real GDP	-2.933226 (-2.614300)	0.0520	- 3.3 62 0 (-3.2070)	0.0736	-0.9389 (-1.6109)	0.3030
Primary Enrollment	-5.329044 (-2.619160)	0.0001	- 5.3 13 2 (-3.2152)	0.0008	-4.2554 (-1.6109)	0.0001
Infant Mortality Rate	-5.912717 (-2.617434)	0.0000	- 5.9 21 4 (-3.2123)	0.0002	-5.9416 (-1.6105)	0.0000
Gross Fixed Capital Formation	-4.144522 (-2.614300)	0.0027	- 4.1 66 7 (-3.2070)	0.0123	-3.8212 (-1.6109)	0.0004
Labor Force	-2.727433 (-2.615817)	0.0802	- 7.8 00 4 (-3.2070)	0.0000	-1.4337 (-1.6107)	0.1387

Values in parenthesis are the critical values at 10% level of significance

Results of ADF test shows that all variables stationary at 1<sup>st</sup> difference. Therefore, this study employed co-integration technique to check the long run association between human capital and economic growth.

### 6.2 Johansen Cointegration Test

Co-integration technique is used to check the long run association among variables. There are two approaches of co-integration technique. First one is Engle Granger (1987) co-integration approach and the second one is Johansen (1988) co-integration approach. Engle Granger approach is used to check long run association between only two variables while Johansen approach is used to check the long run association among more than two variables. According to the model of this study, Johansen co-integration approach is appropriate so this approach is used for this study.<sup>1</sup>

<sup>1</sup> This study has just mentioned the long run co-integrated coefficients, as the purpose here is only to analyze the long relationship among the variables of interest therefore; we are not going for the vector error correction model for the short run coefficient.

Table 4. Unrestricted Co-integration Rank Test (Trace)

Hypothesized Number of Co-integrating Equation(s)	Eigen values	Trace Statistics	0.05 Critical values	Probability
None*	0.731084	109.1082	76.97277	0.0000
At most 1*	0.583897	68.39418	54.07904	0.0016
At most 2*	0.477824	41.21267	35.19275	0.0099
At most 3*	0.352195	21.07038	20.26184	0.0386
At most 4	0.217706	7.611269	9.164546	0.977

Table 5. Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized Number of Co-integrating Equation(s)	Eigen values	Max-Eigen Statistics	0.05 Critical values	Probability
None*	0.731084	40.71400	34.80587	0.0088
At most 1	0.583897	27.18151	28.58808	0.0747
At most 2	0.477824	20.14229	22.29962	0.0973
At most 3	0.352195	13.45911	15.89210	0.1162
At most 4	0.217706	7.611269	9.164546	0.0977

Table of trace statistics shows that there exist 4 co-integrated equations and table of maximum eigenvalue shows that there exist 1 co-integrated equation because the values of trace statistics and maximum eigenvalue statistics are greater than the critical values. It means that long run association exists among variables.

Table 6. Normalized Co-integrating Coefficients

Variables	Coefficients	Standard Errors	t-values
Primary Enrollment	44142.73	10965.5	4.02
Infant Mortality Rate	-9.08	1.4	-6.49
Labor Force	109	5.9	18.47
Gross Fixed Capital Formation	2.86	0.12	23.83
Constant	-1900	190	-10

A result of the table 5 shows that all variable are significant and important determinants to investigate economic growth of Pakistan. The result shows that all independent variables affect economic growth positively and the results of this study matches with the human capital theories like Solow (1955), Lucas (1989) and Romer (1990). "Primary Enrollment" has been used in this study as the proxy for education. This variable is positively related with economic growth. It means that increase in this variable indicates an increase in the level of education. High level of education increases the productivity of workforce and causes technological innovation. This productive workforce produces more goods and services and earns more income and in this way, GDP also increases. In this study, "Infant Mortality Rate" is used as the proxy for health. This variable is also negatively related to the economic growth. High mortality rate means that there are poor health facilities in the country. If there are poor health facilities in the country then it means that the workforce of the country is not 100% healthy

(physically and mentally). Sick and unfit workforce does not able to do proper work and cannot earn more income. In this way, the economic growth decreases.

Gross Fixed Capital Formation is used as the proxy for physical capital. According to the different growth theories, physical capital is necessary for economic growth. More Gross Fixed Capital Formation means more physical capital and more physical capital means more investment in the country. If there is more investment in the country then employment opportunities will increase and production of goods and services will also increase. In this way, economic growth increases.

Labor Force is also a key element for economic growth of a country. In table 5, “C” is the constant. It is also called intercept. The negative coefficient value of intercept shows that economic growth of Pakistan does only affect by the variables included in the model.

Table 7. Decade-Wise Average Values of Data and Comparison with Empirical Results

Years	GDP (million rupees)	Enrollment (million)	Infant Mortality	GFCF (million rupees)	Labor Force (million)
1977-1986	2507131.15	6.1147	102.3	576899.05	25.78
1987-1996	4456035.76	10.7047	100.9	947049.64	31.87
1997-2006	6536993.99	15.8751	80.5	1126839.68	41.6
2007-2012	9111899.5	18.58604	69.83	1412735.66	55.2

The study included decade wise averages because it is an important evidence to support the results of this study. Anyone can easily understand with the help of this table that there is a positive relationship between dependent variable (GDP) and independent variables (GFCF, enrollment, labor force) except one variable (infant mortality rate). It means that an increase in the independent variables (GFCF, enrollment and labor force) causes GDP to increase. The above table shows decreasing Infant Mortality Rate. Decreasing Infant Mortality Rate shows better health facilities in the country. So, decreasing rate of infant mortality is beneficial for the economy. These average values support the empirical results of the study.

## 7. Summary and Conclusion

The aim of this study is to explore the association between human capital and economic growth in Pakistan and investigate the main issues of human capital in Pakistan that affects human capital negatively. The result of this study supports this view that human capital affects economic growth positively and significantly. On the basis of empirical results of Johansen co-integration technique, it is concluded that long run association exists between economic growth and human capital. It is also found by the study that current status of education and health sectors in Pakistan is meager as compared to other South Asian developing countries like India, Bangladesh, Sri Lanka and Nepal. There are many issues of human capital facing by Pakistan that affects human capital negatively. These problems should be removed in order to boost economic growth rapidly.

Special attention should be given to primary level of education because it is the basic level of education and it provides input for upper levels of education. Government of Pakistan should take steps to remove student’s dropout ratio. Multiple Steps should be taken to remove gender disparity and increase female enrollment in all levels of education. Qualified and trained should be appointed in all educational institutions of the country. And training institutions should be established for the training of untrained teachers. Technical education and vocational training institutes should be established.

Govt. of Pakistan should endorse research and development activities at national level and provincial level also. It is strongly recommended that annual budget should increase for education and health sectors. Govt. of Pakistan should take steps to provide better health facilities for poor peoples of the country. Number of hospital and number of qualified doctor should be increased especially in rural areas.

Brain drain is a big problem facing by Pakistan. Government of Pakistan should provide more facilities, jobs and reasonable pay to highly educated peoples in order to attract these peoples to work for their home country. Corruption should be eliminated from both sectors of human capital, education and health. An effective system of accountability should be introduced for corrupt elements.

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