Available Online
Journal of Social Sciences Advancement
www.scienceimpactpub.com/jssa
DOI: https://doi.org/10.52223/JSSA25-060305

Role of Human Capital and Trade Openness in Economic Growth: An Analysis from Pakistan

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ARTICLE INFO

ARTICLE HISTORY
Received: July 10, 2025
Accepted: September 22, 2025
Published: September 30, 2025

KEYWORDS
Human Capital;
Economic Growth;
Labor Force Participation;
Pakistan Economy

ABSTRACT

Human capital is a significant variable in affecting economic growth and the development of economies. The existing research makes an effort to highlight the effect of human capital on affecting growth of the Pakistan economy. We investigate how human capital influences the growth of the economy. We have used time series data from 1990 to 2024. GDP was taken as the dependent variable. Though human capital, trade openness, and labor force participation were used as independent variables. OLS regression results showed that human capital has enhanced the economic growth of the economy. Moreover, trade openness has affected the economic growth of the economy negatively. Finally, result showed that labor force participation also tended to increase the economic growth in Pakistan. The study suggested for more improved and quality education in Pakistan. In addition to this, there is a need to support youth to partake in the work force. Finally, there should be stable environment in the economy to have more growth and economic development.

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INTRODUCTION

International trade affects the growth potential of the economies. One of the existing financial discussions is the association connecting trade openness and the economic performance of the economies. In addition, studies more often than not gauge the extent to which economies are involved in trade. Comparatively, their economic feat is normally calculated by gross domestic product or output in diverse structures. The planned theory in work is that openness to trade affects economic performance, either across nations or eventually. A familiar sight of work from Frankel and Romer (1999) showed an optimistic, important, and feeble connection between the two fundamental factors. The following work has not exposed a straightforward effect of trade openness on economic growth because of possible apprehensions of endogeneity and assessment misspecifications.

The endogenous growth theories assume that much of economic action may improve the level of novelty procedure by providing organizations with additional manufacturing knowledge, all the way by knowledge import (Sachs et al., 1995). The increase in information and the following influences of technical development are based on the spillover influences of human capital accretion in the world. Romer (1986)explained and recognized the thought of run over influences by articulating that investment in new information, empirical work, and expansion in human capital accretion produce extra communal arrival externalities (Coe & Helpman, 1995). Alternatively, Lucas' (1988) model of growth focuses on the significance of human capital accumulation in the growth process of nations. It is argued that it is the diversity for achieving human capital formation level that causes international growth differences. Furthermore, the model gives more information about the procedure of the industrial revolution that urbanized nations experienced.

The theoretical structure of the work is dependent on the endogenous growth theory that reveals the main share of human capital in enhancing long-term growth (Romer, 1990). It is defined as the addition of schooling, physical condition, and labor market involvement that, mutually, enhance output and modernization. Growth is hypothesized to be certainly influenced by the level of education. The model assumes that an increase in education and labor involvement enhances output and economic growth. Abbas (2000) focused on the effect of human capital on economic growth. The regression result revealed that human capital led to an increase in the growth of the economy. Khan et al. (2005) also focused on the role of human capital and investment on the growth of 72 developing countries, including Pakistan. The study concluded that literacy rates and healthcare have boosted higher growth rate of

Pakistan's economy. By using data from 1960 to 2003, Abbas and Foreman-Peck (2008) focused on growth and education. The result showed that the quality of secondary education affected Pakistan's economic growth.

Qadri and Waheed (2011) used data from 1978 to 2007 using an augmented Cobb–Douglas model to check the association of human capital and growth. It was found that human capital has a positive influence on GDP. Qazi et al. (2013) used data from 1980 to 2011 to check an association between human capital and growth. The results revealed that education and growth were strongly connected with each other. Hye and Lau (2015) focused on the role of trade openness on growth by using time series data. Findings showed that trade openness has affected the growth of the nation. It was suggested that there should be more investment in human capital. Teixeira and Queirós (2016) used panel data to find out the effect of human capital on growth in OECD and Eastern European states. It was found that human capital enhanced structural economic growth. Hafeez and Rahim (2019) used data from 1981 to 2014 and applied the ARDL technique. The result showed that human capital and growth were positively related.

Han et al. (2020) studied how human capital affected economic growth in Korea. The results showed that human capital significantly increased the growth of the economy. Asmare and Haiyun (2020) focused on the trade and growth relationship by using time series data. ARDL result showed that trade openness, education, physical capital, and labor force participation tended to enhance the economic growth of the Ethiopian economy. The study concluded that trade must enhance human capital. Akhtar et al. (2023) emphasized the role of gender disparity, trade openness, and labour force participation on the growth of Malaysia by using data from 1980 to 2019. It was found that trade openness and female labor force participation have increased the growth of Malaysia. The study suggested more female labor force participation.

Poudel et al. (2024) investigated how human capital and trade openness affected the economic growth of Nepal by using data from 1991 to 2023. Results showed that trade openness, human capital, tertiary education, labor force participation, and urban population tended to increase the economic growth of Nepal. Ogbuabor et al. (2025) highlighted the influence of industrialization, trade openness, and labor force participation on the growth of Africa. The authors have used data from 2000 and 2018. It was found that trade openness and labor force participation rate have enhanced the growth of the economy. The study suggested stability in the economy for more production and growth.

Pakistan's economy has been observed to have unstable growth trends, struggling with constant confront like low GDP, unemployment issues, high inflation and organizational unevenness. An important factor behind such problems is improper utilization of human capital. Many efforts have been made to resolve this issue, but the economy is still in trouble. Considering the significance of this problem, we have tried to highlight the role of human capital.

Research Questions

The major research questions are given as:

1. What is the impact of human capital on the economic growth of Pakistan?
2. How does trade openness affect economic growth?
3. What is the contribution of labor force participation to the growth of Pakistan?

Objectives

The major objectives are given as:

1. To investigate the role of education on economic growth.
2. To highlight the impact of trade openness on the economic growth of Pakistan.
3. To explain the share of the labor force in the growth of the economy.

Hypothesis

The hypotheses of the study are given as:

1. H1: There is a positive link between human capital and the economic growth of Pakistan.
2. H2: Trade openness influences the growth of the economy.
3. H3: The Higher the labor force participation rate, the higher the economic growth in Pakistan.

RESEARCH METHODOLOGY

Data and Methodology

For this research, we have used time series data from 1990 to 2024 from Pakistan. We have collected data from World Development Indicators and Pakistan Economic Surveys, the World Bank, and UNESCO. Economic growth was used as the dependent variable, and secondary school enrollment rate, trade openness (exports and imports of goods and services as % of GDP), and labor force participation rate were used as independent variables. We have also applied the OLS regression technique for this analysis.

Specification of Model

Model specification is dependent on the human capital–enlarged Solow growth model by Mankiw et al. (1992). These theories focus on the contribution of human capital towards growth. We have used secondary school enrollment, trade openness, and labor force participation rate as independent variables for this research.

The model is given as:

$$GDPPC_t=\beta0+\beta1SSENR_t+\beta2TOPEN_t+\beta3LFPRT_t+\mu t \quad (1)$$

Where:

$GDPPC_t$ = Gross Domestic Product per capita

$SSENR_t$ = Secondary school enrollment (gross %, proxy for education)

$LFPRT_t$ = Labor force participation rate

$TOPEN_t$= Trade openness (Exports and Imports of goods and services as % of gdp)

μt = Error term

RESULTS AND DISCUSSION

The summary statistics of the variables used are given in Table 1. On average, trade openness was 29.6315 percent. This shows the normality and stability of the data. However, the labor force participation rate is 50.5719 percent of the Pakistan economy. Finally, the secondary school enrollment rate is 29.7171 percent, and its value varies from 19.9181 to 32. 4536 percent. It has been observed that the data is normal.

Table 1: Descriptive Statistics

Variables	Mean	St.dev	Minimum	Maximum
TOPEN	29.6315	3.4315	21.4600	33.3301
SSENVR	29.7171	3.8430	19.9181	32.4536
LFPRT	50.5719	1.7411	46.5600	52.7530

The Table 2 shows the regression results. Trade openness is a significant factor affecting the economic growth of the Pakistani economy. More exports tend to increase specialization and production. All this will increase investment and businesses. The result shows that a one percent increase in trade openness has resulted in decreased growth of the economy by 0.0012 percent.

In addition to trade, education is a very significant variable affecting the economic growth of economies. More enrolment and education lead to an increase in the skilled and educated workforce in the economy. These people participate more in production and investment activities, which results in more economic growth. It is found that a one-unit increase in secondary school enrollment results in more growth by 0.0087 percent. The result is favored by Teixeira and Queirós (2016).

Table 2: Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.0794*	0.0897	34.32204	0.0000
TOPN	-0.0012 **	0.0005	-2.5508	-0.0170

SSENR	0.008 7*	0.0003	29.2898	0.0000
LFPR	0.0039	0.0018	2.1712	0.0392
R-Square	0.97			
Adjusted R-square	0.96			
F-Statistics	443.897			
Probability	0.0000			

Labor force participation may also affect the economic growth of the economy. It is found that a one-unit increase in labor force participation rate has resulted in increased growth by 0.0039 percent. Our result is favored by Ogbuabor et al. (2025).

CONCLUSIONS AND RECOMMENDATIONS

In this research, we have investigated the factors affecting the economic growth of the Pakistani economy by using time series data. We have focused on the role of human capital, trade openness, and labor force participation rate on economic growth. The economic growth was used as a dependent variable. We have found out how human capital with other variables, affects the economic growth of the Pakistani economy. OLS results show that trade openness has decreased the growth of the nation. However, secondary school enrollment has contributed positively to economic growth. Finally, labor force participation has also boosted the growth potential of the economy.

On the basis of the results, the study recommends for larger share of the budget towards the economic growth of Pakistan. There should be more allocation of educational expenditures towards economic growth. The government should also provide a more stable environment for more production, specialization, and growth.

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