

Effects of Human Capital on Economic Growth of Nepal

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Abstract

This study aims to find the effects of human capital variables on the economic growth of Nepal based on time series data from 1981 to 2022. The study adopted an analytical research design. The presence or absence of stationary data was assessed using the Augmented Dickey-Fuller (ADF) test and the overall finding was analyzed using the ARDL technique. The long-run relationship among variables was confirmed through the result of the bound test. The results revealed that human capital significantly influences economic growth of Nepal. Based on the analysis carried out it was concluded that gross fixed capital formation positively but insignificantly impacted on the growth in GDP at 5% level of significance. Expenditure on education has a negative and insignificant effect on economic growth, while expenditure on health has significant but negative effect on economic growth of Nepal. Increased private sector investment, involvement in the areas of health and education could accelerate Nepal's development of its human capital.

Keywords: *Human Capital, Economic Growth, Expenditure on Education, Expenditure on Health*

I. INTRODUCTION

The basic concept behind development in any nation is measured in terms of growth. Economic growth can be described as a pattern of constant economic growth throughout a specific time span. Increasing the standard of living for citizens of a nation through economic development can stimulate the economy as a whole. One of the important macroeconomic goals of every nation is sustained economic growth along with social development, and in this context, human capital is seen as an essential aspect. Researchers have studied and analyzed the effects of human capital on economic growth extensively over the past few decades due to an increased interest from economists and policymakers.

The term "human capital" can be described as the abilities and skill sets of human beings (Sharpe, 2001). Human capital theory focuses on not only education but also the health of the individual as an input to economic production. Human capital development, as measured by investment in education or training, refers to the acquisition and growth of individuals with the necessary skills, knowledge, and experience for a nation's economic growth. (Adelakun, 2011). The need to separate capital into physical capital and human capital has emerged. Improvements in productivity have frequently been the focus of research on how they affect the accumulation of physical capital. However, the question of human capital's labor-enhancing characteristics has brought up additional concerns about it as a supply factor (Abbas, 2000).

Given that the term "human capital" in economics refers to "the knowledge and skills that employees acquire via education, training, and experience," there is a substantial amount of research that tends to support the relationship between human capital and economic growth (Mankiw, 2008).

Government spending in the social, health, and educational sectors is steadily increasing in order to achieve the long-term objective of "Happy Nepali, Prosperous Nepal." In the fiscal year 2021/22, health care spending by the government increased by 35%, to a total of NPR 122.77 billion. The education sector receives the largest share of the government's annual budget, totaling \$180.04 billion, or more than 11% of the total budget, for fiscal years 2021-2022. In a similar vein, as the cost of social security rises, the government lavishly spends money on social programs, such as those for the elderly, widows, and the disabled. (Ministry of Finance, 2022).

The budget office will receive information about the relationship between human capital and economic growth in Nepal over the time under consideration from the study's findings. The findings of this study will be useful in helping the state and federal governments understand how human capital influences economic growth. They will gain from knowing more about the human capital initiatives designed to stimulate economic growth. Academics and researchers will benefit from the findings of the study because they will provide a theoretical and empirical framework for learning how human capital affects economic growth. This will be the case because the findings will provide a framework for learning how human capital affects economic growth.

Human capital refers to the mental and physical abilities that a person develops through education, skill development, training, health care, and other methods to increase their productivity and efficiency. It includes everything of a person's personal traits, such as their health, level of nutrition, knowledge, and talents. It also refers to any characteristic of a person that has economic value (Todaro & Smith, 2006).

Making the most of this window of opportunity to lay a stronger basis for sustained economic growth and provide employment for its young and growing labor force is Nepal's key challenge in order to meet the country's goals (Hendrikus, 2020).

Research Objectives

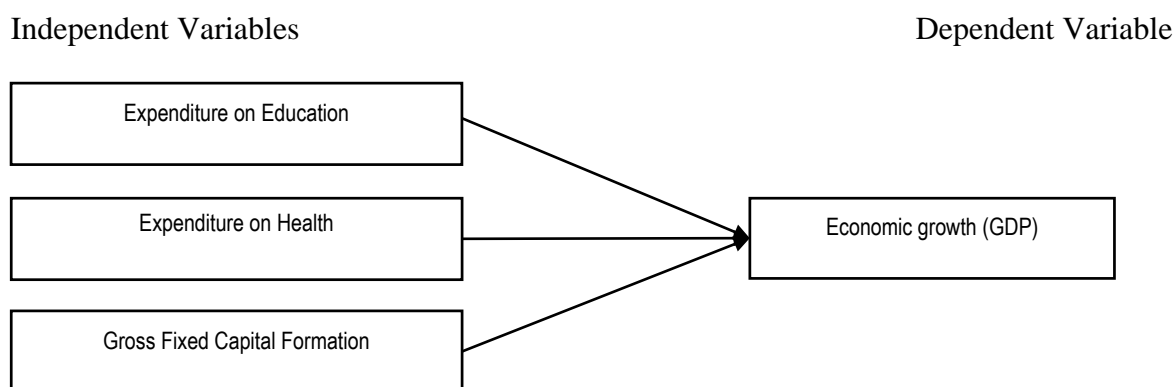
- i. The primary purpose of this research is to investigate the impact that human capital has on the development of the Nepalese economy.
- ii. The specific objectives is to evaluate the effect of expenditure on education, expenditure on health and gross fixed capital formation on economic growth of Nepal.

II. REVIEW OF LITERATURE

Research Framework

Figure 1

Research Framework



Note: Research Framework 2023

Hypotheses

Based on the reviews and above research framework, following hypotheses are formulated for the study:

H₁: There is significant effect of education expenditure on economic growth of Nepal.

H₂: The healthcare expense has a significant impact on the economy of Nepal.

H₃: The rate of expansion of the Nepalese economy is significantly influenced by gross fixed capital formation.

Explanation of Variables

Economic Growth

Growth in the economy is universally acknowledged to be one of the most important goals a nation can pursue in terms of economic strategy. "an increase in the overall output (goods or services) produced by a country" is one definition of what is known as "economic growth." (Ayres & Warr, 2006). Gross domestic product (GDP) growth rates and other measures of economic well-being can be expressed either in nominal (constant dollar) or real (inflation-adjusted) terms.(Coyle, 2015)

Expenditure on Education

Investment in education is crucial for social unity and economic progress, as is well known and widely acknowledged. Even while many of the potential benefits to society from diverse public investments in education are not immediately obvious, they are nonetheless important. The allocation of financial resources towards education aims to generate externalities and other indirect consequences, including enhanced educational attainment and performance among children, improved health outcomes and reduced infant mortality rates, better individual health and reduced fertility rates. These outcomes, in turn, contribute to increased productivity through higher earnings and greater labor force participation, ultimately leading to a decrease in population growth and an improvement in living standards. (Michaelowa, 2000).

Expenditure on Health

Since healthcare is a crucial component of human capital investment, increasing national healthcare spending will often increase welfare, quality of life, and overall productivity. Additional benefits of healthcare spending include increased life expectancy and decreased rates of disease and infant mortality (Murthy & Okunade, 2009). Therefore, it can be said that having good health is an important aspect of having human capital, and that a society's degree of health and its level of economic growth are closely related.

Gross Fixed Capital Formation

Spending on machinery, equipment, and structures as well as adjustments to inventory are all included in gross investment, also known as, "gross fixed capital formation." Net investment is computed for fixed investment, which is investment excluding inventory changes, as "gross investment" (all new plant and equipment) less "depreciation" (an estimate of how much capital stock is used up or worn out during the period) (Ali, 2015).

Theoretical Review

Human Capital Theory

The first two people to propose the concept of human capital were Theodore Shultz and Gary Becker, both from the University of Chicago. This point of view emphasizes the importance of education in the production of products and services while emphasizing how training increases worker efficiency.

(Adelakun, 2011) asserts that inherent abilities can be paired with human capital expenditures, educational opportunities, and a growth of the pool of capabilities. These investments could be made in on-the-job training, health, nutrition, and education, including the building of schools and other educational facilities.

Human capital, in the opinion of proponents of the theory, is at least as important as physical capital. These advocates understood that investing money into education is a wise use of human resources. Tasks requiring logical and analytical thinking are created by an increase in the marginal productivity of highly skilled workers, which also makes it easier to provide specialized and technical knowledge (Todaro & Smith, 2006). According to these views, the availability of high-caliber human capital is a necessity for national productivity and economic expansion. Human capital is build up through investments in things like education, job training, health, migration, and other things that increase individual earning potential.

Empirical Review

The following are empirical assessments of research articles that investigate the impact that human capital has had on the expansion of the Nepalese economy. There is a paucity of research available on Nepal's economic expansion and the government's investment in human capital. This form of scholarly study helps fill in the gaps in our understanding about these issues and promotes legislation that draws attention to the need of public spending on social, health, and educational issues.

(Gautam, 2022) examined the impact of Government human capital expenditure on economic growth of Nepal between 1990 and 2019. The Nepalese economy's growth is measured using the fundamental Cobb-Douglas production function. The unit root and stationarity of variables are assessed using ADF, PP, and KPSS. The ARDL time series econometric model is employed to examine the relationship between the variables in both the short- and long-terms. The analysis reveals that gross capital formation and the social sector positively influence Nepal's economic growth. However, there is an inverse relationship between government expenditure on education and healthcare and real GDP.

(Sharma & Sahni, 2015) used time series data spanning from 1991–1992 to 2012–2013 to examine the causal relationship between human capital investment (education and health investment) and economic growth in India. The presence of causality and co-integration among the variables has been hypothesized; co-integration, Granger Causality analysis, and the Vector Error Correction Mechanism (VECM) have all been used to test this hypothesis. The results of the Johansen co integration test demonstrated that the long-run equilibrium relationship between GDP, health investment, and education investment exists. The Granger causality test found that spending on healthcare and education were both positively related to GDP.

(Abbas & Foreman-Peck, 2008) examined the relationship between human capital and economic growth in Pakistan using time series data from 1960 to 2003. The data were analyzed using the unit root test, Co-integration test and the OLS method. According to the study, human capital is thought to have contributed to little under one-fifth of Pakistan's GDP per capita growth. The impact of inadequate human capital policy on economic growth has been evident since the 1990s.

(Rahman, 2011) investigated whether or not there was a correlation between Bangladesh's gross domestic product, the amount spent on health care, and the amount spent on education. For the purpose of this study's empirical examination, time series data were collected from 1990 to 2009. According to the ECM approach, including spending on health and education as an investment in capital for health and education boosts the relevance of the coefficient of human and physical capital in the development model for Bangladesh. This is because health and education spending are considered investments in capital for health and education. Second, a test called the VAR Granger Causality test was carried out in order to establish the nature of the relationship that exists between these variables. We found that there is only a unidirectional correlation from health spending to GDP through the empirical inquiry that we conducted,

but that there is a bidirectional causality from education spending to GDP as well as from education spending to health spending.

(Benhabib & Spiegel, 1994) performed the growth accounting regressions suggested by a Cobb Douglas aggregate production function using cross-country estimations of physical and human capital stocks. The findings showed that human capital plays a small role in determining per capita growth rates. The impact of human capital investment on economic growth, on the other hand, discovered an insignificant or inverse link between education investment and economic growth.

(Akpolat, 2014) analyzed a panel data set of 13 developed and 11 developing nations from 1970 to 2010 to examine the long-term effects of physical and human capital on GDP. Physical capital is measured by gross fixed capital formation, whereas human capital is measured by expenditures on education and life expectancy at birth. To determine the strength and direction of the co-integration relationship and compare the effects of these physical and human capital variables across these two different country groups, panel DOLS and FMOLS panel co-integrated regression models are used. The result showed that the impact of spending on physical capital and education on GDP is shown to be greater in developed countries than in developing countries. The impact of life expectancy at birth on GDP, on the other hand, is shown to be greater in developing nations.

(Coman et al., 2022) examined the relationship between public education investment and economic growth in 11 former communist Eastern European countries that are now EU members. With a structural break, ARDL is the methodology used. The outcomes match those that were previously attained. On the long run, there is a mixed relationship between public education spending and economic growth; in five nations, there is none; in six countries, there is. On short-term, two countries experience negative consequences while four countries experience positive ones.

(Ali, 2015) conducted a study on the impact of gross fixed capital formation on the economic growth of Pakistan. Utilizing yearly time series data spanning from 1981 to 2014. The Augmented Dicky-Fuller (ADF) unit root test was employed as a preliminary test for the regression analysis of the data in order to verify the stationarity of the data. The econometric program E-Views is utilized to employ the Johansen Co-integration and Vector Error Correction Model (VECM) for the purpose of ascertaining the co-integrating factor and doing regression analysis. The study examines three independent variables: Gross Fixed Capital Formation (GFCF), Private Physical Capital Investment (PRIVT), and the Public Capital Investment Ratio to GDP. The variable being measured is the economic growth of Pakistan, namely its Gross Domestic Product (GDP). All variables exhibit statistical significance and demonstrate a positive correlation with long-term economic growth, aligning with the expected signals..

(Pelinescu, 2015) attempted to demonstrate how important human capital is to the growth and sustainable development of the nation's using a panel methodology. Annual data from the Eurostat database, which are stationary by logarithm, are utilized in the model for the years 2000 to 2012. The study demonstrated a positive relationship between GDP per capita and the inventive ability of human capital (number of patents) and the qualification of employees (secondary education and above). A negative correlation between education spending and GDP per capita was found through study.

(Maune & Matanda, 2022) investigated the relationship between the growth of Zimbabwe's economy and its gross fixed capital formation. Secondary data was collected from the World Bank's World Development Indicators database in order to undertake an empirical analysis of the association between the two variables from 1960 to 2020. It was done using the auto regressive distributed lag method. The results indicate that during the three study periods, there were both unidirectional and bidirectional causality linkages between gross fixed capital formation and economic growth. Although favorable, gross fixed capital formation did not significantly affect Zimbabwe's economic development.

(Boamah et al., 2018) analyzed the relationship between 18 Asian countries' gross fixed capital formation, financial depth, and economic growth. Using panel data from 1990 to 2017 researchers demonstrate the important effects of gross fixed capital formation and financial depth on economic growth. Financial depth is found to hinder economic growth while gross fixed capital formation is proven to be positively correlated with it. Additionally, we observe a favorable impact of net FDI inflow on economic growth.

III. RESEARCH METHODOLOGY

Research Design

The primary goal of this study is to examine the impact of human capital factors on the performance of the country's economic growth. In this study, the dependent variable is economic growth (GDP), and the independent variables are expenditures on health (EH), education (EE), and gross fixed capital formation (GFCF). This study will employ an analytic research design. The study's population consists of the human capital components for the entire nation. This study collects 140 observations spanning from 1981 to 2022, encompassing a total of 42 years of data. The necessary data is obtained from the official World Bank database and the Nepal Rastra Bank's publication on the country's current macroeconomic and financial status (NRB).

Methods of Data Analysis

The ADF test is conducted to assess the stationarity of the data in time series analysis. The results of the ADF test for the unit root indicate that all variables are non-stationary at all levels and at first difference, which aligns with the specifications of the ARDL model. The study's model is:

$$GDP_{t-3} = \beta_0 + \beta_1 LNGFCF_t + \beta_2 EE_t + \beta_3 EH_{t-1} \dots\dots\dots 1$$

Where,

$\beta_0, \beta_1, \beta_2,$ and β_3	Regression coefficients
GDP	Economic Growth (Dependent Variable)
GFCF	Gross Fixed Capital Formation
EH	Expenditure on health
EE	Expenditure on Education

IV. RESULT AND ANALYSIS

Unit Root test

In time series analysis, stationarity of the data is a prerequisite; if this presumption is broken the result of integration is meaningless or is referred to as spurious regression. Prior to moving on to a more complex model, this test aids in verifying the accuracy of the variables.

Table 1: Results of the stationarity of variables

Variable	Adj T-stat	Probability at 5%	conclusion
GDP	-7.831913	0.0000	I (0)
EE	-4.537793	0.0008	I (1)
LNGFCF	-7.776594	0.0000	I (1)
EH	-5.824441	0.0000	I (1)

Source: Authors collection from the E-views 12- SV, 2022

Table 1 shows that GDP is stationary at level, similarly EE, EH, LNGFCF are stationary at first difference. Consequently, we infer that all the variables employed in this investigation exhibit stationarity. Therefore, we observe a combination of integrated variables at I (0) and I (1), indicating the suitability of employing the ARDL Co-integration test.

Autoregressive Distributed Lag (ARDL) model

Table 2: ARDL based on Akaike information Criterion

ARDL (3,0,0,1) based on Akaike information Criterion

Dependent Variable: (GDP)

Variables	Coefficients	T- Value	P- Value
Constant	13.8024	2.0550	0.0484
Δ GDP (-3)	-0.4341	-2.8921	0.0069
Δ LNGFCF	0.6289	0.2747	0.7853
Δ EE	-0.1816	-1.4804	0.1488
Δ EH (-1)	-1.4468	-3.1740	0.0034

$$R^2 = 0.4776$$

$$F - \text{Statistics probability} = 4.0503 [0.0029]$$

$$\text{Adjusted } R^2 = 0.3597$$

$$\text{Durbin - Watson Stat} = 1.5763$$

Source: Authors collection from the E-views 12- SV, 2022

The time series data analysis is conducted using the ARDL model, as outlined in table 2. The model reveals that economic growth (GDP) is the dependent variable, while expenditures on health (EH), expenditure

on education (EE), and gross fixed capital formation (GFCF) are the independent variables included in this study. The whole model is statistically significant in relation to the dependent variables at a significance level of 5%.

The Durbin-Watson statistic (DW) of 1.5763 from the regression model suggests the absence of any serial connection. In addition, the adjusted R-squared, which measures the accuracy of the variables in predicting outcomes, shows that the explanatory variables alone may account for around 47.76 percent of the variations in economic development. The fact that the adjusted R-square is below 0.5 suggests that including additional variables will not enhance the model. The model's explanatory variables have an R-squared value of 0.4776, indicating that they can explain 47.76% of the variation in GDP. The remaining 52.24% of fluctuations in economic growth performance are attributed to factors not considered in this study.

Bounding Test for Co-integration relationship

Table 3: Estimation of Bound test for ARDL Co-integration Model

Test Statistic	Value	Significance	I (0)	I (1)
F-Statistic	11.9810	10%	2.37	2.2
		5%	2.79	3.67
		2.5%	3.15	4.08
K	3	1%	3.65	4.66

Source: Authors collection from the E-views 12- SV, 2022

The computed F-statistic for the model, which is more than the upper bound values of the respective 5 % significance threshold, is 11.9810, according to the results from Table 3: this demonstrates the rejection of the null hypothesis that, when GDP is normalized in each estimated model, there is no co-integration. As a result, it demonstrates that in the context of Nepal, there is a long-term, stable relationship among the variables.

Long Run Relationship in the ARDL Co-integration Form

Table 4: Coefficient of Long Run Relationship in the ARDL Co-integration Form

Variables	Coefficients	Standard of error	T- Value	P- Value
C	5.6542	2.7593	2.0491	0.0490
LNGFCF	0.2576	0.9337	0.2759	0.7844
EE	-0.0744	0.0503	-1.4773	0.1497
EH	-0.1854	0.1602	-1.1573	0.2560

Source: Authors collection from the E-views 12- SV, 2022

At a significance level of 5%, Table 4 demonstrates a positive but insignificant connection between LNGFCF and GDP. According to the link between LNGFCF and GDP, a unit rise in LNGFCF results in

a 0.2576 unit increase in GDP over time. The association between EE and EH is negatively significant at the 5% level. According to the findings, an increase of 1 unit in EE and EH will result by declining of 0.0744 and 0.1854 unit in economic growth.

Error correction version of ARDL model

Table 5: Coefficient in Short Run Relationship in the ARDL Co-integration Form

Dependent Variable: (GDP)				
Variables	Coefficients	Standard error	T- Value	P- Value
D(GDP (-2))	0.4341	0.1354	3.2052	0.0031
D(E_H)	0.9942	0.4012	2.4778	0.0189
CointEq(-1)*	-0.8441	0.2968	-8.2240	0.0000
R ²	0.8145			
DW	1.5763			
Adj.R ²	0.7986			

Source: Authors collection from the E-views 12- SV, 2022

The results for the short-term error correction model for GDP are presented in Table 5. The error correction term coefficient is both negative and statistically significant, providing evidence of co-integration between the GDP and other variables in the model. The error correction term coefficient, which is -0.8441, indicates that approximately 84.41% of the overall adjustment occurs on a yearly basis when a shock occurs. The table clearly indicates that there is a positive correlation between the difference of EH and GDP, which is statistically significant at a 5% level of significance. According to the table, a 1-unit rise in EH results in a 0.9942-unit increase in GDPP.

The results indicate that the error-correction term coefficient, cointEq (-1), in the estimated GDP equation is statistically significant and negative. This suggests that it will effectively repair previous departures from the long-term equilibrium. The value of -0.8441 indicates that 84.41% of previous deviations will be rectified in the present era.

Residual Diagnosis Test

Table 6: Result of residual diagnosis test

Test Series	Probability
Serial Correlation LM Test	0.1845
Normality Test (Jarque-Bera Test)	0.723445

Heteroscedasticity	0.7302
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Source: Author computation from E-Views 12 SV, 2022

The results of the serial correlation LM test are displayed in Table 6, and the fact that the p-value is greater than the 5% level of significance shows that there are no serial autocorrelation residuals present. In a manner comparable to this, the likelihood of Jarque-Bera is higher than the 5% level of significance, which suggests that the data for the time are distributed in a regular fashion. In addition, the overall probability value of the Breusch-Pagan Godfrey test is more than 0.05, which demonstrates that the data are homoscedastic.

V. CONCLUSION AND IMPLICATIONS

Human capital plays a crucial role in contemporary growth theories. Extensive research has been conducted on the subject matter; nonetheless, there remains a substantial amount of knowledge yet to be acquired. The problematic nature of its function in growth and development stems from its dependence on the institutional structure and the specific country in question. The objective of this study was to have a deeper understanding of the current state of affairs in Nepal.

This study examined at the relationships between human capital and economic growth in Nepal from 1981 to 2022 using GDP as a proxy for economic growth and the expenditure on health and education, gross fixed capital formation indices as a proxy for human capital. Based on the above results, the study concluded that human capital significantly influences economic growth of Nepal. Based on the analysis carried out it was concluded that gross fixed capital formation positively but insignificantly impacted on the growth in GDP at 5% level of significance. Expenditure on education has a negative and insignificant effect on economic growth, while expenditure on health has significant but negative effect on economic growth of Nepal.

In order to accelerate the economic growth of Nepal, Government officials and/or legislators should endeavor to develop institutional capacity that increases enrolment in schooling and improves access to fundamental healthcare. Policymakers and the government should concentrate on gaining more resources and structures that are required and appropriate for expanded school enrollment and improved delivery of basic health care. In addition to creating new institutional capability, such measures should focus on strengthening and altering the existing institutional frameworks in Nepal's education and health sectors, which produce qualified labor. Government expenditure should be increased through increasing public expenditure, which contributes to economic growth, according to policymakers. It is preferable to boost capital investment as opposed to ongoing expenses. Finally, the government should keep taking the lead in creating an atmosphere that supports more positive private sector investment in health and education. Since increased private sector, involvement in the areas of health and education could accelerate Nepal's development of its human capital.

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