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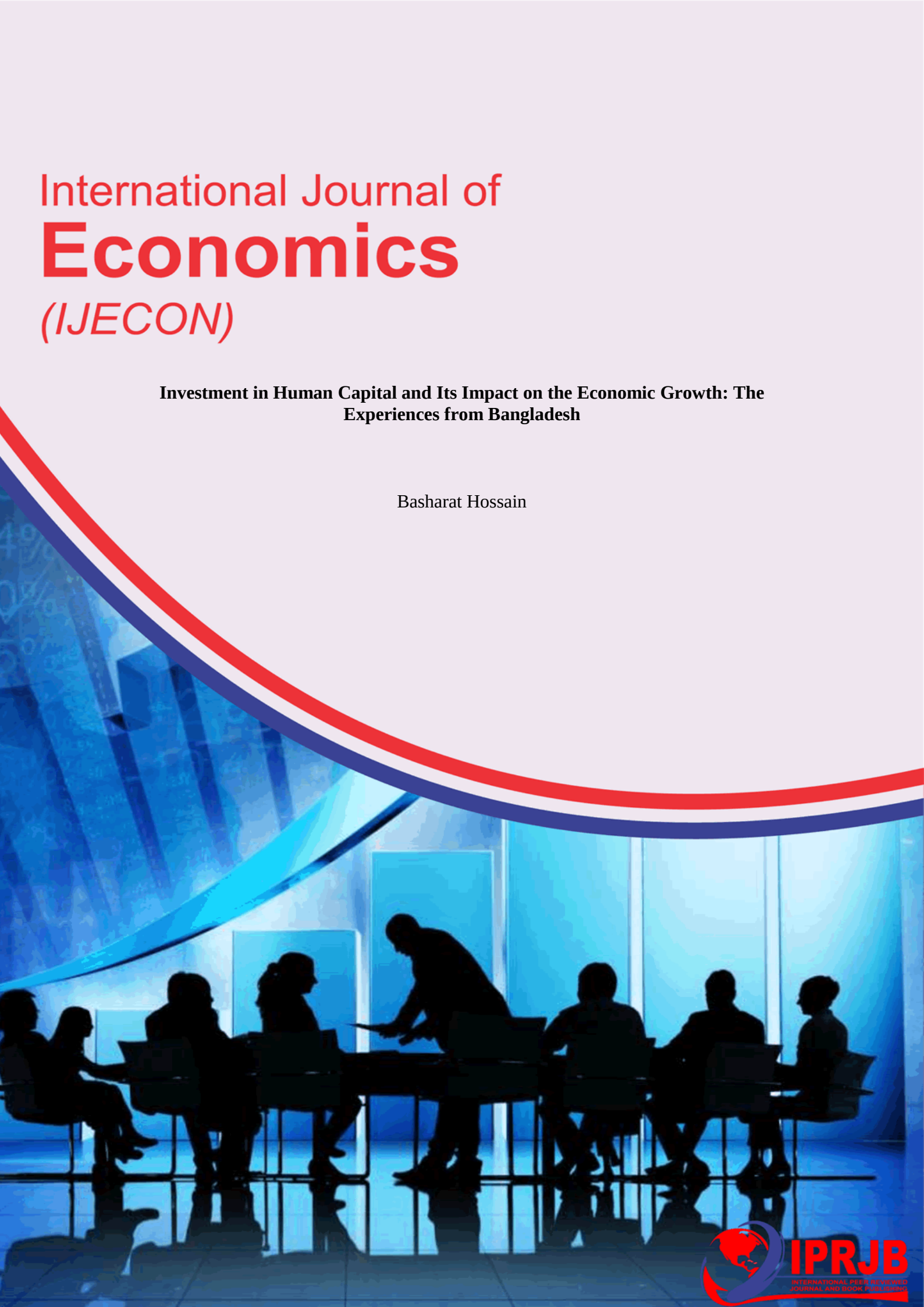
Basharat Hossain



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Investment in Human Capital and Its Impact on the Economic Growth: The Experiences from Bangladesh

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Abstract

Purpose: This paper highlights the human capital formation scenario in Bangladesh, and examines the impact of human capital on the economic growth of Bangladesh. In Economics, the term 'Human Capital' is used to represent the knowledge or educational qualifications, skills, capabilities and health status of the individual that stimulates economic productivity.

Methodology: This is the original research paper based on quantitative analysis. This paper employed the secondary data for 34 years (from 1990 to 2023). It applied the OLS regression model (for 24 years data from 2000 to 2023) to analyze the impact of the human capital on economic growth.

Findings: The econometric analysis revealed that the Human capital (health human capital represented by the child mortality rate and technologically skilled human capital represented by the internet users) has significant positive impact (at 1% and 10% level of significance) on the economic growth of Bangladesh.

Unique Contribution to Theory, Practice and Policy: This paper recommends to increase the education budget to 10%, offer scholarship for the financially vulnerable and drop out students, introducing research grants, training program, and finally facilitate the high quality human capital to reduce the chance of human capital fly.

Keywords: *Impact, Investment, Human Capital, Economic Growth, Bangladesh*

JEL Code: *O15, F43, O47*

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INTRODUCTION

Historical Evolution of Human Capital

The primary concept of human capital was first introduced by Ibn Khaldun in 1377 (Khaldun 1377; Weiss 1995; El-Muhammady 2008, Wahyudi, 2022). Ibn khaldun in his book *Muqaddimah*, emphasized on the learning, skills, *kasb* (effort/work) and quality of the labor (Excellent Human) to enhance productivity. Excellent Human or quality labor must have social and moral integration (*ashabiyyah* in Arabic) accompanied by his knowledge and skills. With the course of time, the concept of Quality labor has been termed as the 'Human Capital (Meilinda, Pelitawati; Wartoyo 2025).

After that, Human capital theory evolved from classical labor value theory (Smith, 1776) through neoclassical investment approaches (Pigou, 1928; Fisher, 897; Schultz, 1961, Becker, 1962, 1964; Mincer, 1958, Solow, 1956 ;) to endogenous growth frameworks (Romer, 1990; Romer, 1994, Romer, 1996, Gibbons and Waldman, 2004).

More precisely, Smith (1776) laid the foundation of human capital by incorporating the acquired and useful abilities of labor to increase productivity. Moreover, Schultz (1961) considers the spending on education, health and international migration as an investment in human capital. Besides, to achieve faster economic growth, Solow (1956) included the human capital (education and skills) with physical labor to the production function. Furthermore, Paul Romer (1994) illustrated in his endogenous growth model that educated and skilled labor stimulates innovation and thereby diffuses new technology for sustained economic growth.

Conceptual Definitions of Human Capital

Human capital is the potential abilities or attributes of a human being. Such as education, knowledge, merits, skills, expertise; experience, intelligence, training, wisdom, etc. Moreover, an individual Human is characterized by born as well as obtained attributes. The obtained attributes are called human capital. It is usually constructed by formal and informal knowledge in educational institutions and at home. Labor market also contributes to developing human capital by workshop, training, mobilization of jobs and experience. The human capital varies by country and the course of time (Mincer, 1981). Samuelson & Nordhaus define it as the stock of useful & valuable skills and technical knowledge of the people that enhance productivity (Samuelson & Nordhaus, 2009). The health of human beings is also considered as human capital because strong physical capability stirs up productivity. Schultz (1961) illustrates the five components of human capital. These are health; training; formal education; adult's education and migration to achieve job opportunity. Table-1 highlights the determinants of human capital.

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Table 1: A Brief Overview of Human Capital

Human Capital: Example	Determinants of human capital	Incentives for the formation of human capital	Institutions for making the human capital
Education, knowledge, skill, experience, expertise,	Primary, secondary, Higher secondary, tertiary education, technical education, Training, Capacity enhancement program	Scholarship, research grants, facilities	School, College, University, training institute, job place

Formation Mechanisms of Human Capital

Human capital is formed by the investment in education and health care. Moreover, it is accumulated by the investments in formal education and on-the-job training. For example: IT Expert; Doctor; Engineer; Researcher; etc. Figure-1 reveals the formation process of human capital and its role in economic growth.

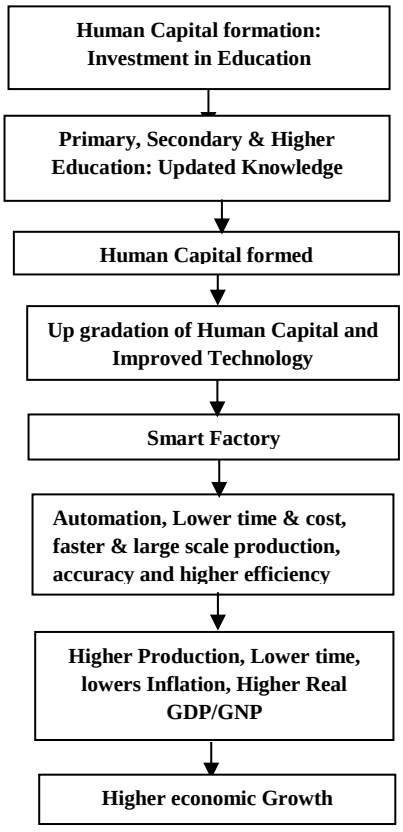

Figure 1: The Formation of Human Capital and Its Linkage with the Economic Growth

Source: Compiled by the author

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Nexus between Human Capital and Economic Growth

The term 'Economic Growth' can be defined as the rise in the total national output of an economy for a period of time. It is calculated as the yearly rate of rise in real GDP (or real potential GDP). The GDP growth rate represents the Economic Growth Rate.

However, human capital is considered as a driving factor of economic growth in the several growth theories of economics (Hanushek, 2008). Mankiw, Romer & Weil, (1992) added the growth rate of human capital in the Solow growth model to measure economic growth. Consequently, the value Residuals decline after the inclusion of human capital growth in the growth model. Schultz (1961) highlights the significance of human capital and detects several anomalies related to economic growth. Such as migration of students and economic growth. After that, Solow (1994), Paul Romer (1994); Grossman and Helpman (1994) and David Romer (1996) show how knowledge affects the economy's growth. The self-explanatory figure 1.1 depicts the research outputs of the economists.

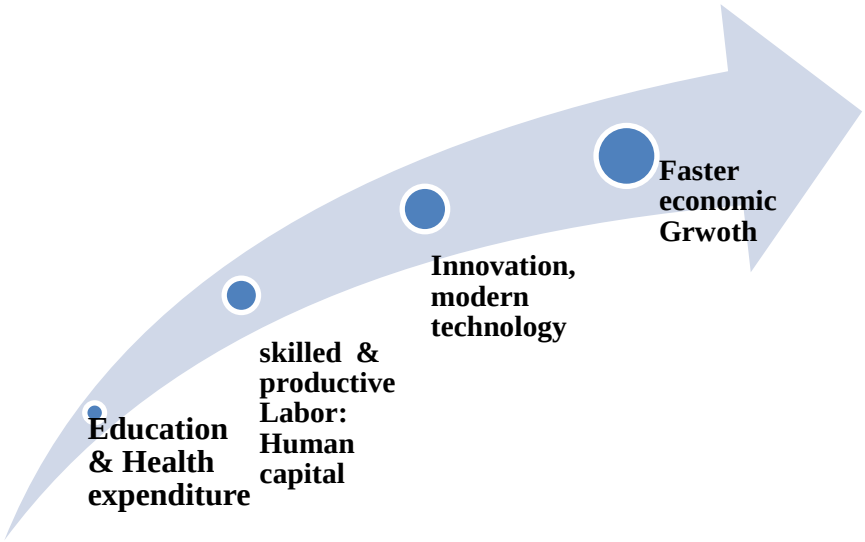

Figure 2: Mechanisms Linking Human Capital to Growth

Moreover, the cross-country evidence on the relationship between the human capital and economic growth will be discussed in the *section 4* of this paper.

A Brief Overview of Bangladesh Economy

Bangladesh is the 35th largest economy of the world and the 2nd largest economy of South Asia. Bangladesh is a lower middle income country with 171.6 million people, located in south Asia (CEBR, 2018; Bangladesh Economic Review, 2024a). The current size of Bangladesh's GDP is USD 450.12 billion with 5.82% growth rate in 2024 and is going to be the 24th world largest economy by 2033 (Bangladesh Economic Review, 2024a), CEBR 2018). Moreover, the Bangladesh economy holds the 1% of the world economy's GDP and this figure is projected to be 1.2% by 2030 (Worldeconomics, 2025). The Industry is the most contributing sector in this economy (37.95%) followed by Agriculture (11.02%) respectively (Bangladesh Economic Review, (2024a)). The largest portion of the total labor force is 40.62% employed in the agriculture sector. Most of the labor force of Bangladesh is unskilled but the skilled labor force cannot contribute to the national economy because of infrastructural shortcomings.

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Furthermore, Bangladesh faces difficult challenges to form a high quality human capital. Most challenging factors are inadequate years of schooling, lack of proper education and training, higher poverty rate, very poor budget on education and health care, structural and curriculum problems, lack of good governance , very poor research stimulus, and political clashes among students in the educational institutions etc. (Uddin & Xie, 2019).

This paper is an initiative to emphasize the formation of human capital, its current trends, and determining the relationship between human capital and economic growth of Bangladesh.

Objective of the Study

The main objective of this paper is to examine the impact of human capital on the economic growth of Bangladesh. More specifically, this paper aims to highlight the human capital formation scenario in Bangladesh. Besides, this article finds the answer of the question-"How does the Human Capital contribute to the GDP of Bangladesh?"

METHODOLOGY

This is a quantitative research that uses the secondary data for 34 years (from 1990 to 2023) and runs the OLS regression model (for 24 years data from 2000 to 2023). The theoretical framework is designed by reviewing several books, and articles. The secondary information was compiled from the different reports and websites. Moreover, the main sources of secondary data are Bangladesh Bureau of Statistics (BBS), Bangladesh Bureau of Education Information and Statistics (BANBEIS), Bangladesh Education Statistics and Bangladesh Economic Review. This paper runs the OLS regression model to inspect the effect of the human capital on the economic growth of Bangladesh. The details of model specification are given below:

$$GDPPC = \beta_1 INVGDP + \beta_2 EDUGDP + \beta_3 LFPR + \beta_4 CMR + \beta_5 Intuser + e$$

Here,

Dependent variable:

***GDPPC*:** It represents the GDP per capita. It represents economic growth of Bangladesh

Independent variables:

INV***GDP*= It** denotes the investment GDP ratio. Investment: In this model Investment is used as the proxy of Physical Capital. Because money spent in purchasing capital goods is termed as an investment. Both Private and public investment is considered in this model. Investment constructs the capital stock of an economy.

$LFPR$ = Labor force participation rate. It represents labor as a component of producing output.

$EDUGDP$ = Education budget as percentage of GDP. It represents the investment in human capital formation. Because human capital is formed by the Education. The National income is usually built by the physical and human capital. Physical capital is formed by the investment.

CMR = child mortality rate at birth. Since human capital consists of education and health of the individual. It represents the health care of human capital. Kalemli-Ozcan et al. (2000); Alataş and Çakir (2016) include the mortality rate; Infant mortality rate as a proxy of Health in human capital that affects economic growth.

$Interuser$ = number of internet users is included as a proxy of technology. Because human capital produces and uses the technology and further technology enhances the economy's productivity.

eì= stochastic error terms.

However, all data in this model are used in Log format.

LITERATURE REVIEW

A large number of research works and studies were performed to determine the nexus between economic growth and human capital. A chain started from earlier contributors of economics to present-day economists adds influencing factors to the topic of human capital and growth issues.

Theoretical Foundations and Empirical Global Evidence

Schumpeter (1942) says in his article that a firm that invests in knowledge creation activities will drive the rivals out of the market. Mincer (1981) defines the term 'Human Capital' and discusses the formation of human capital. He illustrates how education and schooling forms the human capital. Then he shows the nexus among the human capital, growth of personal income and national income. Uddin & Xie (2019) highlighted the challenges and opportunities of the human capital development in the context of Bangladesh. De la Fuente and Doménech (2006) measure the nexus between economic productivity and human capital. They found a significant relationship between them. Viswanath et al. (2009) finds the statistically significant connection among the investment in human capital and GDP growth of India by analyzing the data of the 26 Indian states. Kanayo (2013) inspects how human capital affects the Nigerian economic growth and finds the positive effect. Table-2 highlights the existing findings of fifteen studies.

Table 2: Impact of Human Capital on the Economic Growth: Existing Research

Serial No	Source	Variables of the Model	Findings
1.	Mincer (1981)	Theoretical discussion on Human capital, Personal income growth and national income growth.	-
2.	Romer (1989)	Literacy rate, investment and growth	Positive impact
3.	De la Fuente and Doménech (2000, 2006)	Production and human capital	Positive impact
4.	Bassanini and Scarpetta (2001)	Schooling year; GDP per capita	Positive impact; 6% increase in GDP
5.	Ljunberg and Nilsson (2009)	Higher education, economic growth	Positive impact
6.	Haldar and Mallik (2010)	Physical capital, human capital, output	Positive impact
7.	Yaylalı and Lebe (2011)	Education and per capita GDP	Positive impact
8.	Koç (2013)	Human capital and gdp	Positive impact
9.	Alataş and Çakir (2016)	Index of human capital per person and GDP per capita; Infant mortality rate	Positive impact
10.	Kartal et al. (2017)	Education, health, physical capital, labor and economic growth	Positive impact
11.	Diebolt and Hippe (2018)	GDP per capita; literacy rate; population	Positive impact of literacy rate on innovation
12.	Sharma (2019)	Education; Health and GDP	Positive impact for India negative impact for China
13.	Uddin & Xie, (2019	Issues and Options	Theoretical
14.	Chowdhury et.al (2018)	Human capital and GDP growth	Positive impact for Bangladesh
15.	C N Talukdar (2022)	Health and GDP	Positive impact for Bangladesh

Source: Compiled by the Authors

Moreover, Pelinescu (2015) scrutinizes how human capital affects the economic growth of 25 European countries through panel data analysis. He concludes that human capital has a strongly positive impact on GDP growth. Alataş and Çakir (2016) examine the impact of human capital on 65 countries by analyzing the 45 years data. They find human capital has a statistically positive impact on economic growth. Kartal et al. (2017) find the positive effect of education and health on GDP growth of Turkey. Agolla (2018) discusses how human capital stimulates economic growth through smart factories in the 4th industrial revolution. He emphasizes the

uprising needs of highly skilled human capital. Maresova et al (2018) deliberates the effects of Industry 4.0 on the business and economic output. They conclude that Industry 4.0 is an outcome of human capital; therefore a highly skilled labor market is needed to make automated industry for higher economy's output. Diebolt and Hippe (2018) measure the effect of human capital on innovation and economic development for the long-run in the European region. Their test result reveals that literacy and population is positively related to the per capita patent application. Sharma (2019) tests the effect of human capital on economic growth through a comparison between India and China. She states that education and health positively contribute to GDP growth of India; while negatively affect the Chinese economic growth. Chowdhury et.al (2018) found the strong positive nexus between human capital and economic growth. C N Talukdar (2022) examined the relationship between *GDP* and government expenditure in health sector and found the long run relationship among these variables.

Gaps in Bangladesh Literature

However, a significant number of research works have been performed to examine the linkage between the human capital and economic growth. The existing research illustrates the challenges and opportunities for human capital development, examining the impact of human capital with economic growth about 7 years ago. This paper is an exceptional research in a sense that this paper discusses the process of formation and improving the human capital, including latest data up to 2023, human capital index, and latest education statistics. Then examines how the human capital affects Bangladesh's economic growth.

Human Capital Formation Scenario in Bangladesh Economy

The main components of human capital are education and health. In economics, the knowledge, education, experience and health are considered as human capital. The performance of education and health based human capital will be discussed below:

Investment in Human Capital: Performance of Education

Bangladesh achieved a 120.67% growth rate in the literacy rate during 1991-2023 periods, and present literacy rate 77.9% (Bangladesh Education Statistics, 2023). Still 32.5 million people are illiterate in Bangladesh and one million students (8-14 years age group) dropped out from education. Currently, Bangladesh is developing the human capital through 1, 76,000 or 0.176 million institutions from primary level to university. The existing student population of these institutions is around 3.68 crore or 36.8 million as per education statistics of 2018 (Bangladesh Education Statistics, 2023). The dropout rate is higher for female students (22.45%) than the male students (21.51%) because of family's limitation, marriage, poverty, violence against women and social insecurity (Bangladesh Education Statistics, 2023). Table-3 highlights the dropout rate and a number of students at different education level in Bangladesh

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Table 3: Human Capital formation Scenario in Bangladesh economy

Level of Education	Dropout rate	No of Institutions	No of Students	No of Teachers
Primary	18.6% (2018)	134147	17338100	685400
Secondary (6-10)	36.1% (2018)	20465	10475100	234165
Higher- Secondary (11-12) (Only college)	19.89% (2017)	4495	4278441	123518
Tertiary	6.6% (2000)	145	1028314	29374

Source: Hossain (2016), Bangladesh Education Statistics-2023

However; Bangladesh is in the improving trend of the formation of human capital. The evidence is that the dropout rate has been declining while the corresponding figure of literacy rate increases during the last 15 years. Another interesting fact is that the female education rate has increased by 55.94% between 1981 and 2018 periods while the corresponding figure for male is 36.94% for the same periods of time (UNESCO Institute for Statistics (UIS) 2021).

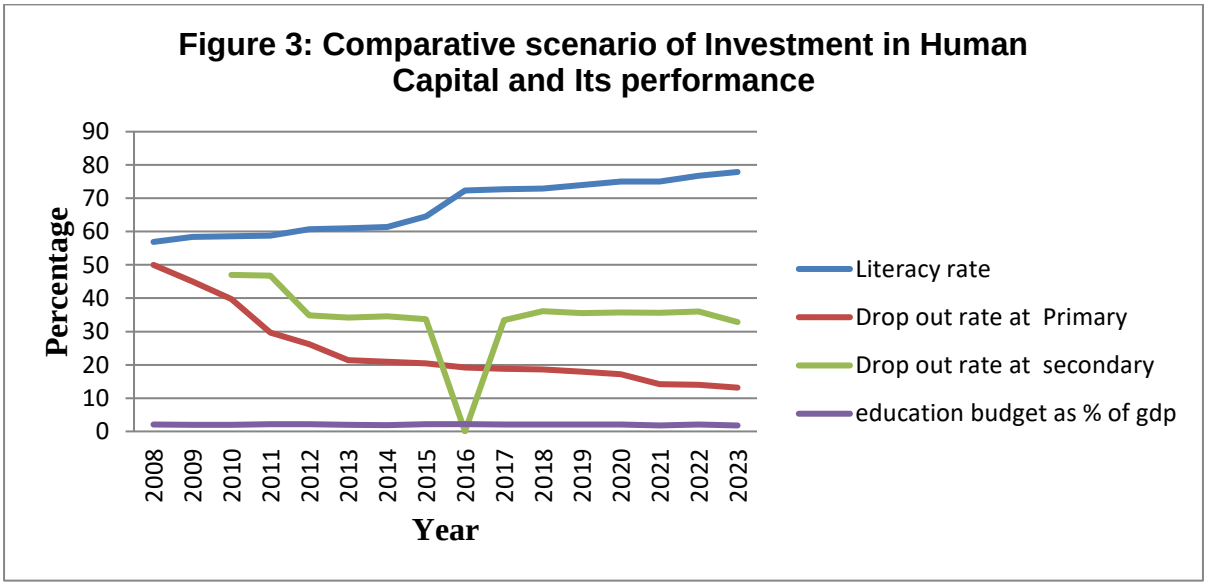

Figure 3: Comparative Scenario of Investment in Human Capital and Its Performance

Source: Bangladesh Education Statistics (2023), Bangladesh Economic Review, (2024)

Besides, the government contributes to the construction of human capital by offering free text-books, stipends for students, and free education from primary to higher education level. According to the statistics of the ministry of education, in 2018, about 2.3 crore or 23 million students enjoy the Tk. 461554.39 lakh stipends at different education levels under several projects. Besides, 307 million free textbooks have been disseminated among the students in 2023 (Bangladesh Economic Review, (2024b).

Though the education quality is good in Bangladesh, but the students of Bangladesh suffer from the lack of effective monitoring, guidance, library facilities and international collaborations (*Alam, and Ahmed (2024)*. Moreover, the linkage between educational expenditures and literacy rate will be discussed in the *table-4 under section 5.2*.

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Investment in Human Capital: Performance of Health Indicators

In the last decade, Bangladesh achieved the momentous success in increasing life expectancy at birth, reducing the maternal and child mortality rate at birth. During 1990-2023, Bangladesh reduced the child mortality rate under age five per 1000 births by 77.27%. The current rate is 20.61 per 1000 and the target is to reduce it to equal or less than 25 per 1000 births (Global Childhood Report- 2024, Bangladesh Economic Review, 2024). According to the Bangladesh simple vital statistics-2023, infant mortality rate is 20 per 1000 live births in 2018 that was 24 in 2017. Moreover, the maternal mortality rate decreased by 12% during 2014-2023 periods. The report says that the driving factor is women's literacy, consciousness by education and empowerment. Furthermore, life expectancy at birth rises to 72.8 in 2023 compared to 65.45 years in 2000. Table-4 exposes the negative relationship between child mortality rate per 100 live births and life expectancy at birth while positive relationship between Literacy rate and life expectancy at birth.

Figure 4: A Comparative Scenario among the Variables of Human Capital

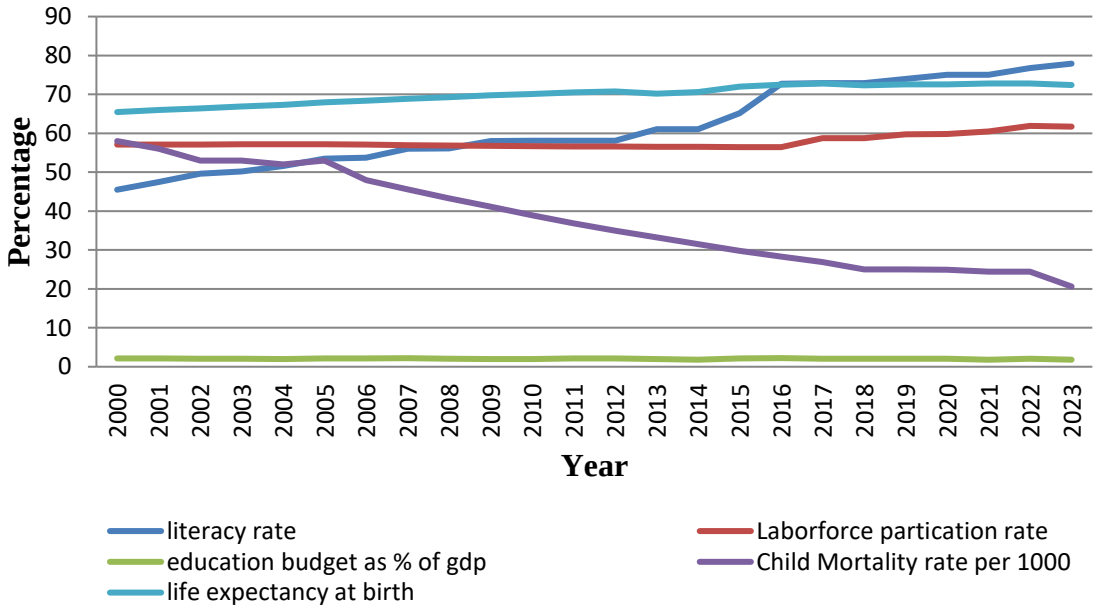

Figure 4: A Comparative Scenario among the Variables of Human Capital during 2000-2023 periods

Human Capital Development of Bangladesh: The Performance (Based on Index)

According to the Global innovation index 2025, the rank of Bangladesh in human capital and Research is 133th and overall position is 106th among 139 countries (Global innovation index 2025).

However, The performance of Bangladesh in human capital and research was in improving and upward trend between 2008 and 2015. But it experiences adverse fluctuations and declining trend from 2016 to 2025. The causes behind that insufficient budget of education (only 2% of GDP), controversial curriculum and evaluation systems and lack of good governance respectively. (Al amin and Greenwood, 2018, Bhiuyan, 2023). The self-explanatory figure-3 illustrates this scenario.

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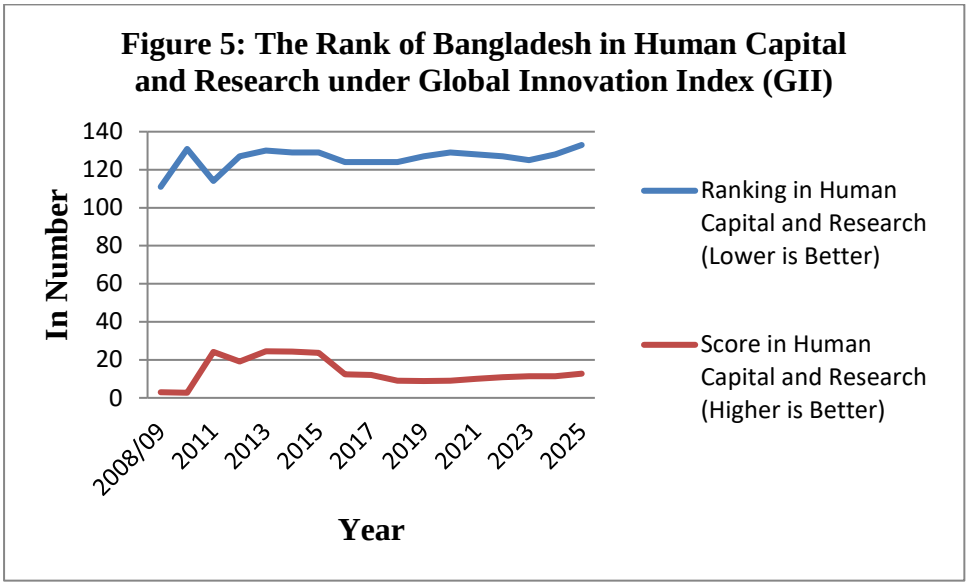

Figure 5: The Rank of Bangladesh in Human Capital and Research under Global Innovation Index (GII)

The Global innovation index assesses the rank of countries in terms of innovation by evaluating about 80 indicators. It was introduced by the United Nations' World Intellectual Property Organization (WIPO) in 2007 (WIPO, 2025). Moreover, under the 'human capital and Research' category evaluates 12 criteria including education expenditures as percentage of GDP, year of schooling, enrollment in tertiary education and specially in science and engineering education and finally research and development (R&D).

Moreover, the World Bank Human Capital Index-2021 determined the 106th rank of Bangladesh with 0.46 scores among the 157 countries. It implies that a child born today will be 46% productive (of his total potential) if he/she avails high quality education and health care. Bangladesh's rank was 3rd in South Asia. The report considers Bangladesh as a potential for human capital, but suffers from lower quality primary schools, lack of diversified skills of university graduates. Moreover, the high skilled employment share is only 21.1% (World Bank, 2021).

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RESULTS

Table 4: Impact of Human Capital on the Economic Growth of Bangladesh

Variable	Regression Co-efficient	P>| t |
Dependent variable: Real GDP Per Capita		
Independent Variables:		
Constant	-4.622721 (-0.72)	
Investment (as % of GDP) (invgdp1)	1.918498** (2.10)	0.051
Labor force participation	3.267699 (3.27)	0.004
Education budget (as % of GDP) (edugdp1)	-.3432218 (-0.90)	0.373
Child mortality rate (cmr1)	-1.046839 ***(-3.10)	0.006
Internet User (interuser1)	.0975163 ** (2.06)	0.054
No. of Observation	24	
R^2	0.89	
Adjusted R^2	0.88	

Value in parenthesis is a t-values and ***, **, * indicate the 1 %, 5% and 10% level of statistical significance

In the econometric analysis, the OLS regression results revealed that the Human capital (health human capital represented by the child mortality rate and technologically skilled human capital represented by the internet users) has significant positive impact (at 1% and 10% level of significance) on the economic growth Bangladesh economy (see Table-5). The investment in education or education budget shows no statistically significant positive relationship with the GDP per capita. Because the Bangladesh government allocates only 2.05% of its GDP on education. The negative regression coefficient of education variable indicates that the higher education budget would raise the GDP per capita. Furthermore; Child mortality rate states the statistically strong negative relationship with the GDP per capita at the 1% level of significance. It implies that the lower Child mortality rate increases the GDP per capita and vice versa. Government investment in the education and health care sector boosted up the economic growth.

Moreover, the internet user variable is used as an indicator of technologically skilled human capital. The result reveals the strong positive relationship (at the 10% level of significance) between the internet user and GDP per capita. Computer and Internet technology is an outcome of human capital. The internet of things is one of the main components of the 4th industrial revolution to stimulate economic growth by hastening and enhancing production. In Bangladesh, the use of the internet has increased tremendously after 2000.

This result is consistent with the findings of Chowdhury et.al (2018) and C N Talukdar (2022) for Bangladesh. Also, it is consistent with the findings of Sharma (2019) for India and China.

Policy Recommendations

Finally; this paper suggests the following measures to improve the human capital of Bangladesh.

- Investment in education is the preconditions to develop human capital and to stimulate economic growth. Bangladesh spends 2.07% (average of the last 24 years) of its annual budget on education. It must be increased to 10%. Because higher human developed countries such as Norway, Finland spends more than 10% of their budget on education. Consequently, they developed high quality human capital and achieved higher GDP growth, respectively
- Though the literacy rate is in increasing trend and primary dropout rate is in decreasing trend. It is not enough to construct the human capital. Because the dropout rate at secondary level fluctuates and is an increasing trend. Government should concentrate on achieving the 100% literacy rate and the lowest dropout rate. Also, higher enrollment in tertiary education should be ensured by offering the lowest or free of tuition fees.
- To make high quality human capital, the government should ensure research Grants, scholarships, and other incentives for higher education.
- Currently, the Bangladesh government is running about 500 youth development centers to train the youth population through 60 fields (DYD, 2024). Besides, it may introduce education together with training programs, training programs for illiterate labor force.
- Human capital flight is another problem for lower income and poorly infrastructural developed countries like Bangladesh. According to the World economic forum, about 82% of migrated students (human capital) do not go back to Bangladesh rather love to stay in other countries. The main causes are the inadequate sectorial job opportunity for the experts from different academic fields, lower practices of rewards and punishments for job performance in the job place, politically unstable country, and politically quarrelsome environment in most of the government run public Universities. Government should replicate and reshuffle policies from the highly human capital developed countries.

Conclusion

This paper discusses the performance of constructing the human capital during the last 34 years and scrutinizes the effect of human capital on the economic growth of Bangladesh. It employs the secondary data and analyzes it through an OLS regression model by the econometric software Stata 14 for 24 years. The econometric analysis revealed that the Human capital (health human capital represented by the child mortality rate and technologically skilled human capital represented by the internet users) has a significant positive impact (at 1% and 10% level of significance) on the economic growth of Bangladesh. Bangladesh achieved success in increasing the literacy rate by 41% and reducing the dropout rate in primary education. But drop out is in a rising trend in the secondary level. It implies that though the literacy rate is increasing, Bangladesh failed to convert some portion of literate people into human capital at educational institutions because of the high dropout rate at secondary level. The Labor force survey reveals that most of the labor force is unskilled. Besides, Educational institutions suffer from political involvement of students and teachers that hamper the development of human capital. Also, lacking adequate sectors and job incentives, 82 % of human capital flies from Bangladesh each year. Finally, this paper recommends increasing the education budget to 10%, establishment of more research and training institutions, and political violence free campuses.

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