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A Literature Review of Human Capital and Economic Growth

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Abstract

This work aims to examine the relationship between human capital and economic growth. The study analyzes datasets from previous works, reviews previous literature, and draws some conclusions on human capital and economic growth. The paper summarizes articles on human capital in terms of (i) the theoretical framework of economic growth theory, (ii) the neo-classical growth model, (iii) the Solow growth production-function, (iv) the new endogenous theory, and (v) empirical evidence on the relationship and causal link between human capital and economic growth. Assessing the literature on human capital and economic growth will serve as a comprehensive literature guide to policy formulation and implementation in the short-run and long-run of creating developmental goals for any region.

Keywords: Human capital, Economic growth

1. Introduction

The term “human capital” can be described as the abilities and skill sets of human beings. The United Nations (2009) expands on the definition of productive wealth embodied in labor, skills, and knowledge. This expertise, integrated with humans, is acquired partly through formal and informal education. Human capital theory focuses not only on education but the health of the individual as an input to economic production, while human capital development (expenditure on education or training as a proxy) refers to the acquisition and an increase in the number of persons who have the skills, knowledge, and experience that are critical for the economic growth of a country (Adelakun, 2011). This paper’s primary contribution to the literature on economic growth, development, and stability focuses on providing a comprehensive summary of literature on the topic.

A sustainable economic growth path that incorporates environmentally sound development is

a more critical macroeconomic objective (United Nations, 2015) because it ensures the continuity of renewable resources and the optimal use of non-renewable resources. The continuity and optimal use of these resources build on Arrow et al. (2004) definition of development as "meeting the needs of the present without compromising the ability of the future generation to meet their own needs"; after all, our resources are not gifts to our children, they are loans from them. For this to occur, human capital is an essential ingredient. Economic literature, both theoretical and empirical, has provided evidence that education is significant to economic growth. Klenow and Rodriguez-Claire (1997), Hall and Jone (1997), and Easterly and Levine (2001) built on the ideas of Adam Smith and other 18th century philosophers and economists who advocated that labor productivity helps create a surplus of wealth. They asserted that technological change is the primary source of growth and that differences in the rate of technological change are the principal causes of income disparity among countries. Nelson and Phelps (1996), Romer, P. (1989, 1990), and Abramovitz (1986) posited that to achieve technological change, a country must engage in innovation or imitation activities that use mainly human capital as their input of interest.

The endogenous growth theories mostly emphasize the role of human capital (e.g., Mankiw, Romer, and Weil (1992) and Lucas (1988)). Common recommendations from these models are for an economy to invest in its educational system; fight poverty; create more opportunities for labor market participation and economic growth, and facilitate socio-economic development. The logic is that if a national economy spends more on education, the country will experience long-term economic growth. Thus, investment in education would have a positive effect on both the individual human capital and the overall economy: it will fight poverty; reduce the number of children that go to school hungry; address government-sponsored job fears, training, and open networking sections; create more interdisciplinary opportunities in the economy; and promote socio-economic growth.

Hanushek and Woessmann's (2008) theoretical contributions emphasized two main mechanisms through which education affects economic growth. The first, based on Uzawa (1965) and Lucas (1988), is human capital, an input in the production process, implying that there is a relationship between human capital and economic growth. The second is the assumption that human capital is the primary source of productivity growth (Nelson & Phelps, 1966). This implies that improving education quality at all levels is imperative for development in any region.

Interdisciplinary opportunities and trade liberalization is an essential tool for increasing global economic growth. Increased imports and exports from countries have diversified their economies, encouraging capitalism to grow and consequently resulting in rapid economic growth. Although the relationship between trade liberalization and economic growth has been analyzed extensively, it remains a controversial topic among policymakers and economists because of the diversity in the empirical findings, as noted by Chaudry and Rahman (2009). However, there is a greater consensus that trade policies that promote openness, surplus trade balance, and high trade volume to Gross Domestic Product (GDP) have been positively related to economic growth (United Nations, 2009, 2015). Trade openness can increase the level and efficiency of investment and the market size in countries with liberal trade policies;

hence, developing countries liberalizing their economies to attract more foreign capital.

Human capital determines the ability of an economy to manage its other factors of production, and it is necessary for innovation. Adopting existing technologies, technological advancement, and catch-up processes are contributing factors to the rate of growth of an economy. Amaghionyeodiwe (2009), Chaudry and Rahman (2009), Liap, Du, Bing, and Yu (2019), Khembo and Tchereni (2013), and Akpolate (2014) have supported the notion that the growth of any economy is influenced by its level of physical and human capital. Hence, there is no country capable of achieving a sustained economic development path without a substantial investment in human capital (Kanayo, 2013).

Some economists argue that higher formal educational attainment leads to more economic growth. Lucas (1988) suggests that the accumulation of human capital translates into sustained economic growth and that education is the primary driving force through which knowledge is accumulated. Romer P. (1989, 1990, 1994) showed that human capital stimulates economic growth and can drive innovation. As documented in the econometric literature, Romer, P. (1989) and Rostow (1960) show that education also provides spillover effects, improves the adaptation speed of entrepreneurs to disequilibrium, and boosts research productivity.

However, there is mixed evidence in the empirical literature regarding the relationship between human capital and economic growth. Temple (1999) and Bills and Klenow (2000) reported a weak correlation between the two, while Levine and Renelt (1992) showed that education (human capital) has no significant statistical impact on economic growth and Dessus (1999) argued that Temple's (1999) findings might have been caused by specification bias. Dessus's (1999) results suggested that as the education enrollment level increases, the standard of education decreases. As a result, educational investment in developing countries fails to generate higher growth.

While most developing countries in Africa and Asia have achieved a noticeable improvement in terms of physical and human capital, which is empirically supported by Macham (2015) and De Gregorio and Lee (2003), most Latin American countries still need more development programs to facilitate their human capital and capital stock growth. These Latin American nations can derive a positive impact from an increase in human capital (OECD, 2017; OECD/ECLAC/CAF, 2016). Rostow (1960) argued that necessary investment needs to be made in three key economic sectors—technology, infrastructure, and transportation systems—for rapid economic growth to take place. The importance of physical capital in enabling an environment for growth cannot be overemphasized, and the impact of human capital and infrastructure on economic growth is a well-established issue (Rahman, 2011; Holden and Biddle, 2017; Sharma and Sahni, 2015; Mehrara and Musai, 2013). For instance, there exists a positive influence from human capital to economic growth, meaning economies with high skill populations, such as Estonia, Switzerland, and the United States of America, have led the world in state-of-the-art human ingenuity. Infrastructure also contributes to the development of a country in various ways, connecting states and countries by building broadband, seaports, airports, and intercountry and interstate roads to facilitate the exchange

of goods, services, and information faster (Diaz, 2013).

2. Literature Review

Most people believe that individuals with a higher level of education and more working experience earn more money than those with less (Weiss, 1995). In most developing countries, the net marginal social returns of expenditure on primary education are higher, compared to the spending on tertiary education. Statistics have shown that people with higher levels of education generally earn more, have higher earning potential, and are more capable of improving the quality of their lives better able to improve the quality of their lives than those with less education (UNESCO, 1997).

Human capital, or skilled labor, was first incorporated into economic analyses in the 1960s and 1970s. Goode (1959), Mincer (1958), and Becker (1975, 1962) expressed different views on human capital, likely since a broad spectrum of factors can directly or indirectly influence the formation and exploitation of human capital. These factors include positive or negative intensive or extensive effects on the economy at the macroeconomic or microeconomic level. The exogenous or endogenous influencers are sometimes grouped into demographic, social, socio-demographic, economic, and ecological categories. The interest in human capital grew as the endogenous growth theory developed. Mankiw, ROnner, and Weil (1992), Romer, P. (1989, 1990), Uzawa (1965), and Lucas (1988) each created models where the output level is defined as human capital. They argue that the quality of education may lead to long-lasting and continued growth of an economy.

2.1 Theories of Economic Growth

The framework of the economic growth theory is appropriate for analyzing the effect of human capital on economies. Education has a direct impact on human capital, which can be measured with the Human Development Index (HDI) and impacts income distribution (Gini Index). According to Solow (1956), an increase in the physical capital stock will increase per capita income but based on his neo-classical growth theory; long-term growth will not be sustainable from inputs in education due to the assumption of the law of diminishing marginal returns, which is associated with excess spending on education. Therefore, an increase in the expenditure on education will increase education enrollment and the quality of education to a certain point; then, as enrollment continues to grow, the quality of knowledge begins to decrease.

In general, education impacts economic growth by increasing innovation and technological/knowledge spillover. According to Romer, P. (1994), improvement in technology and knowledge skills will translate into increased productivity, which will lead to short and long-term economic growth. A discussion of educational expenditures broadens the topic to include two significant theories of economic growth: the neo-classical growth theory and the new endogenous growth theory.

2.2 Neo-classical Growth Model

In 1950, Robert Solow and Trevor Swan developed the exogenous neo-classical growth

model (Dimand & Spencer, 2011). The Solow growth model states that long-run growth is achieved through capital accumulation, skilled labor, population growth, and technological progress (Solow, 1956). The model is based on four variables that are used to determine long-term growth, including output (Y), capital (K), labor (L), and investment (I) or savings (S). In Solow's growth theory, the output is a function of capital, labor, investment, and technology. Solow had four critical assumptions in his model: the first and second, he assumed that labor force growth and technology are exogenous factors, which means that labor force growth is constant; third, the Solow growth model assumes capital and labor to have a constant return to scale; fourth, the model assumes a diminishing return of its variable factor $GDP_{per\ capita}$.

2.4 The Solow Growth Production-Function

$$Y = F(K, L) \tag{1}$$

$$y = f(k) \tag{2}$$

With the constant return-to-scale assumption, the Solow growth production-function becomes $equation\ (1)$ and $equation\ (2)$, where y is output per labor and k is capital per labor. Based on $equation\ (2)$, as capital per labor increases, output per labor will also increase. Hence, as the capital-labor ratio continues to increase, output reaches a peak and starts to diminish; thus, the law of diminishing marginal returns initiates. Therefore, balance can be achieved when savings and investment are at equilibrium with the capital-labor ratio, which will result in a steady-state of the economy:

$$s\, f(k^*) = (\delta + n)\, k^* \tag{3}$$

where: s is savings rate, k is capital per labor, δ is depreciation, and n is the population growth rate.

2.5 The New Endogenous Theory

The neo-classical growth model assumes that the accumulation of capital (savings) in an economy and how people utilize this capital is vital for economic growth. This model shows the relationship between capital and labor and how capital and labor translate to output. The model has some weaknesses, such as the exogenous determination of technology. It assumes that all countries will converge at the same steady-state. Romer, P. (1994) and Stonier and Hague (1972) agree with Solow's assumptions, arguing that technology should be an endogenous determinant rather than exogenous because investment, research and development, knowledge, and capital accumulation translate to long-term economic growth. An investment that concentrates on physical capital and human capital encourages more economic growth, which reinforces the idea that at the steady-state, growth is a direct result of the level of human capital (Romer P., 1990, 1994).

This stated shortcoming led to the creation of the new endogenous growth theory. This model is founded on three main assumptions: 1) technological change results from the "animal spirit" optimism and pessimism of the market, which determines long-run economic growth, 2) technological change causes labor to be efficient, improving output per capita, and 3) the cost

of production of new inventions is incurred once as a fixed-sunk cost. The endogenous growth theory makes technology endogenous, and as a result, addresses the flaws associated with the neo-classical growth model.

Liew (2004) provides a guideline regarding the use of the Lag Selection Criteria (LSC) in determining the autoregressive lag length. The study provided the following information: first, the Akaike's Information Criterion (AIC) and Final Prediction Error (FPE) are superior to the other criteria when studying data sets that are between 0-60 observation, because the AIC and FPE minimize the chance of underestimating while maximizing the possibility of recovering the true lag length; second, these criteria managed to pick up the correct lag length at least half of the time in a small sample; third, the performance increases substantially as the sample size increases; fourth, with a relatively large sample size, the HQC is a better estimator of the autoregressive lag length.

2.6 Empirical Evidence of the Relationship and Causal Link Between Human Capital and Economic Growth

According to Weiss (1995), those with a higher level of education and more working experience earn more money than those with less. In most developing countries, the net marginal social returns of expenditure on primary education are higher compared to the spending on tertiary education. The relationship between education and poverty is defined: people that have attained a higher degree of education earn more or have higher earning potential and are better able to improve the quality of their lives than those with a lesser educational background (UNESCO, 1997).

Human capital, or skilled labor, was first used in the 1960s and 1970s. Goode (1959), Mncer (1958), and Becker (1962, 1975) had differing views on human capital because many factors, directly and indirectly, influence the formation and exploitation of human capital. As the concept of human capital kept growing based on the endogenous growth theory, Mankiw, Romer, and Weil (1992), Romer, P. (1989, 1990), Uzawa (1965), and Lucas (1988) each created models where the output level is defined as human capital. Using human capital in the production-function model to support their argument for human capital investment in the economic growth theory, they argued that the quality of education might lead to long-lasting and continued growth of an economy.

Alexious (2009) and Kim (2010) argued that education is the first step in the path of the economic development process, finding that education plays a crucial role in building a nation's human capital capacity and promoting economic growth. High age-dependency ratio, the undergrowth of $GDP\ and\ GDP_{per\ capita}$, high unemployment, low HDI index percentage, and Gini Index numbers are common problems associated with emerging economies. Pedroni (2002) and Psacharopoulos and Patrinos (2004) analyzed the effects of educational investment on countries and found that the impact of these expenditures is higher in African, Asian, and Latin American countries and is less in the OECD countries.

In contrast, Benhabib (1994) measured the effect of human capital investment on economic growth and found a negligible or somewhat negative correlation between education

investment and economic growth. Quiggin (1999, 2002) also asserted that education has zero monetary or economic benefits, resulting in a decline in economic growth. Due to evidence presented by economists like Benhabib (1994) and Quiggin (1999, 2002), some governments have cut their spending and reduced their budgets for the education sector. Devarajan (1996) also found that education spending harms or is insignificant to economic growth, supporting Benhabib and Quiggin's findings.

Riihelaninen (2013) analyzed the relationship between government education expenditure in the European Union during the Economic Crisis and found a temporary positive effect of educational spending on economic growth. In South American studies, Kiran (2014) analyzed the impact of educational expenditure on economic growth for 18 Latin American countries and found a cointegration relationship between economic growth and educational spending. Blankenau et al. (2007) analyzed 23 developed countries and found a positive relationship between education expenditures and long-term economic growth.

Engelbrecht (1997) argued that human capital is an essential factor in the new growth theory. Sinnathurai (2013), in his study, found that a country with low labor productivity per capita will have low economic growth, high unemployment, and a high poverty rate. In Asia, Africa, and Latin America, over 1.3 billion people earn less than 1 USD per day, and citizens from these continents suffer from malnutrition (Vijayakumar, 2013). The high dependency ratio in a family leads to low productivity of the labor force in that economy, thus proving the negative relationship between poverty and economic growth.

Schultz (1963, 2009) found that increasing the educational level of the labor force significantly increased economic growth in both developing and developed countries. This researcher determined that a higher rate of economic growth opens the path to a sustainable steady-state increase in productive capacity, wealth accumulation, and employment opportunities, which in turn increases productivity. When a country increases its human factor (L) and factors of production ($Y = F(K, L)$), they gain more workers in production and affiliated activities, which will lead to a decrease in the unemployment rate in that economy.

Hawkes and Ugur (2012) argued that the ingenuity of human capital has a broad spectrum of benefits for the national economy, communities, and individuals. Hence, quality education and healthcare systems, low crime rates, and environmental protection laws and policies are significant determinants of economic growth and development. Researchers from the OECD (2017), OECD/ECLA/CAF (2016), and UNESCO (1997) argue that the Millennium Development Goals (MDG), specifically Universal Primary Education (UPE), can't be achieved by only implementing UPE. Education is a significant determinant for developing countries and encourages an environment that attracts investment in human capital stock. The MDG and the Sustainable Development Goals provide a sustained economic development path (United Nations, 2009). Using Kazakhstan as a case study, the United Nations (2015) found that countries with high economic growth rates are more likely to experience an exponential decline in their poverty rate. Hawkes and Ugur (2012) posited that this reduction in poverty would lead to an increase in employment rate and higher income.

Rehman et al. (2015) analyzed the relationship between education and economic growth,

finding that a nation couldn't develop without investing in education. The authors stated that education reduces poverty by increasing productivity per capita. The study also showed strong linkages between poverty-education and education-economic growth. Wolf et al. (1993) analyzed the relationship between higher education level and the labor productivity index and found a high correlation between university enrollment in science and technology and labor productivity growth. The study found that the more scientists and engineers that graduate, the more opportunities for economic growth there are within the country. Therefore, as Sen (1999) argues, education is an essential part of human capital and a country's sovereignty.

Kim et al. (2010) argued for the importance of a well-educated labor force in the diffusion and adoption of new technology and methods of production. Wedgwood (2007) analyzed how secondary education accessibility is limited to those able to supplement education through the private sectors. The author found that some issues of post-primary education are more of a quality sustainability problem than an initiation one. Using Tanzania as a case study, Wedgwood (2007) found the secondary education system in Tanzania is not graduating quality students to supply and support the demand for primary school teachers in the country, making a strong case for government investment in secondary schools. Dahal (2006) found that higher education encourages economic growth and creates employment opportunities and argues that the quantity and quality of an education system influence the labor force, governance, and working conditions of a nation. Hick (1980) researched the net private and social benefits of education investments in the workplace and found a significant increase in the growth rate when the investment was directed to human capital/resources.

Bloom et al. (2006) studied the positive impacts of research, higher education, and innovation on economic activities, but his study focused on the financial returns generated through personal income tax and less on educational gains in the economy. Abbas and Foreman-Peck (2008) and Tilak (1997) estimated the relationship between human capital and economic growth using the OLS technique and argued that human capital was responsible for almost 40% of the increase in a nation's $real\ GDP$. The two studies concluded that only little to no investment in the educational system of an economy could cause low investment and zero economic growth in an economy. The papers found that the higher the level of educational attainment of a region's population, the less likely for its members to be considered poor or live below the United Nations' 1 USD per day mark, because of education impacts knowledge and skills, which in turn encourages growth and development. Barro and Lee (1993) found that an increase in productivity is directly correlated with an increase in the average duration of education. A study by Njong (2010) found that primary education in a poor learning environment, minimal secondary education, and limited higher education reduces economic growth and development. Njong (2010) stated the absence of a current/updated curriculum and a lack of skills/qualified instructors, administrative assistants, and management personnel have a linear relationship between education and earnings.

Abdullah et al. (2015) used the meta-regression analysis (MRA) method to revisit earlier works on the effect of education on the aggregate income share and income inequality. The study assessed the average impact of education on inequality and modeled the heterogeneity in the empirical estimates. The authors analyzed 64 econometric studies that collectively

reported 885 estimates of the effect of education on inequality. They aimed to re-examine later works on the effects of education on inequality using a comprehensive MRA and found that education affects the two tails of the distribution of income, reduces earning from the top earners, and increases the percentage of the bottom earners. Education has been particularly useful in reducing inequality in Africa, and at the secondary level, it appears to have a stronger effect in reducing inequality than at the primary level or higher education. Abdullah et al. (2015) state that the heterogeneity in reported estimates could be explained by the differences in the specification of the econometric models and measures of inequality and education.

Anyanwu (2014) highlighted deep, underlying factors that have promoted or hindered African economic growth and drew lessons from the experience of China. The author used five nonoverlapping three‐year averages of cross‐sectional data from 53 African countries between 1996 and 2010, where the $real\ GDP$ was the dependent variable, the elasticity of growth concerning initial $real\ GDP_{Per\ capita}$ is β_1, the elasticity of growth with respect to government consumption expenditure as a percentage of GDP is β_2, the elasticity of growth with respect to investment rate is β_3, and the vector of elasticity of the control variables was "X." "X" represents other control variables ($\beta_{4.....n}$), including official development aid (ODA), which is a percentage of GDP; Foreign Direct Investment, which is a percentage of GDP; trade openness (total trade as a percentage of GDP); external debt, which is a percentage of GDP; level of education (secondary school enrollment); inflation rate; policy-2 (institutionalized political regime); government effectiveness; urban population; domestic credit to the private sector (as a percentage of GDP); agricultural materials price index; metals price index; oil price index; industrial materials price index. The author's analysis showed that higher domestic investment is significantly correlated with higher economic growth in Africa, which is consistent with Abamann (2008) but contrary to Haacker et al. (2009), who found significant negative effects. Initial real per capita income has a positive but insignificant coefficient. Hence, the cross‐country data does not support the hypothesis of absolute convergence during the period of analysis.

Other results showed that foreign aid impacts economic growth in Africa. Net ODA has a positive and statistically significant impact on economic growth. On average, a 1% increase in net ODA as a percentage of GDP will lead to a 0.437%-point rise in economic growth in Africa. Education has a positive effect on economic growth in Africa, leading to the conclusion that secondary education is significantly related to economic growth. Hence, a 1% increase in secondary education enrollment would increase economic growth by 0.309%-point, meaning, for Africa, education is good for boosting economic growth, and credit to the private sector has an insignificant negative effect on economic growth.

Drucker (2007) reviewed different approaches for examining the influence of research universities on regional economic development outcomes. The authors used four methods to examine the impacts of universities in regional economic development. The first method was the impact of individual universities or university systems, which was done using growth accounting, regional input-output modeling, estimation of Keynesian multipliers, or a broader regional economic forecasting model. This method focuses on estimating the direct and

indirect impact of university spending, investment, and employment in a region. The limitation of this approach is that studies of individual universities cannot be generalized to other universities, regions, or economic situations. Another shortcoming is that it is difficult to assess the indirect impact of a university, such as regional productivity gains or increases in innovative regional activities that depend on a host of interacting factors apart from the university itself. The second approach is based on surveys. This methodology aims to overcome the weakness of the single-case approach by producing results that can be generalized beyond institutions or regions. The limitation of the survey questions aimed at the attribution problem(s) is that they suffer from noticeable validity threats, such as respondent ignorance or bias. The third approach is the production-function estimations, and the fourth approach is the cross-sectional or quasi-experimental designs. These involve selecting a sample from a sampling frame and then analyzing the empirical relationships between the variables using regression-based statistical methods. The advantage of the cross-sectional approach is its flexibility, but one disadvantage is its susceptibility to sampling issues and omitted variable bias.

Heckman (2002) analyzed the importance of cognitive and non-cognitive skills and how they translate into social and economic success. He identified formal (academic institutions) and informal (family culture and workplace) sources of learning as a unique and independent environment for acquiring knowledge. After evaluating a human capital investment strategy, he found that skill begets skill and learning begets learning; hence, early investments in education are effective. The author concluded that it is essential to consider the entire policy portfolio of interventions together, including training programs, school-based policies, school reform, and early interventions rather than focusing on one type of policy in isolation from the others. The paper also explored the relationship between primary and secondary school quality and economic growth. The author used a 20-year data set from Malaysia, using the Gini Index to measure educational inequality at the primary and secondary level and GDP as the dependent variable. The author used a Cobb-Douglas production-function to show the relationship between labor and overall production in the economy. Their model included

$$Y_t = K^{\alpha} H^{\beta} (AL)^{1-\alpha-\beta} \tag{4}$$

where Y_t is per capita income, H is the stock of human capital, L is Labor, K is capital, and A is the growth coefficient.

The research goals of Boyce et al. (2010) were two-fold: first, to examine cognitive, dispositional, and motivational precursors of the propensity to engage in leadership self-development, and second to explore the role of organizational support and the relationships between self-development propensity and reported self-development activities. A survey was designed to test a structural model used in the study of leader self-development. A random sample of over 400 junior-military leaders participated in this study, and the results indicated that a person with characteristics related to mastery, work, or career growth ethics displays the intuition to perform leadership roles and self-development, and was more skilled at performing instructional and self-regulatory processes. The authors concluded with implications for future research on and practice of leader self-development activities.

Soumare (2015) recognized the chicken-and-egg dilemma of education and economic development. Education needs to be sponsored. Developed countries can easily fund education programs that translate into economic development, and emerging economies lack the funding to begin the cycle. The study assessed the impact of Foreign Direct Investment (FDI) on welfare in North Africa using the HDI and $GDP_{per\ capita}$ as welfare measures. In the study, the author examined the relationship between FDI inflow and welfare improvement in North African countries. He also explored whether FDI contributes to improved welfare in the North African region, examining whether FDI has; long-term welfare-improving impacts in some North African countries than in others and drew policy recommendations from their findings. (Soumare, 2015) used HDI and an alternative $real\ GDP_{per\ capita}$ as indicators to measure welfare improvement, $net\ FDI_{per\ capita}$, and an alternative $net\ FDI_{inflow\ to\ GDP_{ratio}}$ to measure FDI. The author used the Granger causality test and found a unidirectional causality between FDI and HDI for the entire region. But, when $real\ GDP_{per\ capita}$ was used as a welfare variable, he found bidirectional causality between FDI and $real\ GDP_{per\ capita}$. The dynamic panel regression model analysis indicated that FDI positively impacted welfare in North Africa, the differing relationships between different countries in the region. In general, FDI contributes to economic growth in North Africa, which generates additional government revenues for the region through fiscal policies and job creation. Soumere (2015) also found that government spending, infrastructure development, institutional quality, and better governance amplifies the positive effects of FDI on welfare in the region, and is essential for the governments in the area to continue investing in social infrastructure while improving the quality of their institutions and their governance.

Mehrara (2013) investigated the Granger causal relationship between education and GDP in a panel of 11 oil-exporting countries. The author's results showed a causality between oil revenue and economic growth and education, but education did not have a significant effect on GDP in the short-run or long-run. The implication suggests that oil revenue drives education and not vise-versa. The authors added that oil revenue mostly contributes to human capital and economic growth, but as the number of enrollment increases, the quality of the educational system declines. Mehrara & Musai (2013) also assessed a similar test, using only developing countries, and the results supported the view that higher economic growth leads to higher education expenditures, but the reverse did not hold.

Akpolat (2014) analyzed the long-run impact of human and physical capital on GDP from 1970 to 2011. The author analyzed 13 developed and 11 developing countries and found that physical capital investment and education expenditures increased GDP in the developed countries than in emerging economies. In contrast, life expectancy at birth was more efficient in increasing GDP in developing countries than the developed ones. Edrees (2016) investigated the causal relationship between human capital, infrastructure, and economic growth in the Arab world. The study found a feedback relationship between human capital and infrastructure and economic growth in the full sample (rich and non-rich). In rich countries, the author found a unidirectional movement running from economic growth to

human capital, and he found a unidirectional movement from economic growth to infrastructure in non-rich countries. The results suggest that these causal relationships are not uniform at different levels of income. For example, economic growth Granger causes human capital in all groups bidirectionally.

Rahman (2011) investigated the causal relationship between health expenditure, education expenditure, and GDP for Bangladesh. The study found the existence of a bidirectional Granger causal relationship between health care expenditure and education, education expenditure, and GDP; and a unidirectional relationship between health care expenditure and GDP. In contrast, (Pelinescu, 2015) highlighted the importance of human capital in promoting economic growth. The study showed a positive relationship between $GDP_{per\ capita}$ and innovative capacity of human capital (number of patents) and the qualification of employees (education attainment [secondary education and above]). The analysis indicated a negative relationship between education expenditure and $GDP_{per\ capita}$.

Sharma and Sahni (2015) explored the Granger causal relationship between human capital investment (education and health care investment) and the economic growth of India. The analysis showed that investment in education and health care is essential and has a positive significant long-term effect on $GDP_{per\ capita\ growth}$, asserting that healthier people who live longer have stronger incentives to invest in skill development, which increases workforce productivity by increasing work capacity and efficiency with new technology. The cointegration test results confirmed that education investment, health investment, and GDP are cointegrated, which is indicative of a long-run equilibrium relationship between the variables of interest. The findings of Khembo and Tchereni (2013) agree with that of Sharma and Sahni (2015), that education has a positive statistically significant effect on $GDP_{per\ capita}$.

2.7 Study Implication

The study aimed to give readers, economists, and policymakers a holistic guide into the economic growth theory. The paper summarizes articles on human capital in terms of (the) (i) theoretical framework of economic growth theory, (ii) neo-classical growth model, (iii) Solow growth production-function, (iv) new endogenous theory, and (v) empirical evidence on the relationship and causal link between human capital and economic growth. Assessing the literature on human capital and economic growth will serve as a comprehensive literature guide to policy formulation and implementation in the short-run and long-run of creating developmental goals for any region.

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