

Systematic Literature Review of Human Capital in Context of Economic Growth

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ABSTRACT

The purpose of this work is to investigate the connection between economic growth and human capital. The paper examines prior research on the relationship between human capital and economic growth, analyses datasets from other studies, and makes some conclusions. In terms of (i) the new endogenous theory, (ii) the neo-classical growth model, (iii) the Solow growth production-function, (iv) the theoretical framework of economic growth theory, and (v) empirical evidence on the relationship and causal link between human capital and economic growth, the paper summarises articles on human capital. Evaluating the body of research on human capital and economic growth will provide a thorough literature guide for developing developmental objectives for any region, both in the short and long terms, and for formulating and implementing policies.

Keywords: Human capital, Economic growth, Education, Training, Health

1. INTRODUCTION

The skills and aptitudes of people might be characterised as "human capital." A definition of productive wealth that is embedded in labour, skills, and knowledge is provided by the United Nations (2009). A portion of this expertise—integrated with humans—is obtained through formal and informal schooling. While human capital development, or spending on education or training as a proxy, refers to the acquisition and growth of the number of people who have the skills, knowledge, and experience that are essential for a nation's economic development, human capital theory also emphasises an individual's health as an input to economic production (Adelakun, 2019). The main addition of this study to the body of knowledge on economic development, stability, and growth is to provide a comprehensive summary of literature on the topic.

"Human Capital" by Gary Becker (1964) According to him, human capital is essentially a means of production and is influenced by factors like education, training, and access to healthcare. The disparity in pay between graduates can be explained by increased human capital. The influence of human capital on the rates of economic growth is also significant. A more important macroeconomic goal is to achieve sustainable economic growth that integrates environmentally sound development (United Nations, 2020). This is because it guarantees the availability of renewable resources and makes the best use of non-renewable resources.

The definition of development provided by Arrow et al. (2004) as "meeting the requirements of now without compromising the ability of the subsequent generation to satisfy their own needs" is strengthened by the continuity and optimal use of these resources; after all, our resources are loans from our children, not gifts. The necessary component for this to happen is human capital. Evidence supporting the importance of education for economic growth has been found in both theoretical and empirical economic literature. The theories of Adam Smith and other philosophers and

economists of the eighteenth century, who promoted the idea that labour productivity helps build a surplus of wealth, were expanded upon by Klenow and Rodriguez-Claire (1997), Hall and Jone (1997), and Easterly and Levine (2001).

They said that the main driver of growth is technology advancement and that variations in the pace of technological advancement account for the majority of the wealth gap between nations. According to Nelson and Phelps (1996), Romer, P. (1989, 1990), and Abramovitz (1986), a nation must participate in innovation or imitation activities that primarily use human capital as its input of interest in order to achieve technical transformation.

Evolution as a Concept

Table 1: Concept Historical Perspectives

Irving Fisher, 1897	The term “human capital” can be described as the abilities and skill sets of human beings
United Nations (2009)	Integrated with humans, is acquired partly through formal and informal education.
Gary Becker (1964)	Human capital, is determined by education, training, medical treatment, and is effectively a means of production.
Adelakun, 2019	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
Klenow and Rodriguez-Claire (1997), Hall and Jone (1997), and Easterly and Levine (2001)	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.
Mankiw, Romer, and Weil (1992) and Lucas (1988)	Investment in education would have a positive effect on both the individual human capital and the overall economy.
Hanushek and Woessmann’s (2015)	Human capital, an input in the production process, implying that there is a relationship between human capital and economic growth.

Source: Researcher Own Meta analysis, 2023

Human capital plays a major role in endogenous growth theories (see, for example, Mankiw, Romer, and Weil (1992) and Lucas (1988)). Investing in education, combating poverty, expanding opportunities for labour market participation and economic growth, and promoting socioeconomic development are common recommendations made by these models for an economy. The reasoning behind this is that a country's economy will grow over the long run if it invests more in education. Therefore, funding education will benefit both the human capital of each individual and the economy as a whole. It will combat poverty, lower the number of children who arrive at school hungry, address government-sponsored job fears, training, and open networking sections, increase the number of interdisciplinary job opportunities in the economy, and foster socioeconomic growth.

Historical Foundation

Table 2: Human Capital and Economic Growth

Heiss (1995)	Higher educated and more experienced workers make more money than those with lower levels of education. The net marginal social returns of primary education spending are typically higher than those of tertiary education spending in developing nations.
UNESCO, (1997)	There is a clear correlation between education and poverty: those with higher levels of education have higher earning potential, make more money overall, and are better able to improve the quality of their lives than those with lower levels of education.
Goode (1959), Mincer (1958), and Becker (1962, 1975)	In the 1960s and 1970s, skilled labour, or human capital, was first employed. Goode (1959), Mincer (1958), and Becker (1962, 1975) held contrasting opinions regarding human capital due to the fact that a wide range of factors both directly and indirectly affect how human capital is formed and used.
Mankiw, Romer, and Weil (1992), Romer, (1989), Uzawa (1965), Lucas (1988)	Since the endogenous growth theory contributed to the expansion of the concept of human capital, various models have been developed in which human capital is defined as the output level. They argued that the quality of education might contribute to the long-term and continuous growth of an economy by using human capital in the production-function model to support their case for human capital investment in the economic growth theory.
Alexious (2009) and Kim (2010)	claimed that the first step in the process of economic development is education and that it is essential to both fostering economic growth and a country's ability to produce human capital. elevated age-dependency ratio, the underdevelopment of
edroni (2002) and Psacharopoulos (2004)	An analysis of the effects of educational investment on nations revealed that the influence of these outlays is greater in Latin American, African, and Asian nations than it is in OECD nations.
Benhabib (1994)	In contrast, 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)	Asserted that education has zero monetary or economic benefits, resulting in a decline in economic growth.

Source: Researcher own Meta analysis, 2023

There is, however, a growing consensus that trade policies that support economic growth have a positive relationship with openness, surplus trade balance, and high trade volume relative to Gross Domestic Product (GDP) (United Nations, 2009, 2020). In nations with liberal trade policies, trade openness can boost investment levels and efficiency as well as market sizes. As a result, developing nations are liberalising their economies to draw in more foreign capital.

Table 2: Human Capital and Economic Growth.

Amaghionyeodiwe (2009), Chaudry and Rahman (2009),	Human capital determines the ability of an economy to manage its other factors of production, and it is necessary for innovation.
Liap, Du, Bing, and Yu (2019), Khembo and Tchereni (2013),	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.
Akpolate (2014) and Kanayo (2013).	Adopting existing technologies, technological advancement, and catch-up processes are contributing factors to the rate of growth of an economy.

Source: Researcher Own Meta analysis, 2023

According to some economists, economic growth is positively correlated with higher levels of formal education. According to Lucas (1988), education is the main mechanism through which knowledge is acquired and that the development of human capital corresponds to long-term economic growth. Romer P. (1989, 1990, 1994) demonstrated how innovation and economic growth are fueled by human capital. Romer, P. (1989) and Rostow (1960), as reported in the econometric literature, demonstrate that education also has spillover effects, increases research productivity, and speeds up entrepreneurs' adaptation to disequilibrium.

The empirical literature, however, offers conflicting data about the connection between economic growth and human capital. Levine and Renelt (1992) demonstrated that education (human capital) has no statistically significant impact on economic growth, and Dessus (1999) contended that specification bias may have contributed to Temple's (1999) weak correlation findings. Meanwhile, Bills and Klenow (2000) and Temple (1999) reported a weak correlation between the two. According to Dessus's (1999) findings, educational standards decline as enrolment in school rises. Consequently, investing in education in developing nations does not lead to increased growth.

2. THEORITICAL LITERATURE REVIEW

Table 3: Theoretical Meta analysis

Human capital theory 1950s and 1960s,	Theodore Schultz and Gary Becker	Human capital can be seen as a means of production – into which investment yields additional outputs. As Becker notes:
NEO-CLASSICAL (OR SOLOW) GROWTH MODEL	Mankiw, Romer and Weil (1992)	Human capital is a factor of production along with physical capital. In other words, human capital growth would raise the marginal product of physical capital, and thus induce further accumulation of physical capital, thereby raising the total output
ENDOGENOUS GROWTH MODEL	Paul Romer (1986) and Robert Lucas (1988).	“The main engine of growth is the accumulation of human capital-of knowledge-and the main source of differences in living standards among nations is differences in human capital.
Neo-classical Growth Model	1950, Robert Solow and Trevor Swan	The Solow growth model states that long-run growth is achieved through capital accumulation, skilled labor, population growth, and technological progress.
New Endogenous Theory	Romer, P. (1994) and Stonier and Hague (1972)	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.

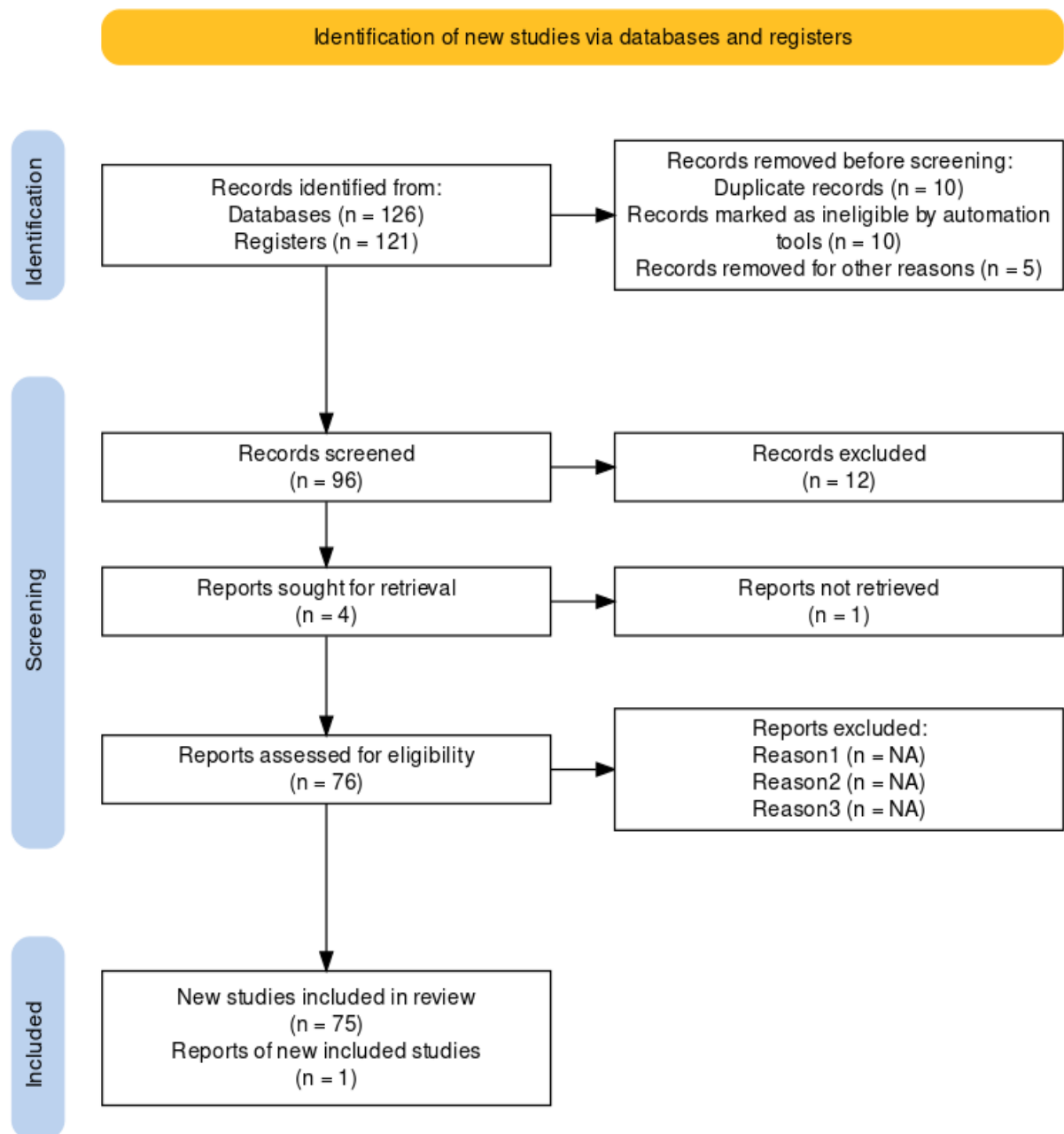
Source: Researcher own Meta analysis, 2023

Literature Review

PRISMA method was applied to the literature review process. PRISMA is a minimal set of items for reporting in systematic reviews and meta-analyses that are based on evidence. Though it can also serve as a foundation for reporting systematic reviews with goals, PRISMA is primarily concerned with the reporting of reviews assessing the effects of interventions.

Published in 2009, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement was created to assist systematic reviewers in openly reporting the purpose of

the review, the actions taken by the authors, and the results they discovered. The guideline has to be updated due to advancements in systematic review methodology and terminology over the last ten years.



Source: PRISMA 2023

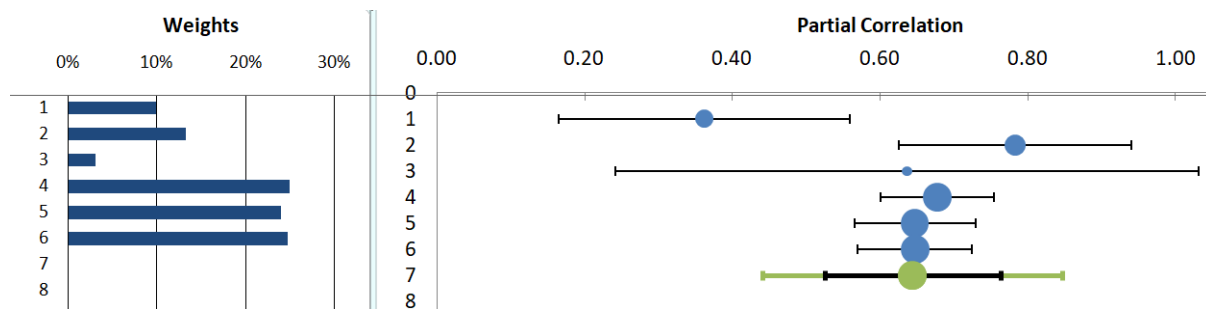
The 2009 statement is replaced by the PRISMA 2020 statement, which also includes new reporting guidelines reflecting improvements in finding, picking, evaluating, and synthesising studies. To make implementation easier, the items' organisation and presentation have been changed. The PRISMA 2020 abstract checklist, the expanded checklist with reporting guidelines for every item, the PRISMA 2020 27-item checklist, and the updated flow diagrams for the original and updated reviews are all presented in this article.

3. META ANALYSIS OF REVIEWED LITERATURE

Table 2: Partial Correlation/ Combined Effect Size

#	Study name	Partial Correlation	CI Lower limit	CI Upper limit	Weight
1	Abdullah et al., 2020	0.36	0.17	0.56	9.90%
2	Edrees (2020)	0.78	0.63	0.94	13.30%
3	Soumere (2020)	0.64	0.24	1.03	3.16%
4	Christa & Kristinae, 2021	0.68	0.60	0.75	24.88%
5	Ramadani et al., 2018	0.65	0.57	0.73	24.00%
6	Pramuki & Kusumawati, 2021	0.65	0.57	0.72	24.75%
Combined Effect Size					
Partial Correlation		0.64			
CI Lower limit		0.52			
CI Upper limit		0.76			
Z-value		13.91			
One-tailed p-value		0.000			
Two-tailed p-value		0.000			

Source: Meta Essentials (2023)

**Figure 1: Forest Plot**

Source: Meta Essentials (2023)

To conduct meta-analyses on partial correlations—that is, correlations between two variables that are controlled for other variables—the researchers developed a partial correlation analysis method. Alternatively expressed, this could be expressed as the proportion of the predictor that remains correlated with the outcome variable following the subtraction of the effect (the magnitude of which is partially accounted for by additional variables). This effect size was used to evaluate the relationship between two variables by taking into account additional variables in both the predictor and the dependent variable.

Z values indicated the total effect size. In a meta-analysis, the researchers used a Z-test to ascertain whether or not the null hypothesis was accepted. This requires a normally distributed random effect size model because the z value was 13.91. Usually, data from a single study with two groups are analysed using a t-test, which naturally uses a t-distribution.

The down x-axis of the above forest plot indicates the effect size scale of the systematic literature that was examined, according to researchers' meta-analysis. Every row, with the exception of the bottom row, displays the estimated effect size as a point with a 95% confidence interval derived from a systematic review. This statistically accurate way of presenting the findings of a single study was used to estimate the range within which the "actual" effect (of the systematic literature under study) was most likely to lie. Researchers believed that each study that was part of the meta-analysis

was a study of a full probability sample of a specific population. The point estimate in the forest plot corresponds to a smaller or larger bullet.

Table 4: Variance of the True Effect Sizes

Combined effect size	0.79
T² (method of moments estimation)	0.00
R²	4.05%

Source: Meta Essentials (2023)

The overall effect size, which is essentially a weighted average of the summary effect sizes and is determined by inversely calculating the variances, was found to be 0.79 based on the combined meta-analyses. This approach is similar to the techniques used to conduct a meta-analysis of primary investigations, with an R² of 4.05%.

The researchers estimated the variance of the actual impact sizes using the information that T² was significant. The researchers used the assumption that "this variance would be τ^2 if we had an infinitely large sample of studies, each itself infinitely big (such that the estimate in each study equaled the genuine effect)" when calculating the variance of these effects. There is a between-study variation of 2 in our meta-analysis. It is an estimate of the variance of the underlying distribution of the genuine effect sizes. As the above chart shows, there are multiple recommended ways to compute τ^2 .

4. PUBLICATION BIAS ANALYSIS

Publication bias is the most well-known type of discrimination in reporting. The results of relevant experiments are either published or not, depending on the nature and importance of the findings. Studies that yield significant results, for example, have a higher chance of being published. Researchers claim that a field of study's body of research is likely to be biased in a variety of ways. It is anticipated that there will be a greater chance of a statistically significant result being published than a statistically non-significant result. Consequently, the estimated cumulative effect size in the study might be higher than it really is. The goal of the publication bias analysis is to (1) make the reader aware of this possible publication bias and (2) adjust the estimate for the magnitude of the overall effect.

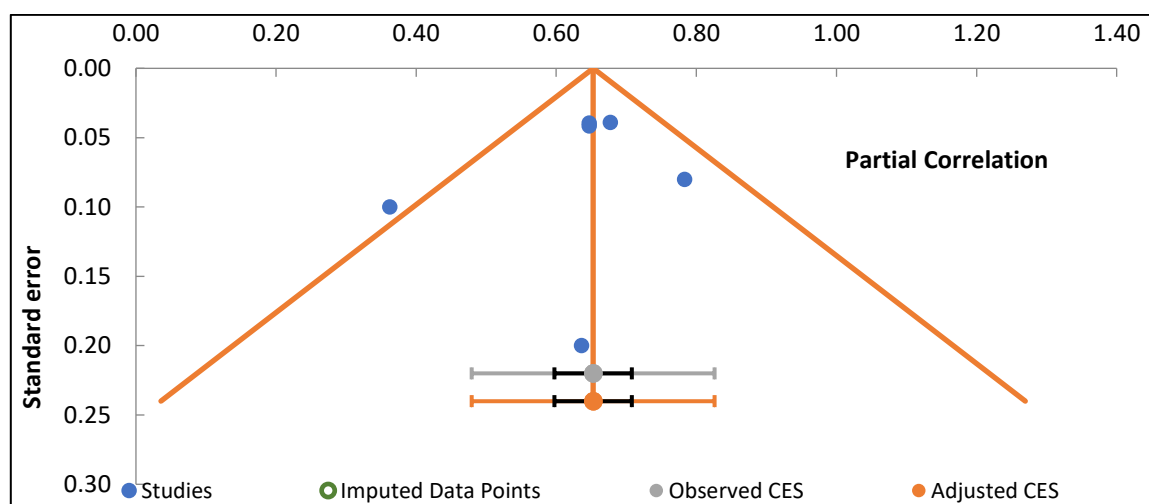


Figure 3: Funnel Plot

Source: Meta Essentials (2023)

Meta-Essentials provides six different analyses that the researchers used to identify publication bias. One kind of analysis is the funnel plot. It is thought that when measured with similar precision (i.e., with similar standard error), observed effect sizes should be approximately symmetrically distributed around the total effect size. It is expected that results that are further away from the null will outweigh those that are closer to it, as was previously mentioned. This is not the case, as the above figure illustrates. Since there are no imputed data points in the Trim-and-Fill approach, the funnel plot indicates that the distribution of effect sizes is not asymmetric. Trim-and-Fill, on the other hand, would impute one or more studies and then alter the overall effect.

Table 5: Egger Regression

	Estimate	SE	CI LL	CI UL
Intercept	-0.90	1.53	-4.83	3.04
Slope	0.70	0.08	0.49	0.90

Source: Meta Essentials (2023)

The researchers employed the Egger's regression test to quantitatively evaluate this disparity. It looks at the correlation between the measured effect sizes and their sample standard errors (SEs); a large correlation shows the presence of effects from small studies. With a slope-value of 0.70 and intercept of -0.90, Egger's test for a regression intercept revealed no indication of publication bias. Funnel plot suggests that there may be publishing bias. The rank correlation test by Begg and Mazumdar produced a p-value of 0.091, suggesting potential publication bias.

Table 6: Heterogeneity

Q	11.54
p _Q	0.042
I ²	56.67%
T ²	0.00
T	0.06
Trim and Fill	On
Estimator for missing studies	Linear
Search from mean	Left
Number of imputed studies	0

Source: Meta Essentials (2023)

Through the use of heterogeneity in meta-analysis, researchers were able to identify differences in study results between studies. Researchers used statistics for evaluating heterogeneity in meta-analysis, also referred to as "non-combinability" statistics, by assessing the consistency of study findings in order to help the user interpret the data. Significant heterogeneity, according to the researchers, ranged from 50% to 90%. Studies are not all estimating the same quantity when there is significant statistical heterogeneity. This does not necessarily mean that there are differences in the actual intervention effect, though. Variations in outcome assessments or methodological heterogeneity led to significant statistical heterogeneity.

Empirical literature review and hypotheses development (In context of coffee cooperatives)

Prior research has supported the association between improved company performance and human capital efficiency and measured the intellectual capital and the impact of its various elements on firm performance using data from 21 insurance companies. They discovered that the efficacy of financial institutions is significantly impacted by human capital efficiency. Additionally, it was discovered that human capital had a favorable correlation with prospective students' interest (Boson et al., 2023).

Examining the impact of intellectual property on the financial stability of 710 Indian businesses between 2001 and 2016. The results demonstrated that although the productivity of a company is greatly influenced by the efficiency of its human capital, the productivity of its employed capital and structural capital is also significantly impacted by these factors (Ployhart, 2021). To determine how intellectual capital—which encompasses human, social, and organisational capital—affects business performance, a survey of 213 coffee cooperatives was conducted. They concluded that social and human capital are essential for a firm's success based on exploratory, confirmatory, and moderating factor analyses (Gupta & Raman, 2021).

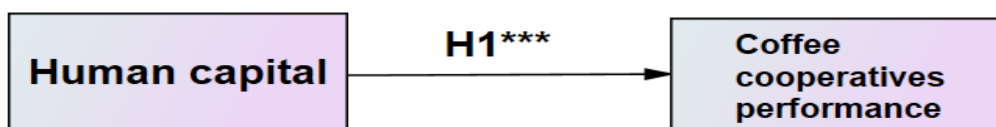
Tuncdogan et al. (2021) carried out a big data study to examine the relationship between three firm performance measures—ROA, ROE, and Tobin's Q—and the three components of intellectual capital—human capital efficiency, structural capital efficiency, and capital employed efficiency—of 171 listed companies on the Saudi stock exchange. The results showed that human capital efficiency has a significant positive impact on ROE. Comparable to this, Rahim et al. (2017) investigated 55 Malaysian technology companies back in 2009. The results showed a strong and positive relationship between firm performance and human capital efficiency (Shiferaw et al., 2023).

Using multiple linear regression models, Kwarbai and Akinpelu (2016) investigated the impact of human capital efficiency on firm performance at manufacturing companies listed on the Stock Exchange Market (Panigrahi et al., 2023). They found that there is a negative correlation between human capital efficiency and employee base expansion and a significant positive correlation between human capital efficiency and ROA and earnings per share. Data on 29 coffee processing companies was gathered by Parham and Heling (2015) in order to assess the effect of human capital efficiency on business performance. Their study shows a positive correlation between the three measures of business success (ROA, ROE, and employee productivity) and human capital efficiency.

A study conducted at 22 African coffee cooperatives examined the connection between human capital efficiency and four metrics. The primary discovery of the paper is the correlation between employee productivity and human capital efficiency. Furthermore, 145 coffee cooperatives had a positive foundational impact on the efficiency of their human, relational, and structural capital. They concluded that structural capital efficiency has a significant effect on performance, in contrast to relational and human capital efficiency. Additionally, it was observed that a company's financial performance is influenced by its human capital. Businesses are starting to pay more and more attention to human capital. Furthermore, over time, the disclosure of human resources has changed to incorporate more comprehensive data and coherent formats (Gobena & Kant, 2022).

H1: The profitability of all sectors is positively impacted by human capital efficiency.

1. Conceptual Framework



Source: Researchers Own construct, 2023

Study Implication

The goal of the study was to provide a comprehensive introduction to the economic growth theory for readers, economists, and policymakers. This paper presents a summary of articles on human

capital with respect to (the) new endogenous theory, (iv) Solow growth production-function, (iii) neo-classical growth model, (iv) theoretical framework of economic growth theory, and (v) empirical evidence on the relationship and causal link between human capital and economic growth. Evaluating the body of research on human capital and economic growth will provide a thorough literature guide for developing developmental objectives for any region, both in the short and long terms, and for formulating and implementing policies.

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