International Review of Entrepreneurship, Article #1715, 22(2): pp. 135-156.

Human Capital Investment, New Business Creation and Economic Growth in Sub-Saharan Africa

Saara L.M. Hamunyela[1] and Michael Graham[2]
University of Stellenbosch Business School, Cape Town, South Africa

Abstract. This paper investigates if a level of human capital investment exists that would, possibly, trigger a positive impact of new business creation on economic growth in sub-Saharan Africa (SSA). To do this, we apply the dynamic panel threshold technique to analyse a panel of 19 SSA countries for the period 2006-2020. Using the World Bank's new business density measure as a proxy for new business creation, we find a negative relation between new business creation and economic growth for SSA countries with low levels of human capital investment. However, we also report that new business creation positively affects economic growth if human capital investment exceeds a certain (estimated) threshold value. This evidence suggests that high levels of human capital in SSA come along with a positive impact of new business creation on growth. Using data from SSA to study the dynamics of the new business creation and economic growth nexus allows us to highlight that investment in human capital accumulation is an important conduit through which a positive impact of new business creation on economic growth can be realised.

Keywords: business creation, economic growth, sub-Saharan Africa, human capital, entrepreneurship, dynamic panel threshold technique.

1. Introduction

Recent discussions on new business creation, as a perspective within the concept of entrepreneurship, have centred on the entrepreneurship ecosystem, a social and cultural environment that is specifically tailored to positively affect (high-quality) entrepreneurship (see e.g., Isenberg, 2010; Szerb *et al*., 2019). In consonance with this, numerous studies have cited human capital[3] to be an important cog of an ideal entrepreneurship ecosystem (see e.g., Isenberg, 2010; Stam, 2015; Stam & Spigel, 2016; Lafuente *et al*., 2018; Dvouletý & Orel, 2019). The implication of this is an open empirical question, especially for regions that lack the requisite

1. Corresponding author: Saara L.M. Hamunyela, University of Stellenbosch Business School, Carl Cronje Drive, 7535 Bellville, Cape Town, South Africa. Tel: +264 (0)81 312 267 7. Email: laudikam@yahoo.com or 18541925@sun.ac.za
2. Email: michael.graham@stellenboschbusiness.ac.za
3. Human capital is defined as a set of resources integral to labour that improve productivity, i.e., knowledge, skills and experiences acquired from education, formal training and employment (Becker, 1962). In this paper, the focus is on human capital accumulation (through investment), measured as "total expenditures on education" as a percentage of GDP.

human capital. For example, the literature shows sub-Saharan Africa (SSA) to be relatively weaker in the areas of human capital and start-up skills, which are crucial abilities in creating new businesses (Lafuente *et al*., 2018). The ability to transform knowledge into economic opportunities, i.e., creation of new businesses, involves a set of skills, aptitudes, and insights that entrepreneurs can accumulate through schooling (Acs *et al*., 2006 and 2009). Thus, sub-Saharan Africa (SSA) being relatively weaker in human capital accumulation and start-up skills implies that education in SSA may not be as broadly accessible as in other regions, and/or entrepreneurial skills are less common, which has significant implications for new business creation in the region.

Human capital, according to the literature, helps improve economic outcomes by expanding the knowledge and skills of people (see e.g., Lucas, 1988, 2015; Ogundari & Awokuse, 2018). It follows, therefore, that human capital accumulation[4] enables individuals to be innovative and productive (Romer, 1990; Bodman & Le, 2013). Hence, a population with higher educational attainment would tend to innovate and establish more businesses. A positive relation between human capital accumulation through schooling, and new business formation can, therefore, be hypothesized (see Audretsch *et al.*, 2005; Acs & Armington, 2006; and Lackéus, 2014). Nevertheless, the high rates of new business creation observed in sub-Saharan Africa (SSA) do not translate into growth (see e.g., Lafuente *et al*., 2018; Van Stel *et al*., 2005). Nonetheless, these economies continue to accumulate human capital, which as suggested in literature, tends to mitigate the negative impact of necessity entrepreneurship[5] (business creation) on economic growth (see e.g., Rodrigues, 2018).

Coupling SSA's relative weakness in human capital and/or start-up skills with the negative relation between new business creation and economic growth in SSA, this paper suggests that there might be a trigger point, of human capital investment that could change the negative relationship between new business creation and economic growth for emerging countries noted in the empirical literature. We, therefore, investigate if there exists a level of human capital investment that would, possibly, trigger a positive impact of new business creation on economic growth in SSA. That is to say that human capital accumulation is likely to enhance the impact of new business creation on economic growth at some point and make the link between these two variables much stronger in SSA.

To investigate the trigger point, we apply the dynamic panel threshold[6] technique (see Kremer *et al.*, 2013), which is designed to estimate threshold values[7] instead of imposing them, to analyse a panel of 19 sub-Saharan Africa

4. Human capital accumulation refers to an increase in knowledge, skills and experiences as a result of investment in education (see e.g., Osiobe, 2019; Unger *et al*., 2011).
5. Necessity entrepreneurship results from market frictions and is generally related to non-innovative firms (see e.g., Reynolds, 2005; Urbano & Aparicio, 2016; Rodrigues, 2018).
6. A threshold is a magnitude or intensity that must be exceeded for a certain reaction, phenomenon, result, or condition to occur or be manifested.

(SSA) countries for the period 2006-2020. This paper makes several notable findings. First, we report evidence showing that for several SSA countries, a negative relation exists between new business creation and economic growth given their current (low) levels of human capital accumulation. This finding confirms the evidence in the extant literature (see e.g., Lafuente *et al*., 2018; Van Stel *et al*., 2005), and is contrary to theoretical postulations that imply a positive relation in the new business creation-economic growth nexus. Secondly, we report evidence suggesting that high levels of human capital investment in sub-Saharan Africa come along with a positive impact of new business creation on growth. In particular, the empirical results show that new business creation positively affects economic growth if total expenditures on education as a percentage of GDP, as a measure of human capital accumulation, exceeds an estimated threshold value of 4.67. This means that SSA countries that invest in human capital accumulation at the level of 4.67 or above could realize a positive impact of new business creation on economic growth.

The contribution of this paper to the literature is two-fold. First, we contribute to the empirical postulation on the entrepreneurship (business creation) and economic growth nexus by showing that human capital accumulation is an important conduit through which a positive impact of new business creation on economic growth can be realised. The extant literature suggests a negative relation between entrepreneurial activities and economic growth in emerging economies (see e.g., Lafuente *et al*., 2018; Acs, Desai & Hessels, 2008; Van Stel *et al*., 2005) without suggesting any possible means of improving this relation. Second, we suggest a threshold level of human capital investment at which SSA economies can realise enhanced and productive entrepreneurial activities for economic growth. The extant literature has been largely silent on this. Ahsan & Haque (2017) show that the significant positive effect of human capital accumulation can only be realised after an economy crosses a threshold level of development. Similarly, Van Stel *et al*. (2005) suggest that the effect of entrepreneurial activities on economic development depends on the stage of economic development. This current paper is different as it focuses on a concrete manifestation of economic development, i.e., the level of human capital accumulation required to trigger a positive impact on the new business creation-economic growth nexus in SSA, rather than the level of development itself. Analysing the effect of entrepreneurship, as one mechanism through which knowledge can be converted into economic opportunities that bring about growth, is important for policy formulation. It may assist in the formulation of intense human capital policies that are growth-enhancing.

The rest of the paper is structured as follows: Section 2 discusses both the theoretical and empirical literature; Section 3 outlines the methodology; Section 4 presents and discusses the empirical results and Section 5 concludes.

7. Whereas threshold value(s) indicate the number that trigger the reaction/result to occur when this value is breached.

2. Literature Review

2.1. Theory: Human capital, business creation and economic growth

In this paper, we adopt the *Knowledge Spillover Theory of Entrepreneurship* to discuss the relation between human capital, business creation and economic growth (see Acs *et al*., 2006 and 2009). In this theory, Research and Development activities (R&D) undertaken by firms are regarded as "purposeful investment in new knowledge" and an essential input in the process of generating growth. However, some of the produced new knowledge cannot be commercialised by the incumbent firms, hence it spills over into the aggregate knowledge stock and becomes opportunities accessible to other firms. Knowledge, therefore, is produced by labour employed in R&D labs of incumbent firms or by individuals engaged in entrepreneurial activities, creating and selling new products and services that emerge as new varieties of capital goods and new knowledge.

The central argument here is that knowledge created within the incumbent firms through research and development (endogenously) results in knowledge spillovers, which allow entrepreneurs to identify and exploit economic opportunities. Thus, the theory suggest that entrepreneurship is one mechanism through which knowledge can be converted into growth. With this understanding, entrepreneurship is regarded as a contributor to economic growth by acting as a channel through which knowledge spills over to agents who create new businesses.

The ability to transform knowledge into economic opportunities, i.e., creation of new businesses, involves a set of skills, aptitudes, and insights that entrepreneurs accumulate through schooling. Hence, an economy endowed with an educated labour force (human capital) which is equipped with high entrepreneurial skills would be able to convert knowledge into economic opportunities. The *Knowledge Spillover Theory of Entrepreneurship* builds a link between human capital and entrepreneurship because human capital is believed to be a store of human knowledge and productive capacity as contemplated in Lucas (1988).

2.2. Empirical review

2.2.1. New business creation and economic growth

A body of work has empirically examined the relation between entrepreneurship, through new business creation, and economic growth. A thread of this literature shows that the impact of entrepreneurial activities on economic growth differs depending on the stage of economic development (see e.g., Van Stel *et al*., 2005). For developed (emerging) economies, a positive (negative) relation between new business creation and the level of per-capita income is documented (Van Stel *et al*., 2005). The relation between the two variables may also differ depending on the type of entrepreneurship. For example, high-growth businesses and opportunity entrepreneurship augment knowledge spillovers and economic

growth (see e.g., Henrekson & Johansson; 2008; Reynolds, 2005). Further Minniti & Lévesque (2010) document evidence suggesting that entrepreneurial activity can take the form of either imitative or research based. However, the sufficient presence of either type has a positive effect on the growth pattern of the economy.

Wennekers *et al*. (2005), studying the relationship between the level of economic development and the rate of nascent businesses in 36 countries, document a U-shaped relation between the level of economic development and the rate of nascent businesses. That is, there are higher rates of entrepreneurship in the early stages of development, mainly necessity businesses. As countries advance through the stages of economic development, a decrease in the rates of entrepreneurship is observed. However, in the later stage, the relationship leans towards positive to reflect the increase in the creation of opportunity businesses (also see Acs, Desai & Hessels, 2008). This implies that a natural rate of nascent entrepreneurship is, somewhat, governed by laws related to the level of economic development. For advanced nations, improving incentive structures for business start-ups and promoting commercial exploitation of scientific findings offer the most promising public policy approach. However, emerging nations may be better off pursuing the exploitation of scale economies, for example, through foreign direct investment and nurturing management qualities of local young businesses.

In another study, Wong *et al*. (2005), using an augmented Cobb-Douglas analysis of cross-sectional GEM data from 37 developed and emerging economies, find that fast growing new businesses have a significant impact on economic growth and account for most of the new jobs created by small and medium enterprises in advanced countries. The evidence presented, generally, offer empirical support to Schumpeter's (1934) theory of economic development.

Another strand of literature suggests a two-way relationship between entrepreneurship and economic growth. For example, Amorós *et al*. (2012) show a reciprocal relationship and state that the level of economic development stimulates new economic activities i.e., the creation of new businesses which in return contributes to development. Also, Galindo & Mendez (2014) demonstrate a circular effect among entrepreneurship, innovation, and economic growth: given that the monetary policy (money supply/interest rate) and social climate (income distribution) are favourable, the three variables exert positive effects on each other. Greater entrepreneurship activity and innovation would enhance economic growth, and the economic growth would in turn have a positive effect on both innovation and entrepreneurship activity (also see, Stoica, Roman & Rusu, 2020). Finally, new business creation through entrepreneurship can also be a consequence of economic growth (Koellinger & Thurik, 2012) because high economic growth leads to greater opportunities and expected rewards (Fritsch & Schroeter, 2011).

Van Stel *et al*. (2005) show a negative relation between new business creation and the rate of economic growth in emerging countries. However, a handful of country studies in Africa confirm the Schumpeter (1934) theory and document a positive relation between entrepreneurship, through new business creation, and economic growth (see e.g., Klapper & Richmond, 2011; Abosede & Onakoya, 2013). The mixed results may be a consequence of differences in the measurement of entrepreneurship (see e.g., Vyas & Vyas, 2019; Klapper & Richmond, 2011). For completeness, we offer the following hypothesis to test the relation between new business creation and economic growth for a cross-section of Sub-Saharan African countries:

H1: There is a positive relation between new business creation and economic growth.

2.2.2. Human capital and business creation

The literature suggests that human capital influences the rate of innovation and technology diffusion (Nelson & Phelps, 1966; Lucas, 1990; Benhabib & Spiegel, 1994). Audretsch, Lehmann, & Warning (2005) show a positive relationship between university graduates and knowledge-based nascent businesses in Germany. In addition, Colombo & Grilli (2005) positively associate founders' levels of human capital with the growth of new technology-based firms in Italy. Similarly, Acs, & Armington (2006) show a positive relation between new firm formation and college-educated adults in the USA.

Lackéus (2014) notes that if the country's population is highly educated, then their ability to overcome social obstacles and take advantage of business opportunities is inherent to self-employment. Likewise, Marvel, Davis & Sproul (2016) found that entrepreneurship is highly dependent on human capital attributes of entrepreneurs.

In related studies on the returns to education for entrepreneurs, Bosma *et al*. (2004), using a rich Dutch longitudinal data set of firm founders find that investments in human and social capital substantially enhance entrepreneurial performance. Also, Van der Sluis, Van Praag & Vijverberg (2008), in a meta-analysis show a positive and measurable impact of education on performance and that the return to a marginal year of schooling is 6.1% (on average) for an entrepreneur, although the returns to schooling in entrepreneurship are higher in the USA than in Europe, higher for females than for males, and lower for non-whites or immigrants.[8]

8. The extant literature has also examined entrepreneurial intentions by means of the theory of planned behavior (see Van Gelderen *et al*., 2008); risk, uncertainty and entrepreneurship (see Koudstaal, Sloof, & Van Praag, 2016); and returns to cognitive ability (Hartog, Van Praag, & Van der Sluis, 2010).

2.2.3. Human capital and economic growth

Human capital is cited, in studies on human capital and economic growth, as an important element for businesses to achieve high quality innovation. Schultz (1961) and Becker (1962) articulate human capital as a set of resources integral to labour that improve productivity, i.e., knowledge, skills and experiences acquired from education, formal training and employment. Human capital enables innovative firms to launch and scale ideas, improve productivity, and consequently aim to stimulate economic growth and job creation (see e.g., Barro, 1991; Hanushek, 2013). However, a sustainable growth of a high-quality human capital, educated, experienced and healthy workforce, can be a challenge especially for emerging economies (Romer, 1990). This is because of inefficient intervention mechanisms other than investing in human capital. Emerging economies have competing needs such as providing basic needs for their citizens, and most countries choose consumption spending over investing in human capital.

Ehrlich, Li, & Liu (2017) in a panel analysis of data from 63 countries for the period 2002-2010 found evidence that confirms the role of entrepreneurial human capital as a driver of economic growth. Their proposition is that higher education attainment of entrepreneurs, augmented with the efficiency of investment in entrepreneurial human capital can enhance economic growth. Also, Rodrigues (2018) investigated the relevance of human capital to drive the impact of entrepreneurship on economic growth in both OECD and non-OECD countries over a period of 1990-2016. The study finds that human capital plays an important role on economic growth. It mitigates the negative effect of necessity entrepreneurship especially for advanced economies (also see Pelinescu, 2015).

Ahsan & Haque (2017), examining the effect of human capital on economic growth, show that the positive effects of human capital can only be realised if an economy reaches a certain level of development. This means an insignificant connection between human capital and economic growth for countries below a threshold, particularly emerging economies inclusive of African countries. The direct analysis of the relation between human capital and economic growth is not the only way through which the impact of human capital can be articulated. Indeed Lucas (1988, 2015), and Ogundari & Awokuse (2018) all note that human capital is a necessary condition for the exercise of successful enterprise. This implies that the effect of human capital on growth may be nuanced by other factors. Human capital accumulation enables individuals to be innovative and productive, and consequently it helps improve on economic outcomes. We, therefore, argue that human capital accumulation is one other factor that can improve the impact of business creation, as a conduit for knowledge spillovers, on economic growth. Therefore, we test the following empirical hypothesis for a cross-section of African countries:

H2: There is a threshold level of human capital, above which SSA economies can realise a positive relation between new business creation and economic growth.

3. Data and Methodology

3.1. Data

The data used in our empirical analysis are taken from two main sources; the World Bank Group Entrepreneurship Survey dataset, and the World Bank's World Development Indicators (see Table 1). We include all countries with the requisite data in the identified databases. The final sample used in the empirical analysis includes 19 Sub-Saharan African countries[9] and the data period is between 2006 and 2020. The choice of both sample period and sample countries is primarily influenced by the availability of the new business density data (which is our proxy for new business creation) sourced from the World Bank Group Entrepreneurship Survey (WBGES) database. The WBGES database contains annual data on the number of new firms over the period of 2006-2020. In the following subsection, we discuss the variables included in the empirical analyses.

3.1.1. Economic growth

Following Acs & Audretsch (1987), Van Stel *et al*. (2005) we use real GDP growth (GDP) as a proxy for economic growth. This is estimated as the annual percentage growth rate of GDP, measured in constant prices, or year-to-year differences. Data on this variable is obtained from the World Development Indicators (WDI). Real GDP growth measures economic growth of individual countries.

Table 1: Model variables

Variable	**Description**	**Source**
Economic Growth (ΔGDP)	Real GDP Growth rate	World Bank Development Indicators (WDI)
New Business Creation (NBC)	New Business Density – the number of new limited liability corporations registered in a calendar year per 1000 people between the age of 15 and 64.	World Bank Group Entrepreneurship Survey dataset
Human Capital — Total expenditures on education (HCEDU)	General government expenditure on education (current, capital, and transfers) expressed as a percentage of GDP; this also includes expenditure funded by transfers from international sources to government.	World Bank Development Indicators (WDI)

9. Botswana, Cape Verde, Central African Republic, Gabon, Lesotho, Mali, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

Human Capital — Labor force with advanced education (HCLAE)	The ratio of the labour force with advanced education to the working-age population (% of total working-age population with advanced education).	International Labour Organization, "Education and Mismatch Indicators database (EMI)", ILO-STAT
Trade Openness (ToP) - Trade (% of GDP)	Trade openness is the sum of exports and imports of goods and services measured as a share of gross domestic product.	World Bank Development Indicators (WDI)
Foreign direct investment (FDI) — Foreign direct investment, net inflows (% of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors divided by GDP.	World Bank Development Indicators (WDI)
Unemployment (UNE) - Unemployment rate	Unemployment rate is the share of the labor force that is without work but available for and seeking employment.	World Bank Development Indicators (WDI)

3.1.2. New business creation

We include the new business density (NBC), as a proxy for new business creation, in our analyses (see e.g. Klapper *et al*., 2015). New business density is a measure of the number of new limited liability corporations registered in a calendar year per 1000 people between the age of 15 and 64. Because business creation is a conduit for knowledge spillover, we assume a positive relationship with economic growth (see e.g., Acs *et al*., 2014; Aghion, 2017; Lafuente *et al*., 2016; Szerb *et al*., 2019).

3.1.3. Human capital

Human capital (HC) is captured by total expenditures on education as a percentage of GDP, a variable frequently used in empirical growth literature (Acs *et al*., 2006; Widarni & Bawono, 2021). This is general government expenditure on education (current, capital, and transfers) expressed as a percentage of GDP, and it also includes expenditure funded by transfers from international sources to government. For robustness, we use an alternative measure of human capital, defined as the share of the labour force with advanced education. Advanced

education comprises of short-cycle tertiary education, a bachelor's degree or equivalent education level, a master's degree or equivalent education level, or doctoral degree or equivalent education level according to the International Standard Classification of Education of 2011.

3.1.4. Control variables

Guided by the empirical literature, we control for other potential drivers of business creation and economic growth in the estimated models. These include foreign direct investment, trade openness, and unemployment rate as discussed below:

Foreign Direct Investment (FDI) is included as a control variable to capture the influence of FDI on entrepreneurship and economic growth. It is expected that the coefficient for this variable will be positive (see e.g., Nxazonke & van Wyk, 2020). *Trade Openness* (ToP) is also included as a control variable as countries that are more open to trade are likely to invest more in necessary infrastructure requirement and be competitive in attracting (new) business interests. Trade is expected to positively relate to new business creation. Finally, *Unemployment* (UNE), which is the share of the labor force that is without work but available for and seeking employment. Literature establishes that unemployment exerts a negative effect on opportunity entrepreneurship, especially during economic crisis because there are limited business opportunities, whereas it positively influences necessity entrepreneurship because there are fewer job options, so people are forced by circumstances to create businesses (see e.g., Verheul *et al*., 2002; Aghion, Howitt & Mayer-Foulkes, 2005).

3.2. Descriptive statistics

Table 2 presents the descriptive statistics for the variables included in the empirical analyses. For GDP, we report an average growth of 3.7% for the data period. Human capital (HC) shows a mean value of 4.8%, and a standard deviation of 2.3%. This indicates that, on average, human capital accumulation in SSA happened at the rate of 4.8% during the data period. However, the majority of the human capital data points fall below the mean. From the new business creation (NBC) variable statistics, we can infer that, on average, 2.6 new businesses per 1000 people are registered per year. The distribution nature of NBC leans towards the positive tail of the distribution curve (2.2 skewness) with a 7.2 peak. Table 4 shows, for each of the 19 countries in our sample, the average value of NBC over the sample period 2006-2020. Trade openness is the most dispersed variable with a standard deviation of 39.8%, and a high mean value of 78.9%, while foreign direct investment rates are heavily skewed (5.1%) and have a substantial tail as indicated by a kurtosis of 45.7%.

Table 2: Descriptive statistics (2006-2020)

	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis	Obs
ΔGDP	3.7	5.4	-36.4	20.7	-2.3	16.4	285
HCEDU	4.8	2.3	1.1	12.3	0.7	3.1	285
NBC	2.6	3.9	0.0	20.1	2.2	7.2	285
FDI	4.3	5.2	-2.5	57.8	5.1	45.7	285
ToP	78.9	39.8	20.7	225.0	1.3	4.7	285
UNE	9.9	8.0	0.9	29.7	0.9	2.5	285

This table reports descriptive statistics on all variables included in the empirical analyses. ΔGDP is the economic growth rate of countries in annual percentage change. NBC is an annual measure of the number of new limited liability corporations registered in a calendar year per 1000 people between the age of 15 and 64 within an economy. HCEDU is total expenditures on education. FDI is the annual net inflows of foreign investments expressed as a percentage of GDP. ToP is the sum of exports and imports of goods and services, expressed as a percentage of GDP. UNE is the share of the labor force that is without work but available for and seeking employment. The data period is between 2006 and 2020, and the number of countries is 19, yielding 285 data observations per variable.

Table 3 presents the Pearson correlation coefficients (the linear association) between the variables to be included in the empirical analysis. We generally report low correlation coefficients, below 0.5, in the data sample. For example, the correlation coefficient between NBC and GDP is -0.02. In addition, the HC variable shows a correlation of 0.04 with GDP. For our independent variables of interest, NBC and HC, the association is negative (-0.50). We also report low correlations (all below 0.5) between GDP and the rest of variables. For this reason, the linear association among the independent variables will not pose any multicollinearity threat.

Table 3: Pearson correlation coefficient matrix

	ΔGDP	HCEDU	NBC	FDI	ToP	UNE
ΔGDP	1					
HCEDU	-0.0394	1				
NBC	-0.0161	-0.0508	1			
FDI	0.0662	-0.1269**	-0.1605**	1		
ToP	-0.0376	0.2356***	-0.0255	0.4794***	1	
UNE	-0.1829***	0.5259***	-0.011	-0.1108*	0.2934***	1

This table reports the Pearson correlation coefficients for the variables included in the empirical analyses. For variable descriptions, see note below Table 2. The data period is between 2006 and 2020. *, **, and *** denote significance at 10, 5, and 1 percent, respectively.

Table 4 presents the average level of investment (average expenditures on education) in human capital for each country (average over the sample period). We detect that some countries, on average, have made notable investments on human capital accumulation (e.g., Botswana, Lesotho, Namibia, and Nigeria). On the other hand, the data shows that countries such as Central African Republic and Uganda have invested, relatively, poorly in human capital accumulation. Taking into consideration, the significant disparity presented by the average data and the HC mean value of 4.8%, it is clear that for most countries, HC will indeed be below the threshold, but for some countries, it will be above the threshold.

Table 4: Country data for key model variables (averages 2006-2020)

Country	**New Business Density**	**Total education expenditures (% of GDP)**
Botswana	12.38	8.08
Cape Verde	0.07	5.26
Central African Republic	6.26	1.48
Gabon	1.16	2.97
Lesotho	1.57	8.87
Mali	0.17	3.54
Mauritius	8.41	4.06
Namibia	0.83	8.09
Nigeria	0.77	8.51
Rwanda	1.11	3.87
Senegal	0.36	4.89
Seychelles	0.27	3.99
Serra Leon	2.62	3.86
South Africa	0.34	5.81
Tanzania	0.25	3.77
Togo	0.79	4.2
Uganda	8.73	2.08
Zambia	1.01	3.44
Zimbabwe	1.49	3.96
Country average	**2.56**	**4.78**

3.3. Model specification

This paper adopts a threshold model to investigate the level of human capital that would trigger a positive impact of new business creation on economic growth in SSA. Threshold models are well established in the analysis of time series data. Hansen (1999) introduced the model to panel data. Ramirez-Rondan (2013) further extends it to allow for dynamic panel threshold analysis. Following the

Kremer *et al.* (2013) model of dynamic panel threshold, we estimate an economic growth model, with a threshold variable, specified as:

$$\mathbf{y}_{it} = \alpha y_{it-1} + \boldsymbol{\beta_1} NBC_{it} I(h_{it} \leq \gamma) + \boldsymbol{\delta_1} I(h_{it} \leq \gamma) + \boldsymbol{\beta_2} NBC_{it} I(h_{it} > \gamma) + \boldsymbol{\emptyset} z_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where $\mathbf{y}_{it}$ is the growth rate of real GDP; the equation is dynamic as it includes the rate of GDP growth from the previous period in the set of explanatory variables ($\alpha y_{it\,-\,1}$) in order to account for transitional growth convergence; i indexes the individual countries, and t is time; $\beta_{1,}$ **and** $\boldsymbol{\beta_2}$ represent the slopes of the parameters that are assumed to be different from each other and are used to distinguish the regimes. NBC_{it} is new business creation which is the regime-dependent regressor; while $\boldsymbol{h_{it}}$ is human capital which is the threshold variable. $I(.)$ denotes the indicator factor for the regime threshold defined by variable $\boldsymbol{h_{it}}$ (in this case, $\boldsymbol{h_{it}}$ is human capital); γ denotes the value of the threshold; and $\delta_{\mathbf{1}}$ is the regime intercept common to all cross sections. z_{it} represents the vector of exogenous (z_{1it}) and endogenous (z_{2it}) control variables; $\boldsymbol{\mu_i}$ is the country-specific fixed effect; and ε_{it} is the error term for country i at period t. Additional to the structural equation, a suitable set of $k \geq m$ instrumental variables (X_{it}) are required. The key feature of this model is that it captures the effect of new business creation on economic growth based on different regimes (low/high) of human capital, and automatically estimates the threshold level.

3.4. Estimation technique

To estimate the level of human capital that would trigger a positive impact of new business creation on economic growth in SSA, we adopted panel regression techniques, more specifically the dynamic panel threshold technique. Panel regression techniques take care of country-specific effects and overcome the weaknesses in-built in multiple cross-country regressions such as omitted variable bias and loss of degrees of freedom. Further, panel data estimation allows for the reduction of the error term due to the substantial number of individual observations involved (Baltagi *et al.*, 2005).

First, we employ the first-difference transformation technique which should allow transformation of the dynamic panel model and eliminate the country-specific effect $\boldsymbol{\mu_i}$. Second, we estimate a reduced form regression for the endogenous variables included in z_{2it} as a function of X_{it} in order to estimate the predicted values of $\hat{z}_{2it}$ which is used to replace z_{2it} in equation (1). Therefore, equation (1) is estimated using least squares and produces a fixed threshold γ. In the third step, the estimator of the threshold value ($\hat{\gamma}$) is selected by picking the value which is associated with the smallest sum of squared residuals. That is; $\hat{\gamma} = argmin_{\gamma}\, S_n(\gamma)$, where $S_n(\gamma)$ denotes the sum of squared residuals obtained from eq. (1) for a given threshold γ. Finally, we use the general method of moments (GMM) to estimate[10] the slope of the coefficients using the previously estimated $\hat{\gamma}$ (see e.g., Kremer *et al.*, 2013).

4. Results and Discussion

The results from estimating equation (1) are presented in Table 5. Panel A of the table shows the estimated threshold level of human capital, and the corresponding 95% confidence interval. Panel B presents the coefficients of new business creation (regime-dependent variable) on growth, denoted as β_1, β_2 and implying the marginal effect of new business creation on growth depending on low (high) human capital regime, i.e., when HC is below (above) the estimated threshold value. The coefficients of the control variables are displayed in Panel C of the table.

Table 5: Human capital investment threshold and growth — SSA

Human capital [Exp. on Edu. (% of GDP)] threshold and real GDP growth	
Threshold estimates	
Panel A: Estimated Threshold	
γ	4.67**
95% Conf. Interval	[0.48 – 8.86]
Panel B: Impact of NBC	
$\hat{\beta}_1$	-19.1326***
	(7.82)
$\hat{\beta}_2$	20.1050**
	(9.615)
Panel C: Impact of Covariates	
Initial real GDP growth	-5.949**
	(3.080)
FDI	6.167***
	(0.004)
UNE	0.203
	(9.828)
$\hat{\delta}$	26.226
	(36.931)

10. The following STATA syntax is used in estimating the model: xthenreg *depvar indepvars* (if) (in), endogenous(*varlist*) inst(*varlist*) grid_num(*integer*) trim_rate(*real*) h_0(*real*) boost(integer) where *depvar* is the dependent variable and *indepvars* are the independent variables.

Bootstrap p-value for linearity test	0.0
Number of Observations	285
Number of Moments	143
N-19	T-15

This table presents the results for the dynamic panel threshold regression described in Sect. 3.3. Panel A of the table shows the estimated threshold level of human capital (γ), and the corresponding 95% confidence interval. Panel B presents the coefficients of new business creation (regime-dependent variable) on growth, denoted as $\hat{\beta}_1$, $\hat{\beta}_2$. Panel C displays coefficients of the control variables. $\hat{\delta}$ is the regime intercept common to all cross sections. Standard errors are in parentheses; *, **, and *** denote significance at 10, 5, and 1 percent, respectively.

The estimated human capital threshold of 4.67 (total expenditures on education as a percentage of GDP) as well as the marginal effects of NBC on growth strongly support the extant literature on the prevailing relationship between NBC and growth. That is, SSA countries with a high level of human capital accumulation i.e., at the level of 4.67 and above, could realize a positive impact of new business creation on economic growth.

The coefficients of the regime-dependent variable (NBC) are significant (1% and 5% levels of significance) and signed according to expectations (i.e., in line with Hypothesis 2). β_1 implies that NBC is negatively correlated with economic growth if human capital investment is less than the threshold (4.67). The coefficient of β_1 suggests that an increase of NBC by 1 limited liability company per 1000 people is associated with a loss of economic growth of 19 percentage point if the level of human capital is below 4.67, i.e. if total expenditures on education are lower than 4.67 percent of GDP. This demonstrates the negative marginal effect of NBC on growth and supports the empirical postulations on the rate of entrepreneurship-growth nexus in emerging economies (see e.g., Lafuente *et al.*, 2018; Van Stel *et al*., 2005). A possible explanation for this could be that a significant number of the businesses created in SSA are either dormant or short-lived. Unfortunately, due to the unavailability of data on the number of firm exits, especially for SSA countries, this explanation cannot be empirically substantiated. Nonetheless, empirical studies focusing on the African manufacturing sector have found that the growth and survival of firms are determined by conditions such as access to credit and quality of human capital. These conditions are found, mostly, to be scarce in African economies (see e.g., Igwe *et al*., 2018; Legas, 2015; Nkurunziza, 2010).

From Table 5, β_2 implies that a positive impact of new business creation on economic growth (20%) could be achieved if the level of human capital is above the 4.67 threshold. Therefore, we find clear evidence suggesting that high HC levels in emerging economies come along with a positive impact of NBC on growth. Our empirical result strongly confirms the theoretical hypothesis that entrepreneurship is one mechanism through which knowledge can be converted into economic opportunities that bring about growth. In accordance with Acs *et*

al. (2006 and 2009), the ability to transform knowledge into economic opportunities, i.e., creation of new businesses, can be intensified through a steady accumulation of skills, aptitudes, and insights that entrepreneurs accrue through schooling. The implication would be that an economy endowed with an educated labour force (human capital) which is equipped with high entrepreneurial skills would be able to convert knowledge into economic opportunities and create more opportunity-based businesses that contribute to economic growth (see e.g., Lackéus, 2014). Similarly, this specific result confirms the literature that note that human capital is a necessary condition for the exercise of successful enterprise in a growth model (Lucas, 1988, 2015; Ogundari & Awokuse, 2018).

Reflecting on the threshold value, we note that the critical value (4.67) of HC is close to the mean (4.8) of our HC data set. This could be indicative that, perhaps, reaching the threshold value is not a far-reaching task for several SSA economies.[11] Perhaps the challenge is political will, consistence, and availability of resources. These economies have many competing needs such as providing basic needs (i.e., health, food) for their citizens, and most countries choose consumption spending over investing in HC.

To establish robustness of our analysis, we re-estimated equation (1) using an alternative measure of human capital; the share of the labour force with at least advanced education (see Section 3.1.3), labeled HCLAE (see Table 1). Results, reported in Table 6, largely confirm our findings. The estimated threshold level (4.25) becomes statistically significant at 1%. Also when using this alternative HCLAE measure of human capital, the negative and positive effects of NBC on economic growth are found for countries below and above the human capital threshold, respectively, and the effects are in the same order of magnitude as in Table 5, which used the HCEDU measure.

Table 6: Robustness test: Human capital threshold and growth — SSA

Human capital [Share of labour force with advanced education] threshold and real GDP growth	
Threshold estimates	
Panel A: Estimated Threshold	
γ	4.25***
95% Conf. Interval	[3.93 – 4.57]
Panel B: Impact of NBC	
$\tilde{\beta}_1$	-24.584***
	(8.64)

11. We notice from Table 4 that 7 out of 19 countries have expenditures on education above 4.67% of GDP.

$\hat{\beta}_2$	20.865**
	(9.77)
Panel C: Impact of Covariates	
Initial real GDP growth	-5.672
	(9.408)
FDI	-3.055
	(4.241)
UNE	-2.096
	(1.803)
$\hat{\delta}$	190.700
	(193.142)
Bootstrap p-value for linearity test	0.0
Number of Observations	285
Number of Moments	247
N-19	T-15

This table presents the results for the dynamic panel threshold regression described in Sect. 3.3. Panel A of the table shows the estimated threshold level of human capital (γ), and the corresponding 95% confidence interval. Panel B presents the coefficients of new business creation (regime-dependent variable) on growth, denoted as $\hat{\beta}_1$, $\hat{\beta}_2$. Panel C displays coefficients of the control variables. $\hat{\delta}$ is the regime intercept common to all cross sections. Standard errors are in parentheses; *, **, and *** denote significance at 10, 5, and 1 percent, respectively.

5. Conclusion and Policy Implications

This paper investigates a level of human capital accumulation that would trigger a positive impact of new business creation on economic growth in sub-Saharan Africa. To do this, we adopted a dynamic threshold model from Kremer *et al.* (2013) to analyse a panel data set from SSA to confirm a threshold level of human capital above which sub-Saharan Africa economies can realise a positive relation between new business creation and economic growth. In particular, our empirical results suggest that new business creation positively affects economic growth if human capital exceeds a certain critical value of 4.67 percent of GDP spent on education. Human capital levels below this threshold come along with a negative impact of new business creation on growth, and the opposite is also true. Therefore, our findings do not support growth-enhancing effects of moderate human capital investment levels below the threshold value.

These results have important policy implications. Indeed, sub-Saharan Africa countries have, over the years, invested in human capital accumulation. However, there is a need for such investment to reach a particular level before it might have an effect. SSA countries should boost human capital accumulation, beyond 4.67, to help counter the regressive behaviour of new business creation and deliver businesses that are more progressive. The risk of political will and misplacement of priorities in terms of government expenditure should be mitigated. This will result into firm commitments, through targeted policies and programmes that will ensure a coordinated and collective approach to enhance human capital accumulation. Furthermore, the responsibility should not just be left to governments. The involvement of local entrepreneurs and developmental partners can be of great support. Such support could be in the form of training and development levies.

Future research may focus on country-specific case studies to investigate how in each country, human capital and entrepreneurship may stimulate economic growth in tandem.

References:

Abosede, A.J. & Onakoya, A.B. (2013), "Entrepreneurship, economic development and inclusive growth", *International Journal of Arts and Entrepreneurship*, 1(3), 375-387.

Acs, Z.J. & Armington, C. (2006), "New firm survival and human capital", In: C. Karlsson, B. Johansson and R. Stough (Eds.), *Entrepreneurship and Dynamics in the Knowledge Economy* (pp. 141-164). London: Routledge.

Acs, Z.J. & Audretsch, D.B. (1987), "Innovation in large and small firms", *Economics Letters,* 23(1), 109-112.

Acs, Z.J., Audretsch, D.B., Braunerhjelm, P., & Carlsson, B. (2006), *Growth and Entrepreneurship: An Empirical Assessment*, CEPR Discussion Paper No. 5409. Available at SSRN: https://ssrn.com/abstract=893068

Acs, Z.J., Autio, E., & Szerb, L. (2014), "National Systems of Entrepreneurship: Measurement issues and policy implications", *Research Policy*, 43(3), 476-494.

Acs, Z.J., Braunerhjelm, P., Audretsch, D.B., & Carlsson, B. (2009), "The Knowledge Spillover Theory of Entrepreneurship", *Small Business Economics*, 32(1), 15-30.

Acs, Z.J., Desai, S., & Hessels, J. (2008), "Entrepreneurship, economic development and instititions", *Small Business Economics*, 31(3), 219-234.

Aghion, P. (2017), "Entrepreneurship and growth: Lessons from an intellectual journey", *Small Business Economics*, 48(1), 9-24.

Aghion, P., Howitt, P., & Mayer-Foulkes, D. (2005), "The effect of financial development on convergence: Theory and evidence", *Quarterly Journal of Economics*, 120(1), 173-222.

Ahsan, H. & Haque, E.M. (2017), "Threshold effects of human capital: Schooling and economic growth", *Economics Letters*, 156, 48-52.

Amorós, J.E., Fernandez, C., & Tapia, J. (2012), "Quantifying the relationship between entrepreneurship and competitiveness development stages in Latin America", *International Entrepreneurship and Management Journal*, 8(3), 249-270.

Audretsch, D.B., Lehmann, E.E., & Warning, S. (2005), "University spillovers and new firm location", *Research Policy*, 34(7), 1113-1122.

Baltagi, B.H., Bratberg, E., & Holmas, T.H. (2005), "A panel data study of physicians' labor supply: The case of Norway", *Health Economics*, 14(10), 1035-1045.

Barro, R.J. (1991), "Economic growth in a cross-section of countries", *Quarterly Journal of Economics*, 106(2), 407-443.

Becker, G.S. (1962), "Investment in human capital: A theoretical analysis", *Journal of Political Economy*, 70(5, Part 2), 9-49.

Benhabib, J. & Spiegel, M.M. (1994), "The role of human capital in economic development: Evidence from aggregate cross-country data", *Journal of Monetary Economics*, 34(2), 143-173.

Bodman, P. & Le, T. (2013), "Assessing the roles that absorptive capacity and economic distance play in the foreign direct investment-productivity growth nexus", *Applied Economics*, 45(8), 1027-1039.

Bosma, N., Van Praag, M., Thurik, R., & De Wit, G. (2004), "The value of human and social capital investments for the business performance of startups", *Small Business Economics*, 23(3), 227-236.

Colombo, M.G. & Grilli, L. (2005), "Founders' human capital and the growth of new technology-based firms: A competence-based view", *Research Policy*, 34(6), 795-816.

Dvouletý, O. & Orel, M. (2019), "Entrepreneurial activity and its determinants: Findings from African developing countries", in: V. Ratten, P. Jones, V. Braga and C.S. Marques (Eds.), *Sustainable Entrepreneurship: The Role of Collaboration in the Global Economy* (pp. 9-24). Cham, Switzerland: Springer.

Ehrlich, I., Li, D., & Liu, Z. (2017), "The role of entrepreneurial human capital as a driver of endogenous economic growth", *Journal of Human Capital*, 11(3), 310-351.

Fritsch, M. & Schroeter, A. (2011), "Why does the effect of new business formation differ across regions?", *Small Business Economics*, 36(4), 383-400.

Galindo, M.-A. & Mendez, M.T. (2014), "Entrepreneurship, economic growth, and innovation: Are feedback effects at work?", *Journal of Business Research*, 67(5), 825-829.

Hansen, B.E. (1999), "Threshold effects in non-dynamic panels: Estimation, testing, and inference", *Journal of Econometrics*, 93(2), 345-368.

Hanushek, E.A. (2013), "Economic growth in developing countries: The role of human capital", *Economics of Education Review*, 37, 204-212.

Hartog, J., Van Praag, M., & Van der Sluis, J. (2010), "If you are so smart, why aren't you an entrepreneur? Returns to cognitive and social ability: Entrepreneurs versus employees", *Journal of Economics & Management Strategy*, 19(4), 947-989.

Henrekson, M. & Johansson, D. (2008), "Competencies and institutions fostering high-growth firms", *Foundations and Trends in Entrepreneurship*, 5(1), 1-80.

Igwe, P.A., Onjewu, A.E., & Nwibo, S.U. (2018), "Entrepreneurship and SMEs' productivity challenges in Sub-Saharan Africa", in: L.-P. Dana, V. Ratten and B.Q. Honyenuga (Eds.), *African Entrepreneurship: Challenges and Opportunities for Doing Business* (pp. 189-221). Cham, Switzerland: Palgrave Macmillan.

Isenberg, D.J. (2010), "How to start an entrepreneurial revolution", *Harvard Business Review*, 88(6), 40-50.

Klapper, L. & Richmond, C. (2011). "Patterns of business creation, survival and growth: Evidence from Africa", *Labour Economics*, 18(S1), S32-S44.

Klapper, L., Love, I., & Randall, D. (2015), "New firm registration and the business cycle", *International Entrepreneurship and Management Journal*, 11(2), 287-306.

Koellinger, P. & Thurik, R. (2012), "Entrepreneurship and the business cycle", *Review of Economics and Statistics*, 94(4), 1143-1156.

Koudstaal, M., Sloof, R., & Van Praag, M. (2016), "Risk, uncertainty, and entrepreneurship: Evidence from a lab-in-the-field experiment", *Management Science*, 62(10), 2897-2915.

Kremer, S., Bick, A., & Nautz, D. (2013), "Inflation and growth: New evidence from a dynamic panel threshold analysis", *Empirical Economics*, 44(2), 861-878.

Lackéus, M. (2014), "An emotion based approach to assessing entrepreneurial education", *International Journal of Management Education*, 12(3), 374-396.

Lafuente, E., Szerb, L., & Acs, Z.J. (2016), "Country level efficiency and national systems of entrepreneurship: A data envelopment analysis approach", *Journal of Technology Transfer*, 41(6), 1260-1283.

Lafuente, E., Szerb, L., & Acs, Z.J. (2018), *The Entrepreneurship Paradox: More Entrepreneurs Are Not Always Good for the Economy – The Role of the Entrepreneurial Ecosystem on Economic Performance in Africa*. Available at SSRN: https://ssrn.com/abstract=3307617

Legas, H. (2015), "Challenges to entrepreneurial success in sub-Saharan Africa: A comparative perspective", *Journal of Business and Management, 7*(11), 23-35.

Lucas Jr, R.E. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, 22(1), 3-42.

Lucas Jr, R.E. (1990), "Supply-side economics: An analytical review", *Oxford Economic Papers*, 42(2), 293-316.

Lucas Jr, R.E. (2015), "Human capital and growth", *American Economic Review*, 105(5), 85-88.

Marvel, M.R., Davis, J.L., & Sproul, C.R. (2016), "Human capital and entrepreneurship research: A critical review and future directions", *Entrepreneurship: Theory and Practice*, 40(3), 599-626.

Minniti, M. & Lévesque, M. (2010), "Entrepreneurial types and economic development", *Journal of Business Venturing*, 25(3), 305-314.

Nelson, R.R. & Phelps, E.S. (1966), "Investment in humans, technological diffusion, and economic growth", *American Economic Review*, 56(1-2), 69-75.

Nkurunziza, J.D. (2010), "The effect of credit on firm growth and survival in Kenyan manufacturing", *Journal of International Trade & Economic Development*, 19(3), 465-494.

Nxazonke, B. & van Wyk, R.B. (2020), "The role of foreign direct investment (FDI) on domestic entrepreneurship in South Africa", *Development Southern Africa*, 37(4), 587-600.

Ogundari, K. & Awokuse, T. (2018), "Human capital contribution to economic growth in Sub-Saharan Africa: Does health status matter more than education?", *Economic Analysis and Policy*, 58, 131-140.

Osiobe, E. U. (2019), "A literature review of human capital and economic growth", *Business and Economic Research*, 9(4), 179-196.

Pelinescu, E. (2015), "The impact of human capital on economic growth", *Procedia Economics and Finance*, 22, 184-190.

Ramirez-Rondan, N.R. (2013), *Essays on Dynamic Panel Threshold Models*, Doctoral dissertation, University of Wisconsin-Madison.

Reynolds, P.D. (2005), "Understanding business creation: Serendipity and scope in two decades of business creation studies", *Small Business Economics*, 24(4), 359-364.

Rodrigues, D.R. (2018), *The Impact of (Opportunity and Necessity) Entrepreneurship on Economic Growth: Does Human Capital Matter?* Masters Dissertation, Universidade do Porto.

Romer, P.M. (1990), "Capital, labor, and productivity", *Brookings Papers on Economic Activity. Microeconomics*, 1990, 337-367.

Schultz, T.W. (1961), "Investment in human capital", *American Economic Review*, 51(1), 1-17.

Schumpeter, J.A. (1934), *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Stam, E. (2015), "Entrepreneurial ecosystems and regional policy: A sympathetic critique", *European Planning Studies*, 23(9), 1759-1769.

Stam, E. & Spigel, B. (2016), *Entrepreneurial Ecosystems*, USE Discussion paper series, No. 16-13. Utrecht, Netherlands: Utrecht School of Economics, Utrecht University.

Stoica, O., Roman, A., & Rusu, V.D. (2020), "The nexus between entrepreneurship and economic growth: A comparative analysis on groups of countries", *Sustainability*, 12(3), article 1186.

Szerb, L., Lafuente, E., Horvath, K., & Pager, B. (2019), "The relevance of quantity and quality entrepreneurship for regional performance: The moderating role of the entrepreneurial ecosystem", *Regional Studies*, 53(9), 1308-1320.

Unger, J.M., Rauch, A., Frese, M., & Rosenbusch, N. (2011), "Human capital and entrepreneurial success: A meta-analytical review", *Journal of Business Venturing*, 26(3), 341-358.

Urbano, D. & Aparicio, S. (2016), "Entrepreneurship capital types and economic growth: International evidence", *Technological Forecasting and Social Change*, 102, 34-44.

Van Gelderen, M., Brand, M., Van Praag, M., Bodewes, W., Poutsma, E., & Van Gils, A. (2008), "Explaining entrepreneurial intentions by means of the theory of planned behaviour", *Career Development International*, 13(6), 538-559.

Van der Sluis, J., Van Praag, M., & Vijverberg, W. (2008), "Education and entrepreneurship selection and performance: A review of the empirical literature", *Journal of Economic Surveys*, 22(5), 795-841.

Van Stel, A., Carree, M., & Thurik, R. (2005), "The effect of entrepreneurial activity on national economic growth", *Small Business Economics*, 24(3), 311-321.

Verheul, I., Wennekers, S., Audretsch, D., & Thurik, R. (2002), "An eclectic theory of entrepreneurship: Policies, institutions and culture". In: *Entrepreneurship: Determinants and Policy in a European-US Comparison* (pp. 11-81). Boston, MA: Springer.

Vyas, V. & Vyas, R. (2019), "Entrepreneurship and economic growth: A review and synthesis of conceptual arguments and empirical evidence", *International Review of Entrepreneurship*, 17(3), 231-256.

Wennekers, S., Van Stel, A., Thurik, R., & Reynolds, P. (2005), "Nascent entrepreneurship and the level of economic development", *Small Business Economics*, 24(3), 293-309.

Widarni, E.L. & Bawono, S. (2021), "The comparation of foreign financial investment and human investment effect on economic in Indonesia base on macro economic point of view", *Studies of Applied Economics*, 39(12), article 25.

Wong, P.K., Ho, Y.P., & Autio, E. (2005), "Entrepreneurship, innovation and economic growth: Evidence from GEM data", *Small Business Economics*, 24(3), 335-350.