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Entrepreneurial ecosystems quality and productive entrepreneurship: entrepreneurial attitude as a mediator in early-stage and high-growth activities

Abstract

This study examines the mediation effects of entrepreneurial attitudes (EA) on the nexus of the entrepreneurial ecosystem (EE) quality and productive entrepreneurship for early-stage and high-growth entrepreneurial activities. The study employs global entrepreneurship monitor (GEM) panel data of 137 economies from 2014 to 2018. Random effect panel regressions and relative effect size estimations were used for data analysis. Our findings show complementary mediation effects suggesting that EE quality steers entrepreneurial activities via the EA. However, such mediation is much more vivid towards high growth than early-stage activities. Vibrant EEs provide necessary resources that boost the attitude of potential and nascent entrepreneurs to engage in early stage and high-growth entrepreneurial activities. The study utilizes GEM data to explain the EEs and EA dynamics and their related effects on entrepreneurship at the macro level. Future research may study the phenomena by using micro level data. The paper explores a less empirically researched question on how EEs steer entrepreneurship growth and development. It reveals a need for new perspectives/logics (e.g., mediation/moderation) for improving the explanations on the extant EEs framework. It further informs policymakers and practitioners to design entrepreneur-centred EE policies and programs.

Keywords: *entrepreneurial ecosystems, entrepreneurial attitude, high-growth start-ups, early-stage start-ups, effect size*

4. Introduction

The dramatic increase of entrepreneurs and new ventures globally has triggered various initiatives, strategies, and policies as an attempt to support entrepreneurial growth and sustainability (Audretsch & Belitski, 2017; Hunt, 2015). The initiatives to establish conducive environments for new ventures have led to the birth of the concept of entrepreneurial ecosystems which is referred to a set of interconnected elements such as leadership, culture, capital, markets, human skills, and support that holistically foster entrepreneurship development and consequently promote economic growth and social welfare (Isenberg, 2010; Tracy et al., 2018). While the concept has increasingly captured the attention of scholars, practitioners, and policymakers, the extant body of knowledge on its theorizing is dominated by conceptual works which suffer from insufficient empirical validation (Malecki, 2018).

Moreover, while some studies conceptualize the direct relationship between eco factors that define the EE quality and productive entrepreneurship as an eco-output (Nicotra et al., 2018), few recent empirical studies reveal contradictory findings that open room for further inquiry. For instance, Corrente et al. (2019) document a direct relationship between eco-factors and eco-output in European countries (developed economies) whereas Kansheba (2020) shows that such relationship in the context of developing countries using Sub-Saharan African economies is an indirect one and more pronounced when mediated by innovations. Inadequate conclusive evidence on the direct causal relationship between eco-factors and eco-outputs of the EEs calls upon a need for further inquiry to explore other logics that have the potentials of improving the current theorizing on the existing EE framework.

This study builds on the entrepreneur-centric view of the EEs to fill the above gap by postulating the mediating role of entrepreneurial attitude on the relationship between EE quality and successful entrepreneurial activities. Entrepreneurs and start-ups are focal and key drivers of the ecosystems (Acs et al., 2018). These are the ones that initiate entrepreneurial decisions about what, where, and when to invest, innovate, when to start, or expand the venture (Isenberg, 2010). Supports from other EEs actors such as financial providers, training and education institutions, business incubators and accelerators, community, government need to be strategically directed towards enhancing efficient and effective entrepreneurial participations, processes, and performance among entrepreneurs and their startups (Audretsch & Belitski, 2017). The idea is that the stronger the EE vibrance (quality) characterized by abundance of actors and their variant supporting activities, the higher the entrepreneurial

attitude and morale by entrepreneurs, and ultimately the higher the birth rate of early-stage and high-growth entrepreneurial activities (Atiese et al., 2018). Vibrant EEs are habitats that provide necessary tangible (e.g., financial capital and supporting infrastructures) and intangible resources (e.g., appropriate knowledge and skills, motivation, and networking) which increase one's entrepreneurial morale (Hunt, 2015). We consider whether entrepreneurial attitude can improve the explanation about how vibrant EEs foster entrepreneurial processes and development.

Despite the growing recognition of EE research, there is a limited understanding of the concept at both the micro (local) level and the macro (country) level (Kansheba and Wald, 2020). Micro and macro level insights on EEs are important for informing theorizing as well as policy making (Nicotra et al., 2018; Isenberg, 2010). The present paper aims at filling the later gap by employing the Global Entrepreneurship Monitor (GEM) panel data of 137 economies over the period of 2014 to 2018 to test the postulated relationships. Moreover, we add to the few empirical contributions on EE at the national level such as Acs et al. (2018), Corrente et al. (2019), and Kansheba (2020). Our findings suggest a positive (complementary) mediation effect indicating that the influence of EE quality in steering entrepreneurial activities is more pronounced when mediated by the entrepreneurial attitude. Vibrant EEs provide necessary resources that boost the attitude of potential and nascent entrepreneurs to engage in early-stage and high-growth entrepreneurial activities.

The article proceeds as follows. Section 2 presents a literature review on the concepts of productive entrepreneurship and the role of the EEs. It further discusses the mediation role of entrepreneurial attitude. Section 3 introduces the data and methods. Section 4 presents empirical findings and discussion. Section 5 concludes the paper by summarizing the implications of the study and developing suggestions for future research.

4.1. Literature Review and Hypotheses Development

4.1.1 Productive entrepreneurship: early-stage and high-growth entrepreneurial activities

Baumol (1990) and Acs et al. (2017) refer to productive entrepreneurship as any productive entrepreneurial activity that contributes directly or indirectly to the net output of the economy or capacity to produce additional output and ultimately increase total welfare. Nicotra et. al

(2018) further added that the total value creation by productive entrepreneurship should exceed the sum of the value created by individual entrepreneurs. Targeting and stirring productive entrepreneurship promote innovation, competition, and market efficiency that finally increase people`s welfare (Audretsch & Belitski 2017). Customers get access to a wide variety of goods and services due to the presence of quality and differentiated products from new entrants and incumbents. Nicotra et al. (2018) classify productive entrepreneurial activities into two as early-stage and high-growth entrepreneurial activities.

Early-stage entrepreneurial activities are comprised of both potential and nascent entrepreneurs; people who are engaged in the process of creating new ventures (Herrington et al., 2015). Additionally, Acs et al. (2018) in their GEM report refer to (total) early-stage entrepreneurial activity (TEA rate) as the percentage of an economy's 18–64-year-old population who are either a nascent entrepreneur actively planning to start a new business or owner-manager of a new business within the first 42 months of starting. TEA rates are commonly used as a benchmark to understand the quality and nature of early-stage entrepreneurship and their economic effects among economies (Atiase et al., 2018). The economies ranked lower in terms of TEA have more necessity-driven entrepreneurs (those that join entrepreneurial processes because they had no other options for job) while economies with higher TEA rate, such as e.g., Sweden, have more of opportunity-driven entrepreneurs who always join entrepreneurial processes as an avenue to explore business opportunities (Draghici et al., 2014). To that end, high rates of early-stage entrepreneurial activities, particularly those that are opportunity-driven, entails that the entrepreneurial atmosphere in a certain economy is dynamic and vibrant (Shinnar & Zamantılı nayır, 2019), and that the formal employment sector is sufficiently strong to provide work for those who would rather not become entrepreneurs (Acs et al., 2018).

On the other hand, high growth entrepreneurial activities are regarded as generators of positive outcomes to an economy (Yang and Li, 2008). These are ventures that exhibit great ambition for growth and have a potential strategy for realizing this ambition (Tracy et al., 2018). However, high growth start-ups are normally rare, take time to be formed, technology demanding, and therefore few entrepreneurs can sustain their business to that level (Peci et al., 2012). Despite being few, high growth start-ups provide substantial contribution to economic growth and development. Thus, Autio (2009) concluded that government support and initiatives should not be confined towards emphasizing the establishment of entrepreneurial

ventures per se, but also towards encouraging innovations that accelerate scale up and high growth of those established ventures (Isenberg, 2010).

4.1.2. Entrepreneurial ecosystem and its role in fostering productive entrepreneurship

The concept of entrepreneurial ecosystems has been used to express, explicate, and convey views and frameworks on how businesses interact with their environments (Colombo & Dagnino, 2017). Firms within entrepreneurial ecosystems have additional benefits other than their resources and capabilities (Acs et al., 2017). These additional benefits are derived from a wide network of different players, shared resources, knowledge accumulation, and knowledge transfer within and from outside the ecosystem (Castillo et al., 2017). Recent research on entrepreneurial ecosystems is dominated by conceptual work and case studies (Kansheba & Wald, 2020), and often based on the framework coined by Isenberg (2010).

The term entrepreneurial ecosystem has been defined by various scholars and in different ways. While some scholars have associated the concept with geographical boundaries, others have viewed the concept beyond the geographical limitations as a network that is not locally confined (Kansheba and Wald, 2020). For instance, Cohen (2006) and Spingel (2017) refer to an EE as a union of localized or interconnected elements and actors such as cultural outlooks, social networks, investment capital, universities and active economic policies that support and facilitate creation of innovative ventures. Furthermore, Malecki (2018) points out the effects of globalisation in fostering entrepreneurial environments. Through technological advancement and globalisation, members of the certain EE can fetch necessary resources even beyond their existing EE through new means of entrepreneurial financing such as crowdfunding and crowdsourcing (Maroufkhani et al., 2018). Accordingly, Philip (2017) and Theodoraki et al. (2018) document that an entrepreneurial ecosystem is an interconnected system with multiple players at both micro- and macro-level, entrepreneurial organizations such as venture capital providers, business angels and banks; various institutions such as universities and public sector agencies; and companies (both as start-ups and large), that formally or informally connect, mediate and foster entrepreneurship development which in turn promotes economic growth and social welfare (Katharina, 2020).

Extant studies have focused on categorizing success eco-factors that improve the quality of entrepreneurial ecosystems (Malecki, 2018) with very few studies analysing the causal

relationships between EEs and entrepreneurial performance and development (Audretsch & Belitski, 2017). The impact of EEs differs from one country to another due to contextual characteristics that distinguish them. For instance, unlike developing economies, developed economies have better infrastructures and complementary between formal and informal institutions that foster entrepreneurial activities (Williams & Vorley, 2017). Furthermore, some economic regions are attractive for international businesses, for instance Europe (Corrente et al., 2019) and parts of the Middle East, due to their good networks which promote the vibrance of entrepreneurial ecosystems than in other regions.

Moreover, the dynamics of both early-stage and high-growth entrepreneurial activities depend on the quality of the EE the startups are operating in. However, according to Sánchez (2013), such dynamics are attributed with the presence of strategic policies and programs focused towards improving entrepreneurial environments. For instance, several developing countries are still characterized by poor entrepreneurial environments (Bretones & Radrikan, 2018). As a result, communities in these economies have low entrepreneurial morale due to a low support of entrepreneurial initiatives that finally hinder one's ability to discover and materialize new entrepreneurial potentials (Fitzsimmons & Douglas, 2005). Atiese et al. (2018) document that African countries need broad financial inclusion, strong, efficient, and effective state institutions to support entrepreneurship development. Besides, Kansheba (2020) concludes that to close the gap of poor entrepreneurial growth, entrepreneurial ecosystems in developing economies need to provide innovation-focused entrepreneurial supports to new start-ups. Thus, by supplying necessary entrepreneurial resources, EEs act as habitats for productive entrepreneurs with innovative ideas.

Nicotra et al. (2018) categorized eco-factors that define the EE quality into five forms of capital: financial, institutional, knowledge, social, and market capital (Ashenafi et al., 2021). They further propose the existence of the direct effect of eco-factors on productive entrepreneurship as an eco-output. The few recent studies that tested their propositions reveal different findings. For instance, Corrente et al. (2019) find a direct relationship between eco-factors and eco-output in European countries where cultural and social norms, government programs, and internal market dynamics being identified as most relevant eco-factors. However, Kansheba (2020) finds that the influence of eco-factors on eco-output in Sub-Saharan Africa becomes more pronounced when mediated by innovations. Such a variation in

findings and insufficient empirical conclusion open doors for further inquiry. We thus, hypothesize that:

H1a: EE quality positively influences early-stage entrepreneurial activities.

H1b: EE quality positively influences high-growth entrepreneurial activities.

4.1.3. The mediating role of entrepreneurial attitude in the nexus of entrepreneurial ecosystem and productive entrepreneurship

Carsrud and Brännback (2011) acknowledge that entrepreneurial attitudes is amongst critical and important but largely ignored topics in entrepreneurship research. Fayole and Gailly (2015) argue further that due to conventional tendency of entrepreneurship research to borrow from other disciplines, it tends to decelerate potential knowledge growth in some productive line of research lines. For instance, Carsrud and Brännback (2011) comment that prior researchers abandoned the entrepreneurial trait as a research line due to failure in demonstrating personality traits that would uniquely describe an entrepreneur. Similar attempts were noted in management science where scholars tried to discriminate managerial traits from entrepreneurial traits for both organisational and entrepreneurial success (Angulo-Guerrero et al., 2017). Eventually this led to research focus shift towards the embedded interrelatedness between entrepreneurial traits and entrepreneurial processes and activities (Carsrud and Brännback, 2011).

Avlonitis and Salavou (2007) refer to entrepreneurial attitude as one of the individual entrepreneurial traits that encompass one's feelings, thoughts, and conation towards entrepreneurship (Çolakoğlua and Gözükar, 2016). Moreover, Thomas and Muller (2000) regard entrepreneurial attitude as an essential personality trait that involves the need for achievement and growth, innovativeness, risk-taking as well as ambiguity tolerance that all together motivate an individual to undertake entrepreneurial actions and participate in entrepreneurial activities (Acs et al., 2018). It is also the perceptions toward the value, benefit, and favourability of entrepreneurship which affect (positively or negatively) entrepreneurs' intentions to step into new venture creation (Ajzen, 2002). Bosma and Schutjens (2011) posit further that entrepreneurial attitude is composed of fear of failure in starting business, perceptions on startup opportunities and self-assessment of personal capabilities to start a business.

Entrepreneurial traits, such as attitude, are believed to be prerequisite characteristics in fostering entrepreneurial activities (Schillo et al., 2016). Entrepreneurial attitude has been proven to be an essential predictor of entrepreneurial processes including the intention to start-up (join), and scale-up entrepreneurial activities (venture creation and growth) (Jason and Evan, 2005). For instance, Draghici et al. (2014) document that the failure of the “Lisbon strategy” for making the EU the world’s most competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion was due to incapacity in stimulating entrepreneurial attitude which resulted in a relatively poor impact on economic growth. To that end, encouraging and strengthening the entrepreneurial attitude is crucial and necessary for successful entrepreneurial (both early-stage and high growth) activities.

Entrepreneurial attitudes at either (psychological/individual) micro level (Colakoğlu, & Gözükarab, 2016; Amidzic, 2019) or (sociological/country) macro level (Draghici et al., 2014; Nitu-Antonie, 2017) are largely influenced by the EEs in which they operate in. It is reported that apart from internal motivations that influence the entrepreneurs there are also external motivations such as resources and opportunities (Mueller, 2006). Vibrant EEs provide for tangible resources (financial capital and infrastructures) and intangible resources (knowledge, skills, and networks) that develop and increase the entrepreneurial attitude of both potential and nascent entrepreneurs (Roundy, 2017). However, EEs are evolutionary in terms of their configurations and elements (Liguori et al., 2019). With that regard, entrepreneurial attitudes become dynamic given the changes in the quality of a particular EE (Mack & Mayer, 2015).

Thus, people with high entrepreneurial attitudes are more likely to engage in entrepreneurial activities and maximize their utilities than those with lower entrepreneurial attitude (Jason & Evan, 2005). Fitzsimons & Douglas, (2005) further posit that entrepreneurial attitude involves an individual’s ability to identify and utilize potential lucrative entrepreneurial opportunities and how culture supports and embraces entrepreneurial behaviours. People with higher entrepreneurial attitudes are more likely to participate in entrepreneurial activities and processes than those with lower attitudes (Ács et al., 2018). Moreover, entrepreneurs can benefit from social networks by developing social relationships through trust rather than opportunism (Frese, 2009).

Potential entrepreneurs have the chance to learn from experienced entrepreneurs and capitalize on their experiences or access start-up capital (Kwon & Arenius, 2010). Social backgrounds

that embrace entrepreneurial success and failure stories inculcate into people the entrepreneurial spirit to engage in entrepreneurial activities (Jason & Evan, 2005). Vibrant entrepreneurial ecosystems are habitats that nurture entrepreneurial attitudes and innovative ideas by supplying key and necessary resources required by potential and nascent entrepreneurs and start-ups for their growth (Shirokova et al., 2018). We thus hypothesize that:-

H2a: The entrepreneurial attitude mediates the association between the entrepreneurial ecosystem quality and early-stage entrepreneurial activities.

H2b: The entrepreneurial attitude mediates the association between the entrepreneurial ecosystem quality and high-growth entrepreneurial activities.

H3: The mediating effect of entrepreneurial attitude on the association between entrepreneurial ecosystem quality is stronger for high-growth entrepreneurial activities than for early-stage entrepreneurial activities.

Figure 4.1 integrates the hypotheses in a research model.

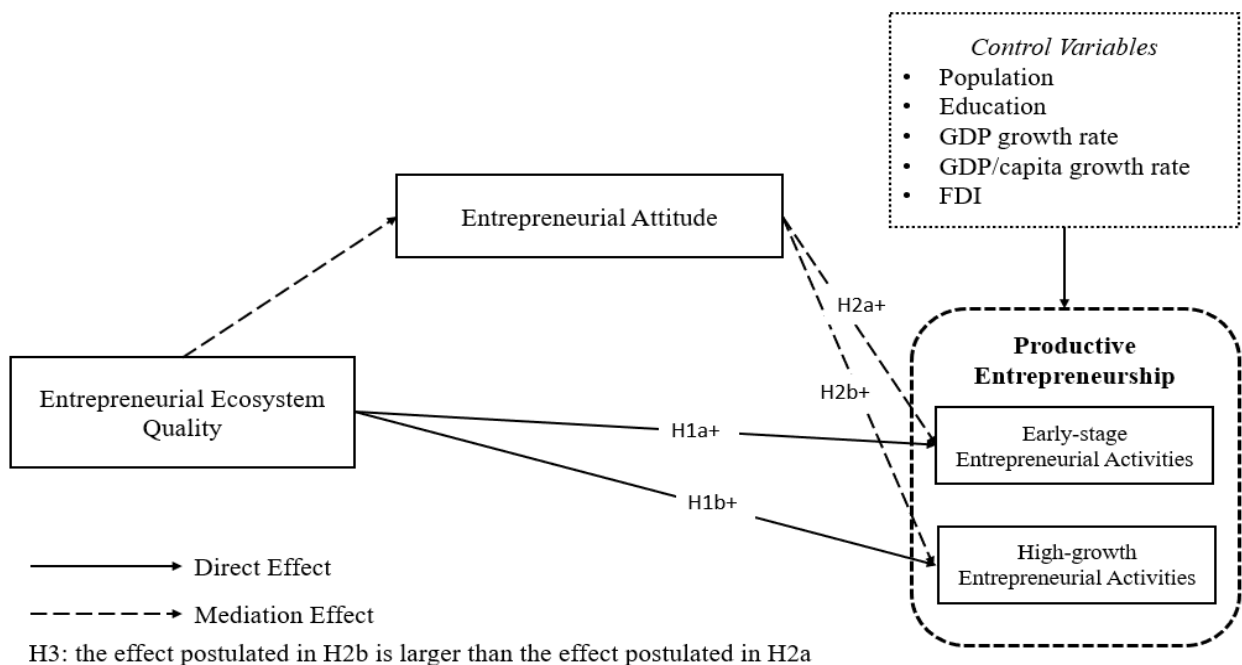


Figure 4.1: The research model

4.2. Data and Methods

4.2.1. Data

As posed by Corrente et al. (2019) among of the challenges encompassing EE empirical research is deciding on suitable constructs, data sources, and level of analysis. However, Nicotra et al. (2018) proposed the prevalent and widely used comprehensive panel data sets that can aid empirical validations of EE studies at different level of analysis including institutional and country level. Thus, following their study, we gathered data from the global entrepreneurship monitor (GEM) on 137 economies from 2014 to 2018. The GEM dataset is compiled from the annually administered national expert survey (NES) on experts from economies of different geographic areas and levels of economic development. The GEM dataset is preferable and used in this study as it harmonized, globally comparable data that presents entrepreneurial perception (at a country level) regarding the quality and depth of entrepreneurial ecosystems, attitude, and activities of different economies. We also gathered data (for the control variables) from other global databases including the World Bank and United Nations Development Program (UNDP). Appendix. 4.1 provides a summary of the variables, measurements, and data sources.

Dependent variables: The study uses the total early-stage entrepreneurial activity (TEA) and high-growth start-up rates as the indicators of the productive entrepreneurship. TEA represents the proportion of the working-age population that has an intention to start an entrepreneurial activity and/or has started one within the last three and a half years (Acs, et al., 2017). The high growth start-up rate represents the proportion of companies with business models that are designed to be repeatable and scalable (Nicotra et al., 2018). These indicators are suggested by Nicotra et al., (2018) and have been widely used in research (Herman & Szabo, 2014; Kansheba, 2020; Corrente et al., 2019).

Independent variable: The study employs 12 attributes (eco-factors) to represent the quality of entrepreneurial ecosystems (Nicotra et al., 2018; Corrente et al., 2019). These include i) access to finance, ii) governmental entrepreneurial support and policies, iii) taxes and bureaucracy, iv) governmental programs, v) physical infrastructures, vi) commercial and professional infrastructures, vii) post-school entrepreneurial education and training, viii) basic-school entrepreneurial education and training, ix) research and development transfer, x)

entrepreneurial supporting cultural social norms, xi) internal market dynamics, xii) internal market openness.

Mediating variable: Five items measure the mediating variable, the entrepreneurial attitude (Acs et al., 2018). These include i) entrepreneurial opportunity perception, ii) startup skills, and iii) risk acceptance. Exploitation of economic opportunities by entrepreneurs and/or entrepreneurial firms during the creation of new ventures or scale-up is attributed to their cognitive perceptions and risk-taking processes (Nitu-Antonie et al., 2017). Additionally, Nitu-Antonie et al. (2017) argued that enhancing entrepreneurial behaviours induces new and nascent entrepreneurs and start-ups to join entrepreneurial activities which in turn may explain market competitions and dynamics at the macro level.

To obtain aggregate indices for the entrepreneurial ecosystem quality and entrepreneurial attitude, we apply the normalization and arithmetic mean procedures (Corrente et al., 2019). The Eq. (1) shows how normalized value for each indicator was obtained while Eq. (2) and Eq. (3) show how normalized values were aggregated for each country (Draghici et al., 2014). The *NI* stands for normalized indicator, the I_{ijc} stands for the value of the indicator *i* for the period *j* for the country *c*, the I_i^{min} stands for the minimum value indicating lower (poor) entrepreneurial ecosystem quality or entrepreneurial attitude, the I_i^{max} stands for the maximum value indicating higher(better) entrepreneurial ecosystem quality or entrepreneurial attitude, the *AEEQ* stands for aggregated entrepreneurial ecosystem quality index, and *AATT* stands for aggregated entrepreneurial attitude index.

$$NI = (I_{ijc} - I_i^{min}) / (I_i^{max} - I_i^{min}) \dots \dots \dots (1)$$

$$AEEQ = (Sum\ of\ NI\ for\ EEQ\ for\ period\ j\ for\ particular\ country) / 12 \dots \dots \dots (2)$$

$$AATT = (Sum\ of\ NI\ for\ ATT\ for\ period\ j\ for\ particular\ country) / 3 \dots \dots \dots (3)$$

Control Variables: The study used control variables that may also influence the level of productive entrepreneurship in a country. These control variables are the size of the population, the education development level, the gross domestic product (GDP) growth rate, the GDP per capita growth rate, and foreign direct investment (FDI). Controlling for the impacts of these variables on productive entrepreneurship is crucial for a robust analysis (Atiese et al., 2018).

4.2.2. Model goodness-of-fit and estimation

We hypothesize that entrepreneurial attitude mediates the role of EE quality on productive entrepreneurship in terms of early-stage and high-growth entrepreneurial activities. We therefore employed panel regression model to examine the stated relationships where random effects (RE) estimator was selected over fixed effects (FE) estimator (Lensink et al., 2017). Additionally, we performed effect size estimations to examine the relative mediation effect size of the entrepreneurial attitude. To ensure model goodness-of-fit several regression assumptions were tested prior analysis (see Appendix 4.3). The Breusch-Pagan test results show the p-value of 0.247 above the benchmark of 0.05 indicating the absence of heteroskedasticity (Hausman & Taylor, 1981). The Pearson-wise correlation matrix (see Appendix 4.2) shows that all variables have the value below the benchmark of 7, suggesting the absence of serious multicollinearity problem (Kansheba, 2020). This is also supported by the variance inflation factor-VIF results where all explanatory variables are less than the cut off points of 5. The Shapiro-Wilk W normality test results show the p-value of 0.022 which is greater than 0.01 suggesting that residuals are normally distributed (Hair et al., 2010). The link test for model specification results shows the p-value of 0.085 is greater than 0.05 suggesting that the model is correctly specified (Lensink et al., 2017). Statistically significant F-statistics further confirms the goodness of fit of the model. Both the explanatory and mediating variables explain about 50 percent (R-squared-Overall) of the variation in the outcome variables.

4.3. Results

4.3.1. Descriptive Statistics

Table 4.1 reports the descriptive results of the studied variables. The productive entrepreneurship has the mean value of about 13 percent in terms of early-stage entrepreneurial activity and about 32 percent in terms of high-growth entrepreneurial activities. Furthermore, EE quality has the mean value of about 37 percent while entrepreneurial attitude has about 36 percent. Regarding to control variables, the mean value of population is 64 percent while that of education development being about 62 percent. The GDP growth rate has the mean value of about 3 percent while the GDP/capita growth has the mean value of about 0.02 percent. The foreign direct investment has the mean value of about 2 percent.

Table 4.1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Early-stage Entrepreneurial Activities	609	12.57	7.86	2.44	41.46
High-growth Entrepreneurial Activities	700	31.58	28.99	0.00	100.00
Entrepreneurial Ecosystem Quality	656	36.50	17.82	8.77	86.20
Entrepreneurial Attitude	656	35.83	18.17	4.10	84.40
Population	675	64.29	6.54	49.31	85.32
Education	696	61.83	19.79	0.00	92.65
GDP growth rate	670	3.21	3.29	-24.00	26.68
GDP/capita growth rate	700	0.02	0.03	-0.245	0.25
Foreign Direct Investment	590	2.30	9.15	-51.47	88.35
No. Countries	137				

4.3.2. *The panel regression results: Random Effect (RE)- estimates*

Tables 4.2 and 4.3 provide for the RE results on the mediation role of entrepreneurial attitude on the relationship between the EE quality and productive entrepreneurship in terms of early-stage and high growth entrepreneurial activities. Table 4.2 consists of model 1 to model 5 results. Model 1 presents the baseline model where the output variable, early-stage entrepreneurial activities is regressed with control variables only. At this stage only GDP growth and GDP/capita growth found to have statistically but mixed (positive and negative) significant influence on early-stage entrepreneurial activities. We postulated in H1a that the EE quality positively influences the early-stage entrepreneurial activities.

Thus, in models 2, the independent variable (EE quality), is added to the baseline. The results suggest the statistically significant and positive direct influence of the entrepreneurial ecosystem quality on the early-stage entrepreneurial activities (model 2). Models 4 and 5 present the results of the mediation role of entrepreneurial attitude on the role of the EE quality towards early-stage entrepreneurial activities. The results support H2a by indicating the full (indirect-only) positive mediation effect. The direct effect of the quality of entrepreneurial

ecosystem on early-stage entrepreneurial activities vanishes when entrepreneurial attitude mediates the relationship.

Table 4.2: The influence of the entrepreneurial ecosystem quality and entrepreneurial attitude on productive (early-stage) entrepreneurial activities: RE estimate

	<i>Early-stage Entrepreneurial Activities</i>		<i>Entrepreneurial Attitude</i>	<i>Early-stage Entrepreneurial Activities</i>	
	(1) Coef	(2) Coef	(3) Coef	(4) Coef	(5) Coef
Population	-0.016 (0.039)	-0.013 (0.040)	0.072** (0.035)	-0.038 (0.048)	-0.043 (0.046)
Education	-0.003 (0.025)	0.005 (0.027)	0.035* (0.019)	-0.004 (0.031)	0.003 (0.030)
GDP growth	0.955** (0.351)	0.928** (0.353)	0.513* (0.264)	0.937** (0.368)	0.883** (0.362)
GDP/Cap growth	-0.989** (0.357)	-0.963** (0.359)	-0.579** (0.269)	-0.933** (0.374)	-0.882** (0.367)
FDI	-0.002 (0.038)	0.002 (0.039)	-0.022 (0.024)	-0.006 (0.040)	0.003 (0.040)
Entrepreneurial Ecosystem Quality		0.21* (0.109)	0.881*** (0.018)		0.108 (0.063)
Entrepreneurial Attitude				0.067** (0.338)	0.113** (0.046)
_cons	0.109*** (0.025)	0.110*** (0.025)	-0.037* (0.022)	0.121*** (0.031)	0.128*** (0.030)
R-Squared (Overall)	0.039	0.043	0.89	0.493	0.497
Chi-Squared	8.67**	9.31**	26.43***	8.45**	12.49*
Observations	696	696	696	652	652
No. Countries	137	137	137	137	137

We further hypothesized that the EE quality positively influences the high-growth entrepreneurial activities (H1b). The results in model 7 in Table 4.3 support H1b by establishing that there is positive and statistically significant relationship between EE quality and high-growth activities. Moreover, results in Table 3 in model 9 also suggest the full

(indirect-only) positive mediation effects of the entrepreneurial attitude on the EE quality-High growth entrepreneurial activities relationship, thus supporting H2b.

Table 4.3: The influence of the entrepreneurial ecosystem quality and entrepreneurial attitude on productive (high growth) entrepreneurial activities: RE estimate

	<i>High-growth Entrepreneurial Activities</i>			
	(6) Coef	(7) Coef	(8) Coef	(9) Coef
Population	0.165 (0.119)	0.053 (0.087)	0.041 (0.127)	0.136 (0.1004)
Education	0.328*** (0.079)	-0.003 (0.068)	0.180 (0.089)	0.051 (0.074)
GDP growth	-1.220 (1.093)	0.109 (0.845)	-0.808 (1.049)	0.458 (0.862)
GDP/Cap growth	1.459 (1.110)	0.184 (0.854)	1.059 (1.057)	-0.364 (0.866)
FDI	0.184 (0.131)	0.008 (0.116)	0.116 (0.129)	-0.050 (0.116)
Entrepreneurial Ecosystem Quality		0.832*** (0.065)		0.811* (0.415)
Entrepreneurial Attitude			0.042** (0.021)	0.235** (0.097)
_cons	0.019 (0.075)	-0.007 (0.055)	0.053 (0.083)	-0.058 (0.066)
R-Squared (Overall)	0.116	0.319	0.471	0.483
Chi-Squared	38.29***	24.76***	25.95***	28.91***
Observations	696	696	652	652
No. Countries	137	137	137	137

The findings shown in Table 4.4 indicate that the mediating role of entrepreneurial attitude is much higher for high growth than for early-stage entrepreneurial activities. The intraclass correlation coefficient (ICC) suggests that the mediating effect of entrepreneurial attitude on high-growth entrepreneurial activities is twice the mediating effect on early-stage entrepreneurial activities.

Table 4.4: Mediation effect size between early-stage and high-growth entrepreneurial activities

	<i>Early-stage Entrep. Activities</i>		<i>High-growth Entrep. Activities</i>	
	Eta-Squared	df	Eta-Squared	df
Model	0.078	2	0.296	2
Entrepreneurial Ecosystem Quality	0.043	1	0.057	1
Entrepreneurial Attitude	0.067	1	0.167	1
F-Statistics	27.69*** (2, 653)		137.58*** (2, 653)	
Observations	656		656	
R-squared (Between)	0.46		0.61	
R-squared (Within)	0.13		0.38	
R-squared (Overall)	0.497		0.483	
Intraclass Correlation Coef (ICC)	1.39		2.65	

4.4. Discussion

Entrepreneurial ecosystems play a vital role in fostering entrepreneurship and economic development of a country. Established entrepreneurial ecosystems substantially contribute towards the creation of wealth, jobs, and improved competitiveness (Colombo & Dagnino, 2017). While there are many players within an entrepreneurial ecosystem, entrepreneurs and their respective start-up companies are central (Tracy et al., 2018). Therefore, efforts to foster entrepreneurial activities should concentrate on these players (Isenberg, 2010; Audretsch & Belitski, 2017). Accordingly, this study sought to examine direct effect of EE quality on the early-stage and high-growth entrepreneurial activities. The study further argues for the new perspective on the extant EE framework by postulating the potential mediation role of entrepreneurial attitude.

Our findings show that there is a positive relationship between EE quality and productive entrepreneurship in terms of early-stage and high growth entrepreneurial activities. Moreover,

the findings indicate that this relationship is positively (indirect only but complementary) mediated by the entrepreneurial attitude. This suggests that the influence of entrepreneurial ecosystem quality on fostering entrepreneurship at both early-stage and during scale up is more apparent through the mediation effect (Zhao & Chen, 2019). More specifically, the findings reveal that the magnitude of the mediation effect is more pronounced to high growth than early-stage entrepreneurial activities. The current findings provide for the possible reason on the conclusion drawn by Draghici et al. (2014) that developed economies experience more high growth start-ups than developing ones. Our findings also explain the assertion by Jose et al. (2019) that despite the presence of many new start-ups joining early-stage entrepreneurial activities in developing economies, these start-ups fail to attain substantial growth due to low entrepreneurial attitude of their owners.

As suggested by Isenberg (2011), research and policy focus should be towards emphasizing opportunity-driven (productive) entrepreneurial activities that are characterized by economic value addition and growth aspiration by new entrepreneurial entrants. The assumption behind this emphasis is that opportunity driven- and high-growth start-ups yield more outcomes (economic impact) than necessity-driven start-ups whose target is limited to merely joining the entrepreneurial activities with less growth aspiration (Nicotra et al., 2018). As pointed out by Acs et al. (2017), both early-stage and high-growth entrepreneurial activities do not take place in a vacuum, but they are influenced by the environments (ecosystems) in which entrepreneurs and their related start-ups operate in (Nitu-Antonie, 2017). Moreover, such ecosystems are characterised by a generic and specific set of economic and social frameworks that mirror the ability of a country to foster entrepreneurship (Isenberg, 2010) through enhancing entrepreneurial behaviours.

Additionally, Isenberg (2010) posits that vibrant entrepreneurial ecosystem transform behaviour through success and failure stories from experienced entrepreneurs which enrich the entrepreneurial understanding and knowledge of potential and nascent entrepreneurs. However, on the other hand, low entrepreneurial attitude has been associated with unsupportive entrepreneurial ecosystems. For instance, Atiese et al. (2018) document that poor EEs that are apparent in most of developing economies are attributed to poor technological advancement and un-supporting entrepreneurial culture. Supplementary, Sussan and Acs (2017) argue that in places where the level of information technology is still low, entrepreneurial networking is hampered which results in stagnant venture growth. Castillo et al. (2017) conclude further that,

unlike societies with non-supportive cultural norms and values towards entrepreneurial behaviours, societies that embrace entrepreneurial behaviour in their culture foster entrepreneurial creativity, innovation, and investment.

4.5. Conclusion

Although entrepreneurial ecosystems include a diverse set of elements and actors (Isenberg, 2010), key players within entrepreneurial ecosystems are the entrepreneurs and their respective start-up firms. While there is a growing body of literature on identifying key elements for successful entrepreneurial ecosystems, the field is still accompanied by limited, contradictory and inconclusive empirical findings. This study builds upon the entrepreneur-centred perspective of entrepreneurial ecosystems and examines the mediating role of entrepreneurial attitude on the linkage between EE quality and productive entrepreneurship in terms of early-stage and high growth entrepreneurial activities of 137 economies from 2014 to 2018. The findings establish the positive (indirect only but complementary) mediating effect of entrepreneurial attitude where such effect being more pronounced towards high growth than on early-stage entrepreneurial activities.

4.5.1. Theoretical implications

Our study contributes to the EE research through filling the theoretical and empirical gap by extending the existing conceptual frameworks on entrepreneurial ecosystems (Nicotra et al., 2018). Extant studies have focused on identifying key EE elements (eco-factors and eco-outputs) with limited empirical validation on their causal relationship. Few recent studies (e.g., Corrente et al., 2019 and Kansheba, 2020) that tested the existing EE framework provide conflicting conclusions which call for more inquiry on other logics that improve the explanation of the role of EEs in fostering entrepreneurship growth and development. To that end, current study argues for and provides empirical support for the indirect-only positive mediating role of entrepreneurial attitude on the relationship between EE quality and productive entrepreneurship in terms of early-stage and high growth activities. Vivacious entrepreneurial ecosystems boost entrepreneurial morale by providing key and necessary entrepreneurial tangible and intangible resources (Audretsch & Belitski, 2017) which in turn increase the rate of entrepreneurial activity engagement and high growth of potential and nascent entrepreneurs.

4.5.2. Practical implications

Our study informs policymakers that policies and programs targeted towards fostering EEs need to be entrepreneur (startup)-centred so that inculcate entrepreneurial traits to join and scale-up entrepreneurial activities. Our study also sheds light to nascent entrepreneurs (business owners) and managers of entrepreneurial ventures to leverage on the resource richness of their EEs in shaping their entrepreneurial behaviours and initiatives which ultimately results in gaining competitive advantage and improved performance. As argued by Audretsch and Belitski (2017) EEs supply key tangible (e.g., finance and infrastructure) and intangible (e.g., social network support) entrepreneurial resources necessary for venture creation and growth. For instance, social networks influence the speed at which the information and resources flow through the ecosystem as well as the interactions among participants (Roundy, 2017). Moreover, the significant influence of EE quality on entrepreneurial attitude implies a need for entrepreneurship education and training decision makers to appreciate the role of EEs in shaping entrepreneurial personality traits. EEs dynamics and how they affect entrepreneurial traits such as attitude can be taught and strengthened.

4.5.3. Limitations and area for further research

In this study we employed GEM dataset which presents a macro (country) overview of the quality and depth of entrepreneurial ecosystems. While national level insights of the EEs are important for the theorizing and policy making, we still acknowledge the need for micro level insights towards this objective. Thus, future research could enrich further our understanding of the current studied phenomenon by employing micro (individual, firm, or meta-organisation) level data. Future research may also explore other aspects/logics (e.g., mediation/moderation) that have potential to improve the explanations on the extant EEs framework. For instance, Sub-Saharan Africa despite being a resource-rich region and potential for entrepreneurial opportunities, the region is characterized by poor EE quality and low entrepreneurial activities. Future research could explore the hindering factors and possible mechanisms to revamp the quality of entrepreneurial ecosystems in this region.

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Appendices

Appendix 1. Summary of variable description and related data source.

Variable	Data Source
Productive Entrepreneurship	
Total early-stage entrepreneurial activities	GEDI
High growth startups rate	
Quality of Entrepreneurial Ecosystem	
i). <i>Access to finance</i> : The availability of financial resource for SMEs (including grants and subsidies)	
ii). <i>Governmental entrepreneurial support and policies</i> : Government focuses Entrepreneurship as a relevant economic agenda.	
iii). <i>Taxes and bureaucracy</i> : Government`s taxes or regulations are either size-neutral or encourage new and existing SMEs	
iv). <i>Governmental programs</i> : Government set quality programs directly assisting SMEs at all levels of government (national, regional, municipal)	GEDI
v). <i>Physical infrastructures</i> : Ease access to physical infrastructure (e.g. water, transport, electricity, telecommunication, land, space at affordable prices	
vi). <i>Commercial and professional infrastructures</i> : Support Structure e.g. availability of mentors/advisors, incubators/accelerators	
vii). <i>Post school entrepreneurial education and training</i> : The extent to which training in creating or managing SMEs is incorporated within the education and training system at higher learning institutions.	
viii). <i>Basic-school entrepreneurial education and training</i> : The extent to which training in creating or managing SMEs is incorporated within the education and training system at primary and secondary levels	
ix). <i>Research and Development transfer</i> : The extent to which national research and development will lead to new commercial opportunities and is available to SMEs	
x). <i>Entrepreneurial supporting cultural social norms</i> : The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income	
xi). <i>Internal market dynamics</i> : The level of change in markets from year to year	
xii). <i>Internal market openness</i> : The extent to which new firms are free to enter existing markets	
Population: pop aged 15-64 as % of total population	World Bank

Education Development: *Level of education as proxied based of four goals of Education for All (EFA)- universal primary education, adulty literacy, quality of education and gender.* UNDP

GDP/capita growth: *Growth domestic product per capita growth rate* World Bank

GDP growth: *Growth domestic product growth rate* World Bank

Foreign Direct Investment: *Flow as % of net GDP* World Bank

Appendix 2: Correlation and Variance Inflation Factor (VIF) results

Variable	VIF	1	2	3	4	5	6	7	8	9
1		1								
2	1.34	0.1235*	1							
3	1.1	-0.051	0.4634*	1						
4	2.44	-0.1146*	0.5587*	0.5455*	1					
5	1.12	-0.0302	0.1760*	0.2967*	0.2720*	1				
6	2.17	-0.0913*	0.3283*	0.5597*	0.5681*	0.4150*	1			
7	1.06	-0.0764*	0.0324	-0.0351	0.0007	0.0649	-0.0083	1		
8	2.36	0.0021	-0.0213	-	-	0.056	-	0.6168*	1	
9	1.54	-0.0467	0.1219*	0.1632*	0.2076*	0.1084*	0.1419*	0.0914*	0.0781*	1
Mean	1.46									

Note: 1=Early-stage entrepreneurial activities, 2= High-growth entrepreneurial activities, 3= Entrepreneurial attitude, 4= Entrepreneurial ecosystem quality, 5= Population, 6= Education, 7= GDP/capita growth, 8= GDP growth, 9= Foreign direct investment (FDI).

Appendix 3: Regression model assumptions

S/N	Regression Assumptions	Test(s)	We seek values
		<i>Breusch-Pagan hettest</i>	
1	No heteroskedasticity problem	Chi2(1): 1.341 p-value: 0.247	> 0.05
2	No multicollinearity problem	<i>VIF (See Appendix 2)</i>	< 5.00
		<i>Shapiro-Wilk W normality test</i>	
3	Residuals are normally distributed	z: 2.013 p-value: 0.022	> 0.01
		<i>Linktest</i>	
4	No specification problem	t: 1.724 p-value: 0.085	> 0.05
		<i>Test for appropriate functional form</i>	
5	No functional form problem	F(3,46):27.842 p-value: 0.0630	>0.05
6	No influential observations	<i>Cook's distance</i> no distance is above the cut-off	< 1.00