Quantifying the Relationship between Entrepreneurship and Competitiveness in Developing Countries

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Abstract

This research was primarily aimed at determining the effect of entrepreneurship on international competitiveness in the developing countries, with the hypothesis that entrepreneurship has a positive impact on international competitiveness in the developing countries during the study period, from 2011 to 2018. The VAR model was conducted, allowing each variable in the structure to be endogenous, followed by performing an impulse-response analysis and variance decomposition showing what percentage of fluctuations of an endogenous variable can be explained by itself and others.

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1) Introduction:

It is accepted globally that entrepreneurship is an important component of the world economy. Entrepreneurship contributes to the formation of new business opportunities, innovation, productivity, and growth to present many economic benefits. Therefore most governments give priority to support entrepreneurship. Entrepreneurship is a multidimensional concept as there is no single definition of entrepreneurship. There is no universally accepted definition of entrepreneurship, so having multiple definitions of entrepreneurship results in the existence of a large number of different measures of entrepreneurship.

Various theories of entrepreneurship may be explained from the viewpoints of economists, sociologists, and psychologists. These theories have been supported and given by various thinkers for more than two and a half centuries. As, theories of entrepreneurship evaluated through different schools of thought such as early and classical school, mainstream school, Austrian school, and Radical school.

Entrepreneurship helps to boost economic efficiency by introducing innovation, the competitiveness, and creating competition. Nonetheless, the competitive effect of these entrepreneurship activities varies between countries at various stages of development, as well as between regions within a single nation. A country's performance in today's globalized world is typically assessed by its competitiveness.

Competitiveness, in particular, is closely linked to the degree to which a country can concurrently raise its citizens' real incomes when producing globally needed goods and services under free and fair market economic circumstances. (Reda, 2012, p.1)

The central basis of this research is entrepreneurship's explanation of competitiveness, taking into account the relationship between corresponding phases of economic development. There is a great deal of variation in the degree of entrepreneurship and its time-series trend across countries. Many studies indicate that the stage of economic development is a significant factor in this diversity. This research also opens up many new research and debate avenues, and the findings can be useful in making policy decisions to boost innovation and entrepreneurship in developing countries as well as justifying the value of encouraging policies and projects along these lines.

2) Statement of the Problem:

Individuals in developing economies could be more motivated to start a company due to a lack of alternative income sources. Furthermore, developing nations could face less intense competition as well as an increasing demand for new products and services that correspond to the population's aspirations. So it is not enough to simply concentrate on new firm development and quantify potential GDP outcomes when discussing entrepreneurship and its impact on competitiveness of developing economies. Instead, one must differentiate between

companies that were started to take advantage of a specific market opportunity and those that were started out of necessity.

These issues are likely to reduce the effectiveness of the targeted positive effect of entrepreneurship on economic performance thus competitiveness; however, if these issues are addressed by emphasizing the importance of innovative entrepreneurship and simplifying the procedures and criteria for launching new businesses and ventures, economic competitiveness in developing economies will be improved, and better prospects will be available.

3) Hypothesis of the Study:

Our main hypothesis is that entrepreneurship is considered a significant factor that influencing international competitiveness in the developing countries. Also, starting from the four explanatory variables considered in our empirical analysis we formulate four sub-hypotheses, namely:

Hypothesis 1.1 High job creation expectation rate has positive impact on economic competitiveness of developing countries.
Hypothesis 1.2 Self-employment has a positive impact on economic competitiveness of developing countries.
Hypothesis 1.3 Innovation rate has a direct and positive impact on economic competitiveness of developing countries.
Hypothesis 1.4 Total early stage entrepreneurial activity has a positive impact on economic competitiveness of developing countries.

4) Methodology:

The study is based on both the deduction and the induction approaches and contains two main frameworks:

Firstly the research reviews the literature about the link between global competitiveness and economic development and the impact of entrepreneurship on international competitiveness, secondly, we test the hypotheses of the study by using panel data estimation techniques choosing as a dependent variable of the econometric model the international competitiveness of countries, while we used entrepreneurship as explanatory variable, as we measure entrepreneurship by varies indices such as; high job creation expectation rate, the rate of self-employment, innovation rate, and total early stage entrepreneurial activity; also we took into account the growth rate of gross domestic product as a control variable. The general equation adapted to the sample is described in the following by Equation (2):

$$GCI_{it} = \beta_0 + \beta_1\ JOBCR_{it} + \beta_2\ SELFEMP_{it}\ \beta_3\ INNOV_{it}\ \beta_4\ TEA_{it}\ \beta_5\ MacroEc_{it} + \alpha_i + \varepsilon_{it} \qquad (2)$$

To investigate a model with these features, we employ an autoregressive model (VAR), which is constructed by fitting a multivariate panel regression of each dependent variable on its own lags as well as the lags of all other dependent variables.

5) Linking Entrepreneurship, Economic Development, and Global Competitiveness:

Entrepreneurship is regarded as an essential strategy for development due to its work, innovation, and welfare impacts; moreover, the nature of entrepreneurship varies greatly depending on the degree of economic development. (Acs, Desai & Hessels, 2008, p.219) The degree and time-series trend of entrepreneurship vary greatly across economies and the effect of entrepreneurial activity on the economy varies according to entrepreneurship characteristics, which in turn relies on the stage of economic development. Some researchers showed a favorable association between entrepreneurship and economic development, while others showed the reverse. (Herman, 2018, p.426)

Entrepreneurship is at the center of national advantage; it is critical for implementing innovations because entrepreneurship is the demonstrable capacity and desire of people, working alone or in groups, to perceive and generate new economic possibilities just like (new products, new manufacturing processes, new operational schemes, and new product-business combinations), and to bring their innovations into the economy in the face of confusion and other challenges, through taking decisions on the location, type, and usage of resources and organizations. (Afolabi, 2015, p.52) Furthermore, entrepreneurship is critical to a country's economic growth. In many other words, there is a direct connection between entrepreneurship growth and economic development, with a rise in the number of entrepreneurs resulting in an increase in

economic growth. This influence is the consequence of their ability to articulate themselves concretely and their proclivity to invent. (Afolabi, 2015, pp.53-55)

Fortunately, it was discovered that entrepreneurship was positively correlated with a nation's overall economic development. And it is, entrepreneurship leads to economic development. (Pawitan, Nawangpalupi & Widyarini, 2017, p.263) Economic development, according to Schumpeter's theory, is dependent on inventions, which are searched out and adopted by entrepreneurs. (Do Carmo Farinha, 2015, P.22). The Schumpeterian entrepreneur aims to generate new profit prospects through his creative work. These opportunities can arise as a result of increased production, in which case their relationship to economic growth becomes apparent. (Afolabi, 2015, p.54) As a result, there are many ways in which entrepreneurship can influence economic development, such as by creative behavior. Entrepreneurs may bring significant developments into the market through the implementation of new products or the evolution of existing products, as well as changes in the manufacturing process and increased market competition. They can develop their knowledge of what might be technically feasible and also what consumers want by implementing market combinations of existing products and services. (Van Stel, et al., 2005, p.311)

The Global Economic Monitor indicates that nations with higher levels of entrepreneurial activity enjoy strong economic

growth. In short, entrepreneurs are the link between new ideas and economic development. As global competitiveness demonstrates the degree to which countries demonstrate their resilience and enhance their results, implying the level of growth of the economy; in many other words, the level of economic development of a country is valued by global competitiveness. (Corrigan, Crotti, Hanouz & Serin, 2014, p.55)

Furthermore, Porter (1990) and Porter et al. (2002) describe competitiveness in terms of a country's economic growth; moreover, competitiveness is evaluated in terms of the WEF country's competitiveness concept, which is described as the collection of influences, policies, and institutions that decide a nation's level of production while taking into consideration its level of development, They identified three distinct stages: factor-driven, efficiency-driven, and innovation-driven, as well as two transitions among these stages. (Acs et al., 2008, p.309)

Nations in the factor-driven stage are distinguished by low yield expense, a high proportion of entrepreneurial self - efficacy practices, inertia in innovation investment, and a slow external opening, so factor-driven countries compete based on low value-added goods or their resource endowment including such the natural resources and abundant supplies of cheap labor low-cost productivity improvements in the production goods. (Rusu & Tudose, 2018, p.46; Huggins, Izushi, Prokop & Thompson, 2014, p.265)

Countries must improve their manufacturing productivity and train their workers to be able to respond to the ensuing technological growth process in order to move into the second stage, the performance-driven stage. To compete in the second stage, economies should have productive manufacturing practices in big markets that enable businesses to take advantage of economies of scale. As a result, efficiency, which is focused on economies of scale, increases stress on and decreases the proportion of personal entrepreneurial activities. In this case, it is thought that entrepreneurial interest declines as the economy grows. (Acs et al., 2008, pp.309-310)

In recent years, analysts have come to understand the possible entrepreneurial innovation's input-completion and gap-filling abilities, as well as the important contribution of innovation and productivity to competitiveness and economic welfare. To transition into the third stage, the innovation-driven stage, societies must foster innovation in order to enter the technical frontier and thereby become a knowledge-based economy, which is exclusive to the innovation-driven stage. (Amorós, Fernández & Tapia, 2012, p.3)

Various studies indicate that entrepreneurship can lead to job creation, economic growth, and development across invention, thus increasing the country's competitiveness. As a result, entrepreneurial activity is regarded as central to innovation, competitiveness, economic development, and job creation. (Carree & Thurik, 2003, p.6)

6) Entrepreneurship Performance in some Developing Countries:
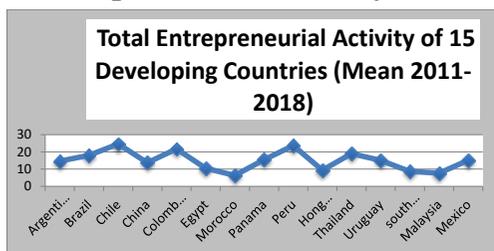
The degree to which economies participate in entrepreneurial activities varies greatly. Any of these distinctions are due to how entrepreneurial practice manifests itself: In some economies, there are a lot of self-employed people and startup businesses; in others, there are a lot of developed and medium-sized businesses; and in still others, there are a lot of entrepreneurial workers (often referred to as intrapreneurs) working for existing corporations. (Bosma, Hill, Ionescu, Kelley, Levie & Tarnawa2020, p.36)

Each of these various types of entrepreneurial operation contributes to a more sustainable economy in its own way. Intrapreneurs should ensure continuous innovation in larger companies, while startups represent dynamism and potentially "creative destruction" (where new businesses challenge and replace obsolete ones). Simultaneously, owner-managers of existing businesses (mostly known as small or medium-sized enterprises) also serve as an important foundation for an economy and society. We present the most indicators which used to measure the entrepreneurial activity to better understand entrepreneurial activities in the developing countries of our study. (GEM Global Entrepreneurship Report, 2019, p.36)

- **Total Entrepreneurial Activity in some Developing Countries**

It indicates the percentage of people aged 18 to 64 who are directly involved in launching a new business (labeled as a nascent entrepreneur) or who are currently running a new business (categorized as new business owners)

Figure 1.1 represents the average level of TEA for each economy[4] through the period (2011-2018). As the figure shows that Chile has the highest percentage of individuals engaged in an entrepreneurial activity with a mean of 24.5% during the period 2011-2018. Morocco and Malaysia are the countries that report the fewest volume of entrepreneurship with a mean percentage equal to 6% and 7.6% respectively.

Plotted by Researcher, Shown in Table 4.1 in Appendix
Source: Global Entrepreneurship Monitor, "GEM Global Entrepreneurship Reports from 2011 to2018 ", Adult Population Survey Data (APS).
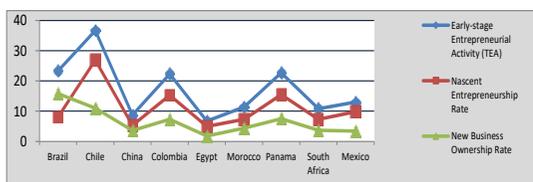
Figure 1.2 and 1.3 show the early-stage entrepreneurial and its components; nascent entrepreneurship and new business ownership scores and ranks during 2019 for some developing countries (only 9 countries were included from discussed countries)[5], as anticipated, it is obvious that a large percentage of TEA in each discussed developing countries represent

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[4] Countries that were included: Argentina, Brazil, Chile, China, Colombia, Egypt, Morocco, Panama, Peru, Hong Kong, Thailand, Uruguay, South Africa, Malaysia, and Mexico.

[5] As only nine developing countries out of fifteen discussed countries participated in 2019 GEM's report: (Brazil, Chile, China, Colombia, Egypt, Morocco, Panama, South Africa, Mexico).

nascent entrepreneurs except Brazil, where it scored 23.3 in TEA and the new business ownership rate recorded the highest percentage 15.8 out of nine countries achieving 4th rank in this area.

Figure 1.2 Early-stage Entrepreneurial, Nascent Entrepreneurship, and New Business Ownership Scores during 2019
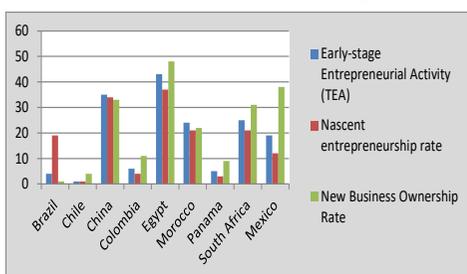
Plotted by the Researcher, Shown in Table 4.2 in Appendix
Source: Global Entrepreneurship Monitor Consortium, (2019), "*GEM Global Entrepreneurship Monitor*", *Global Report*.

Also, it is noticed that the levels of TEA are the lowest in Egypt and China (with a score equal to 6.7% and 8.7% respectively of adults starting or running a new business) where Egypt was ranked as 43rd countries and China as of 35th in TEA out of 50, and they scored 5 and 5.3 in NDE respectively while the new ownership rate for both countries recorded 1.8 and 3.6 and in Morocco and South Africa (each with just 11.4 and 10.8 respectively for TEA and 7.3 for NDE) and as all countries the new ownership rate is lower than nascent entrepreneurship with scores 4.4 and 3.7 respectively.

Figure 1.3 Early-stage Entrepreneurial, Nascent Entrepreneurship, and New Business Ownership Ranking during 2019

Plotted by the Researcher, Shown in Table 4.2 in Appendix
Source: Global Entrepreneurship Monitor Consortium, (2019), "GEM Global Entrepreneurship Monitor", Global Report.

Chile also has the highest TEA of 36.7, where more than one in every three adults is starting and operating a new firm, but it only scores 26.9 in nascent entrepreneurship. Encouragement of individuals to start businesses is a shared policy goal in the majority of economies. However, it is also critical to transforming such startups into long-term financially viable enterprises.

7) Assessing Competitiveness in some Developing Nations

Competitiveness is generally defined by the (WEF) as the group of individuals, policies, and circumstances that influence a country's level of production. In general, higher levels of productivity lead to higher levels of income and better rates of investment returns. Because rates of return are the most important determinants of an economy's growth rates, a more competitive economy is more likely to expand quickly in the medium to long term.
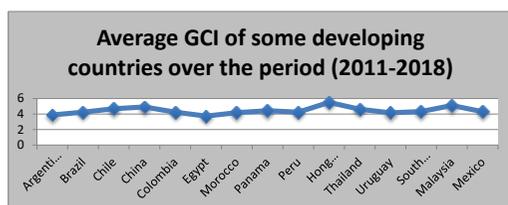

Figure 1.4 Evolution of Competitiveness of the Developing Countries Considered in the Analysis over the period (2011-2018)

Plotted by the Researcher, Shown in Table 4.5 in Appendix
Source: World Economic Forum, "GCR Global Competitiveness Reports ", Global Reports, (2011-2018).

As seen in Figure 1.4, the average economic competitiveness of discussed developing countries has experienced variations with a tendency to increase in the analyzed period. The lowest level

of average GCI was achieved in Egypt, and Argentina, where they recorded 3.7 and 3.9 respectively, while the highest average level was achieved in Hong Kong, Malaysia, and China where their average score was 5.5, 5, and 4.9 during the period 2011-2018.

8) Measuring the Impact of Entrepreneurship in promoting International Competitiveness in some Developing Countries

we test the hypotheses of the study by using panel data estimation techniques for some developing countries[6], shown in Table (2) in the appendix, choosing as a dependent variable of the econometric model the international competitiveness of countries, while we used entrepreneurship as explanatory variables, as we measure entrepreneurship by varies indices such as; high job creation expectation rate, the rate of self-employment, innovation rate, and total early stage entrepreneurial activity; also we took into account the growth rate of gross domestic product as a control variable. The data for the period 2011–2018 was collected from the World Economic Forum's Global Competitiveness Reports, Global Entrepreneurship Monitor, and the World Bank.

- **Unit Root Test**

Variables were subjected to unit root tests prior to econometric estimations to ensure that the data included in the study are

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[6] the country selection was based on data availability for the indicators measuring entrepreneurial activity and quality, our sample includes only fifteen countries.

stationary, so (Levin, Lin, and Chu test), (Im, Pesaran, and Shin test), and (ADF) test were used to assess whether or not panel data included the unit root. Thus, as shown in Table 1 in appendix, the global competitiveness index (GCI), self-employment (SELFEMP), job creation (JOBCR), innovation (INNOV), total entrepreneurship activity (TEA), and economic growth (GDPGRW) data become stable on the level that all the series are integrated by order zero.

- **Estimating VAR model**

To approximate the VAR model, we used lag-length selection criteria to determine the optimum length of lag periods in the VAR model. We ran the default VAR (2) model and then applied the lag length selection criterion. Most criteria opt for a 3 maximum lag length, given that all the criteria are efficient, and of the five criteria three suggest a 3-lag length compared to two suggesting a 4 maximum lag length. So, we follow the majority and choose the more general model suggested by the FPE, AIC, and SC. So in the VAR model, we used three lag intervals. That is, we ran a VAR (3) model. The panel VAR results indicate that all independent variables are explaining 92% of the changes of the dependent variables.
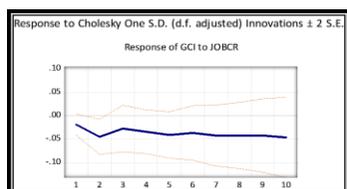
We used the concepts of impulse response function and variance decomposition to predict the mutual influences among entrepreneurship indices and the global competitiveness index in the analysis of a VAR model. The impulse response function describes how a single impulse arising from one of the

endogenous variables influences the changes in each endogenous variable.

- ▪ **Impulse Response of High Job Creation Expectation on Global Competitiveness Index**

The percentage of entrepreneurs who plan to build six or more jobs in the next five years is known as the high job creation expectation rate.
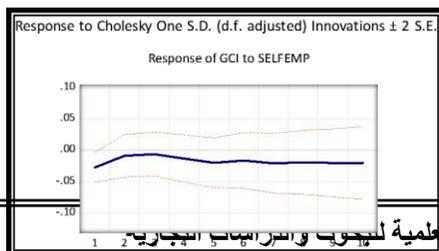

Source: Graphs have been drawn by the researcher using Eviews.edition11.

Figure 1.5 Impulse Response of Self-employmenton on GlobalCompetitiveness Index:

Figure 1.5 shows fluctuating responses, with the expectation of creating new jobs having a negative coefficient and statistically significant on the GCI of developing countries at the beginning of the period and increasing at the end of the period, implying that the expectation of creating new jobs has a negative coefficient and statistically significant on the GCI of developing countries. This finding contradicts the hypothesis that increasing job creation in future years would improve economic competitiveness.

- ▪ **Impulse Response of Self-employment on Global Competitiveness Index**

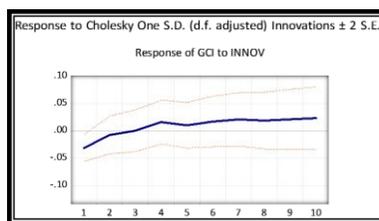Figure 1.6 below shows the impulse responses of the global competitiveness

Source: Graphs have been drawn by the researcher using Eviews.edition11.

index to shocks in self-employment over the next 10 periods in the discussed countries. As indicated in this graph that GCI of developing countries responds also negatively and significantly to self-employment shocks, while this relationship is a weak in the short run, it become a strong negative relationship in the long run; where the positive shock of self-employment will lead to a negative response in the global competitiveness of these countries. As a result, this relationship occurs because most self-employed individuals in developing countries are considered necessity driven entrepreneurs, i.e., individuals who pursue benefit in the absence of other sources of income and are only concerned with surviving, where these individuals decide to become entrepreneurs for survival purposes, and their activities do not aid market growth; they are not generally involved in creative business activities, and their activities do not aid competitiveness development.

- **Impulse Response of Innovation Rate on Global Competitiveness Index**

Shocks originating from other variables in the system are represented by the impulse response functions. Figure 1.7 shows that a shock to the innovation

Source: Graphs have been drawn by the researcher using Eviews.edition11.

variable reduces competitiveness at first, but the effect fluctuates over time, eventually showing an optimistic and upward trend in competitiveness after almost three years.

Figure 1.7 Impulse Response of Innovation Rate on Global Competitiveness Index:
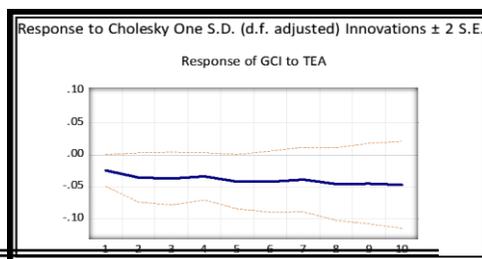
According to the findings in Figure 1.7, although the innovation rate in the discussed developing countries has a negative and statistically significant effect in the short run, this effect would become positive and significant in the long run, implying that the innovation rate has a significant impact on the developing countries' economic competitiveness in the long run. This finding indicates that greater entrepreneurial development, as measured by entrepreneurs' creation of new or improved goods or processes, boosts developing countries' long-term economic competitiveness, since innovation determines success and enhances productivity growth, which drives growth.

- **Impulse Response of Total Early Stage Entrepreneurial Activity on Global Competitiveness Index**

The impulse response functions of the developing countries model are shown in Figure 1.8.

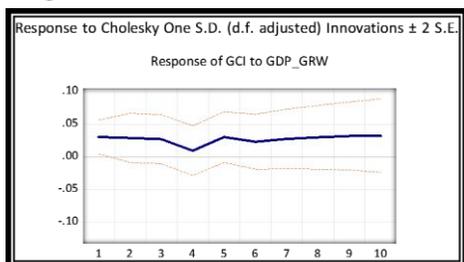**Figure 1.8 Impulse Response of Self-employment on Global Competitiveness Index:**

The impulse response functions show that the GCI of developing countries reacts negatively and substantially to total early stage entrepreneurial activity shocks, with a downward

Source: graphs have been drawn by the researcher using Eviews edition11.

trend after four years. Over time, the cumulative impact of total early-stage entrepreneurial activity builds up and escalates.

Impulse Response of Economic Growth on Global Competitiveness Index

Figure 1.9 shows that in the developing countries analyzed,

Source: Graphs have been drawn by the researcher using Eviews.edition11.

there is a long-term relationship between global competitiveness and annual gross domestic product growth rate. A one standard deviation GDP growth innovation has a positive and significant effect on global competitiveness.

Figure 1.9 Impulse Response of Economic Growth on Global Competitiveness Index:

The simulative effect of GDP growth cumulates and escalates over time, reaching its minimum after approximately four years, and then the response does rise steadily in response to one standard deviation shock in GDP growth rate and flatly fluctuates over the rest of the period. This suggests that an increase in GDP growth significantly increase competitiveness for the next 10 periods.

9) Variance Decomposition of Entrepreneurship Variables on Global Competitiveness Index

The predicted variances of each endogenous variable are decomposed through different channels, in percentages; to demonstrate how much of an endogenous variable's fluctuation can be explained by itself and others.

The degree to which shocks exogenous to the remaining variables will explain the forecast error variance of each variable is determined by variance decomposition. Variance decomposition accounts for the information about the proportion of the movements in a sequence that are due to the shock in the variable itself and other shocks identified. This separates the variation in endogenous variables into the component shocks of the VAR. Table 1.1 below shows the variance decomposition of GCI – explaining whether innovations in the variables in the system are the reasons for the variations in the global competitiveness and quantifying the relative importance of shocks from different sources on GCI.

We found from the table that among all the variables in the system, total entrepreneurship activity accounts for the largest proportion of the forecast error variance in GCI, by keeping aside the effect of GCI on itself, where the maximum magnitude of the impact of total entrepreneurship activity was reached at period 10, where 20.43% of changes of variance in GCI were regarded to total entrepreneurship activity. As shocks in GCI accounts for the variation in total entrepreneurship activity, followed by high job creation, GDP growth, innovation

in the long run, and finally the least contribution for the variance in GCI was self-employment.

Concerning the short run analysis, at the first year, GDP growth accounts for 9.49 percent of the variation in GCI. Self-employment, total early stage entrepreneurial activity, high job creation expectation rate, and innovation rate account for 7.3, 5.7, 3.4, and 2.9 percent, respectively. The remaining 70.9 percent of variation in GCI is explained by its own shocks.

Table 1.1 Variance Decomposition of GCI

Period	S.E.	GDP_GRW	TEA	INNOV	SELFEMP	JOBCR	GCI
1	1.673534	9.496299	5.779138	2.946044	7.377011	3.487747	70.9137(
2	1.920978	11.82071	11.87813	2.041077	5.314086	15.40750	53.5385(
3	2.051260	12.93591	16.04024	2.663221	4.282955	15.62551	48.4521:
4	2.142198	10.21596	16.48942	5.026456	3.908467	16.35486	48.0048:
5	2.280912	10.84515	18.14958	6.462374	4.242162	17.84619	42.4545:
6	2.366920	10.30642	19.27569	8.319562	4.138758	17.99928	39.9602!
7	2.439156	10.19315	19.10982	10.08909	4.320991	18.66779	37.6191'
8	2.519962	10.28619	19.86452	11.25999	4.312090	18.96081	35.3164(
9	2.592815	10.46921	20.20281	12.39242	4.332642	19.05832	33.5446(
10	2.665400	10.51002	20.43601	13.38338	4.286536	19.36336	32.0207(

Cholesky Ordering: GDP_GRW TEA INNOV SELFEMP JOBCR GCI

Source: Tests have been calculated by the researcher using Eviews.edition11.

The importance of innovation rate in explaining GCI variations increases over time especially in the long run, while the importance of self-employment diminishes. In fact, based on our estimates, innovation rate explains over 12 percent of the variation in GCI if one considers lead times of 10 years or more. Although the pattern of negative effect of high job creation expectation rate, self-employment, and total early stage entrepreneurial activity on GCI, innovation rate appears to drive GCI patterns in terms of the magnitudes of impact in the long run.

Conclusion:

The originality of the study results from analyzing the impact of entrepreneurship on the level of economic competitiveness for developing countries. Before estimating the model by VAR, the panel unit root to check the stationary of data at the 5 % significance level, using the (Levin, Lin, and Chu test) as well as (Im, Pesaran, and Shin test), in addition to (ADF)test. Results from these tests revealed that all variables; global competitiveness index, high job creation expectation rate, self-employment, innovation rate, total early stage entrepreneurial activity, and GDP growth are free from the unit root representing a stationary time series at the level stage. Then Pedroni and Kao residual co-integration tests, and Johansen Fisher panel co-integration test have been conducted to test the existence of the long-run relationships between the variables, and all tests confirmed the existence of the long-run relationship.

The results have shown a significant and negative effect of entrepreneurship indices except the innovation rate and GDP growth have a positive effect in the long run on economic competitiveness for developing countries. This is due to the fact that in developing countries, the proportion of entrepreneurs motivated by necessity is higher than that of entrepreneurs motivated by opportunity.

We believe that by presenting the position of innovative entrepreneurship, we can demonstrate why it is critical for decision-makers in developing countries to support opportunity-driven entrepreneurs, especially those who employ innovative techniques (introducing new products to the market, new production techniques or new business techniques, etc.). According to previous research, the benefits of entrepreneurship can only be realized if the business climate is innovative, as creative entrepreneurs are critical to the economy's competitiveness.

Appendix:

Table 1: Panel Unit Root Tests

Panel unit root tests Variables	Levin, Lin & Chu		ADF - Fisher Chi-square		Im, Pesaran and Shin W-stat	
	Test Statistics	P-Value	Test Statistics	P-Value	Test Statistics	P-Value
GCI	-5.08825	0.0000	56.5303	0.0024	49.2922	0.0147
SELFEMP	-3.17073	0.0008	63.5955	0.0003	51.5497	0.0085
JOBCR	-3.89780	0.0000	48.7220	0.0089	57.5282	0.0008
TEA	-2.75398	0.0029	55.2545	0.0016	78.8507	0.0000
INNOV	-9.45581	0.0000	46.0521	0.0172	59.7787	0.0004
GDPGRW	-6.39141	0.0000	77.0493	0.0000	90.5890	0.0000

Source; Tests have been calculated by the researcher using Eviews.edition11. All variable indicates significance at 5% level. See all unit root tests in appendix 2.

Table 2: The Measurements and Sources of the Variables of the Model

Variable	Measurement	Source
Global Competitiveness Index (GCI)	It takes scores from 1 to 7 till the report of 2017 then it becomes taking values from 0 to 100 starting from the report of 2018 (a higher average score means a higher degree of competitiveness) and is calculated as a weighted average of several components of competitiveness that are grouped into 12 pillars.	World Economic Forum
High job creation expectation rate (HJOB)	Percentage of those involved in total early stage entrepreneurial activity who expects to create 6 or more jobs in 5 years.	Global Entrepreneurship Monitor
Self-employment (SELFEMP)	Self-employed workers are those workers who, working on their own account or with one or a few partners or in a cooperative, hold the type of jobs defined as "self-employment jobs." i.e. jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced. Self-employed workers include four sub-categories of employers, own-account workers, members of producers' cooperatives, and contributing family workers.	World Bank
Innovation Rate (INNOV)	Percentage of those involved in total early stage entrepreneurial activity who indicate that their product or service is new to at least some customers and that few/no businesses offer the same product.	Global Entrepreneurship Monitor
Total early stage entrepreneurial activity (TEA)	The percentage of working age population who either actively involved in starting a new business or are running a new business that is less than 42 months old. Also represents the percentage of the population with the age between 18–64 who are either a nascent entrepreneur or owner-manager of a new business.	Global Entrepreneurship Monitor
Control Variable		
Rate of Economic Growth (GDPGRW)	It measures the level of economic growth, it represents the annual percentage growth rate of GDP at market prices based on constant local currency.	World Bank

Source**:** Own elaboration from WEF, WB

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