

Feedback effects of Entrepreneurship, Innovation, and Economic Development: Empirical evidence from selected MENA Countries

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ABSTRACT

Entrepreneurship and innovation have become essential for the growth and development of organizations in all sectors, not only in developed countries but also in developing countries, which often face a variety of socio-economic problems. This article aims to explore the relationship between three variables: entrepreneurship, innovation and economic development in eight MENA countries (Algeria, Morocco, Egypt, Tunisia, Turkey, Jordan, United Arab Emirates, and Saudi Arabia) and to show if there is a feedback effect. We estimate three balanced panel data equations with the fixed and random effects methodology for the period 2006-2017. The results show that several factors have a positive effect on innovation and entrepreneurship, including money supply and per capita income. In addition, there is a feedback effect between entrepreneurship and innovation, so that innovation facilitates the creation of new businesses and entrepreneurship generates more innovations because of competitiveness. But this combination is still ineffective in promoting growth in the MENA region, which is explained by another result: legal entrepreneurship has a significant negative impact on economic development. This impact is discussed through other factors in our analysis, such as institutional contexts, entrepreneurship-innovation management, the type of entrepreneur and the sector in which it operates.

Keywords: entrepreneurship, innovation, economic development, MENA countries.

1. Introduction

In a sluggish global economic and financial context marked by a slowdown in growth, the deterioration of living conditions, and the rise in unemployment, the reflection on the opportunities for job creation and recovery of activities are undoubtedly on the menu of all national economic development programs. Dating back to the post-world war II era we cannot fail but to mention that even countries which are known now by the developed world have witnessed a several dynamic forces such as fluctuating economies and demographical changes including record unemployment and the urgency for countries has increased to identify new sources of growth and develop a sustainable path to economic success. Among many sources and factors that can improve the economy, small businesses and start-ups have gained the awareness of many countries as a way to save the economy and ensure prosperity and high standard of living, even academically the intention of several researchers and scholars was attracted to this field of research and they began to put more focus toward entrepreneurship and innovation over time with a large number of studies analyzing the link between entrepreneurship, economic growth, job creation and innovation (Acs, Estrin, Mickiewicz & Szerb, 2018, Aparicio, Urbano & Audretsch, 2016, Galindo & Méndez, 2014, Ácset al., 2013; Szirmai et al., 2011; Naudé, 2011; Braunerhjelm, 2010; Career and Thurik, 2010; Walzer, 2009; Wenekers et al., 2009; Audretsch et al. 2006; Van Stel et al., 2005; , Stel, Carree & Thurik, 2005 ; Dejardin, 2000). As a result, most of them have forwarded the idea that entrepreneurship could be a solution for numerous environmental and social preoccupations especially in developed countries (e.g. Hall et al., 2010; Senge, Lichtenstein, Kaeufer, Bradbury, & Carroll, 2007; Wheeler et al., 2005). But when it turns to poor and developing countries there seems to be a cloud of skepticism hanging over the value of entrepreneurship (Adusei, 2016) and very little work has been published in the Middle East and the world's emerging markets (Chamlou, 2007).

The Mena region is not an exception as it is a large, complex, and diverse region from a very rich country to very poor county and it's a part of the world which faces a wide range of economic issues. The MENA group includes (Algeria, Bahrain, Cyprus, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates, and Yemen). Knowing that the Arab Spring highlighted

the political and socio-economic issues almost in the whole region especially the very high unemployment rate of young graduates, according to the world bank group 2013 “youth unemployment rates in MENA at 21 % in the Middle East and 25 % in North Africa, are higher than any other region in the world”, This situation calls for a radical change in higher education to raise the quality of education in the region and prop up the employability of graduates, moreover the new ordinary of low oil and gas costs is compelling numerous nations to implement reforms to increase diversification, in this context its becoming more and more important for governments and policy makers and civil society leaders to work together to figure out which are more effective policy instruments to foster growth and as it is the case of many emerging countries including MENA region that stores the potential for enormous growth opportunities in term of youth population and raw materials, engaging in innovative entrepreneurship via the creation of new markets and businesses could be a new bold strategy to spur economic growth and reduce the reliance on natural resources.

Regardless the fact that entrepreneurship and innovation have been found to be complementary to organizational success and sustainability in the lively and changing environment of today (Zhao, 2005) and Despite all the focus bestowed on the importance of entrepreneurship and innovation in improving the economy especially in developed countries, very little empirical researches that formally tests the feedback effects between entrepreneurship, innovation, and economic development were shown especially in MENA countries, thus the purpose of the paper is to contribute a better understanding of the relationship between entrepreneurship, innovation and economic development as well as we aim to test empirically if there are any feedback effects at work between new businesses creation, innovation and economic development in north and middle east countries, if not we will try to answer why the economic role of entrepreneurship doesn't work and what are the convenient policy instruments to foster growth through the combination entrepreneurship/innovation.

Our article is structured as follow: after a brief introduction, we present in two sections a theoretical and empirical literature review about the relationship between entrepreneurship, innovation and economic development. The four section consists about the estimation model. The results and discussion are in the section five followed by a conclusion.

2. Entrepreneurship and innovation in economic development

The perception toward entrepreneurship has changed drastically over the time, in the modern economy the resurgent of small and middle enterprises seems to be clear and the role of entrepreneurship in economic development has gained more and more interest by researchers and policymakers alike. First Entrepreneurship remains one of the most popular concepts in economic development. However, its exact meaning remains elusive (Adusei, 2016) as it is an ill-defined concept (Sander Wennekers and Roy Thurik 1999), indeed we cannot derogate from two questions that are too often asked: "What are we talking about when we talk about entrepreneurship? (Gartner 1990). And what is the exact meaning of entrepreneurship? "Both questions are too large and each author expresses in a different way the understanding of the phenomenon, this lack of one definition has yielded a broad array of definitions Bilic et al. (2011) and Kauffman (2008) posit that entrepreneurship should be construed as a transforming process which could be from an innovative idea to an enterprise or from an enterprise to the creation of value. Schumpeter (1912) considers it as the initiation of innovative activity and the bringing of new products to market. Kirzner (1973) appears to share the view that entrepreneurship is a contest of ideas, positing that entrepreneurship encompasses the competitive behaviors that propel the market process. In sum, we can define entrepreneurship as the act of being an entrepreneur that is, an entrepreneur is a person who undertakes innovation, finance and business acumen to transform innovations into economic goods.

It does exist another consensus of many researchers that entrepreneurial activity has come to be perceived as an important vehicle to assure the future development of the entire society's preoccupations (Dean & McMullen, 2007; Patzelt & Shepherd, 2011). Beck, Demircug-Kunt and Levine (2005) posits that "a solid small business sector and entrepreneurship are in general linked to a strong economy, across developed and developing countries" Baum and al, (2007) state that: "Entrepreneurship is important because it is the economic mechanism through which inefficiencies in economies are identified and mitigated" thus the entrepreneur has come to be perceived as the most single important player in a modern economy (Lezear 2002 p.1) ,his function is to reform or revolutionize the pattern of production by exploiting an invention, or more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way (Audretsch, Keilbach & Lehmann, 2006).

On the other hand, the economic theory of entrepreneurship proposes that entrepreneurship and economic growth take place when economic conditions are favorable, those conditions differ from a country to another and this depends on the level of economic development of each country, in this context Stel, Carree & Thurik (2005) state that entrepreneurial activity affects economic growth depending on the level of GDP per capita and entrepreneurship take a different position in different stages of economic development, this spatial effect of entrepreneurship led to the emergence of many research investigating about how can entrepreneurship affect positively the economy of nations. According to Audretsch et al. (2006), the significant contribution of entrepreneurship to economic growth lies in its serving as a medium for the spillover of knowledge that might otherwise have stayed uncommercialized, while González-Pernía, Jung and Peña (2015) report that entrepreneurship and innovation in developing countries remains too weak compared with the conventional linkage studied in Knowledge Spillover Theory of Entrepreneurship (KSTE) premises which oblige policy-makers in developing countries to recognize the risk-bearing and focus on innovative firms to benefit from transforming economic knowledge into growth. Another research made by Wong, Ho & Autio (2005) seems to share the position that only fast-growing new firms (small and medium firms), not all firms are most efficient in fostering growth particularly in developed countries, which confirm in some extent the statement of (Audretsch, Keilbach & Lehmann, 2006) “small has become beautiful again” this new perception over the value of entrepreneurship to growth processes of countries engender a growing interest of both researchers and policymakers about linking entrepreneurship to growth, furthermore there is another aspect which attract the intention of researchers which is culture, or the propensity of taking risks and creating self-jobs, Stuetzer et al.(2017) in an empirical analysis confirm a positive relationship between entrepreneurship culture and the level of economic growth where regions bestowed with a higher amount of entrepreneurship culture, have a higher employment growth, whereas research by Ibourk and Amaghous.(2016) supports that high-income countries are weakly involved in entrepreneurial activities.

Most of the results mentioned above are aligned with that replicative entrepreneurship is immaterial to growth (Path et al 2008; Baumol et al 2007), therefore it is not unfair to claim that entrepreneurship and innovation are inseparable and If we consider entrepreneurship as a vehicle then innovation must be its engine especially in such vibrant that the economy has come,

Subsequently, innovative activity becomes mandatory, a life and death matter for the enterprise. William Baumol. (2002) supposed that “innovative activity may be more important than productive efficiency” (P1) and “to be innovative, an idea must be creative, and it must be implemented” (Levitt, 2002).

Innovation may be defined as exploiting new ideas leading to the creation of new product, services or process, it is not just the invention of new idea that is matter, but it is actually bringing it to market, putting into practice and exploiting it in a manner that leads to new product, services or system that add efficiency or develop quality. It has been acknowledged that innovation leads to wealth creation and nobody can deny the role of innovation in the economic and social development, especially after the qualitative leap the world has witnessed in all fields after the World War II. In addition to that, the role of innovation has to be emphasized as a significant source of entrepreneurial opportunity and a key factor in the development of countries, however as preceding empirical evidence has shown, the effect of entrepreneurship on economic development relies on the quality of new business formation (González-Pernía and Peña-Legazkue 2015; Wong, Ho, and Autio 2005). Shane (2009) seems to share the same view that the entry of innovative new businesses with the potential to grow, and not new businesses in general, which conduct the economic development of countries. As an important part of innovation process several economist traditionally consider that opportunities for IDE “Innovation-Driven Entrepreneurship” (I-DE) come from investment in new knowledge (Acs et al. 2009), while The KSTE emphasizes the importance of knowledge as the main source of entrepreneurial opportunities to spark innovative start-up businesses (Acs et al. 2009). As Drucker (1998) points out, “innovation is a key process in entrepreneurship activity, promoting such business, thereby bringing to the fore another feedback effect: entrepreneurs innovate, and their innovations stimulate other entrepreneurs to carry out their activity and to create more innovations”. Galindo & Méndez (2014) concluded in a research paper that the three variables; entrepreneurship, innovation, and economic growth have positive effects on each other where innovation and entrepreneurship enhance economic growth and this latter promotes entrepreneurship and innovation in developed countries. Here we arise again the question that was a part of many precedents researches on the case of developing countries in general and MENA region in special which represent our case of study about the possibility of generalizing the fundamental principles of the knowledge spillover theory to explain

innovation-driven entrepreneurship in developing countries and if the contextual factors advocated by the KSTE to spur innovation and I-DE also work in developing economies?

3. Measuring entrepreneurship, innovation, and economic development

3.1. Entrepreneurship

The deficiency of providing one standard definition of entrepreneurship reflects the fact that there is a multidimensional concept (Audretsch, Keilbach & Lehmann, 2006), as a result, many countries are struggling to find a way to enhance the estimation or the measurement of entrepreneurship at the national dimension. At worldwide dimension programs by the World Bank, Eurostat, and private associations, for example, the Global Entrepreneurship Monitor (GEM), has additionally begun to develop universally comparable data.

As mentioned above one measure does not capture all entrepreneurs in any country therefore, Multiple measures of entrepreneurship exist and reflect different types of activities thus, researchers and many specialized organization took several indicators to measure entrepreneurship, for instance (Acs et al. (1994), Blanchflower (2000), Blanchflower (2004), Le (1999), OECD (1998), OECD (2000) Li et al., 2012; Glaeser, 2007; Audretsch et al., 2006; Carree et al., 2002) are more likely to use the overall rate of self-employment as an indicator to compare entrepreneurship across countries. Self-employment ratio is defined as the proportion of the labor force who are; self-employed or business owners.

For others, the self-employment rate is an imperfect measure as it may not comprise owners of incorporated businesses thereby a set of alternative measures have been recommended, for instance, the rates of new business formation, business ownership, and innovation which are identified by (Naudé, 2011). (Meyer 1990) measure entrepreneurship as the number of business owners divided by the total non-agricultural employment; however (Gartner and Shane 1995) measure it through the number of firms per capita.

The Global Entrepreneurship Monitor (GEM) uses Total Early-stage Entrepreneurship Activity (TEA) to measure entrepreneurship which is defined as the percentage of the population aged between 18 and 64, that are involved in a new entrepreneurial activity or running a new business.

Recently (Dau & Cazorra, 2014; Thai & Turkina, 2013) then (Dahri and Omri, 2018) have measured entrepreneurship by the total number of newly registered businesses as a percentage of the working-age population.

$$Entrepreneurship = \frac{\text{Number of New Registered \& Unregistered Business}}{\text{Working Age Population}}$$

For our research and regarding the data constraints, we will center on formal entrepreneurship (Klapper et al., 2007) and use the number of new businesses registered as the main indicator. New businesses registered are the number of new limited liability corporations registered in the calendar year (World Bank's Entrepreneurship Survey and database).

3.2. Innovation

The connection between innovation and economic development shows a great interest for researchers over the time (Solow 1956., Schumpeter 1912-1939., Wong, P.K., et al., 2005., Pessoa, 2007., Westmore, 2013., Minniti, Venturini, 2013). in our current investigation and depending on data availability we use the proxy of patent (number of patents issues) as a measure for innovation, not forget to mention that patents have been largely used in economic research (e.g. Scherer, 1982;Griliches, 1998) and are a trustworthy measure of innovative activity at the industrial and regional level (Acs and Audretsch, 1989).

3.3. Economic development

The economic development is usually measured by Gross Domestic Production (GDP) (Ferreira, Fayolle, Fernandes & Raposo, 2016) and (Natanya Meyer and Danie Meyer, 2017) also GDP per capita is usually used to measure economic growth in the literature (Stel, Carree & Thurik, 2005) however in our study we use GDP per capita in (constant 2010 US dollars) to measure economic development.

4. Empirical estimation

To investigate the relationship between entrepreneurship, innovation and economic development in MENA countries, this study utilizes a model based on three equations that reflect a feedback effect:

$$\begin{aligned} \text{❖} \quad \ln(Y)_{it} = \beta_0 + \beta_1 \ln(IN) + \beta_2 \ln(E) + \beta_3 (PI)_{it} + \beta_4 (HDI) + \\ \varepsilon_{it} \dots \dots \dots (1) \end{aligned}$$

$$\text{❖} \quad \ln(IN)_{it} = \beta_5 + \beta_6 \ln(BMG) + \beta_7 \ln(E) + \beta_8 \ln(y)_{it} + \varepsilon_{it} \dots \dots \dots (2).$$

$$\begin{aligned} \text{❖} \quad \ln(E)_{it} = \beta_9 + \beta_{10} \ln(IN)_{it} + \beta_{11} (GNIC)_{it} + \beta_{12} \ln(BMG)_{it} + \beta_{13} \ln(y)_{it} + \\ \varepsilon_{it} \dots (3). \end{aligned}$$

Where:

- **Y:** is GDP per capita in (constant 2010 US dollars) that refers to the sum of gross value added by all resident producers in the economy plus any product taxes, using the World Bank national accounts data and OECD National Accounts data files. (Stel, Carree & Thurik, 2005).
- **IN:** is innovation, which is measured in the number of patent issues (Acs and Audretsch, 1989) using data from the World Bank's world database indicators (WDI) and WIPO world intellectual property organization.
- **E:** is entrepreneurship measured with the number of new businesses registered in a country in a fiscal year (Klapper et al., 2007) using data from the International Monetary Fund.
- **PI:** is gross fixed capital formation in Millions of constant 2005 US\$ Organization for Economic Co-operation and Development and World Bank. (Bleaney and Nishiyama 2002).
- **GNIC:** is per capita income PPP: (constant 2011 international \$) GNI is gross national income (GNI) converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GNI as

a U.S. dollar has in the United States. Using data from the World Development Indicators database of the World Bank.

- **HDI:** human development index, one of the most important determinants of competitiveness by measuring the quality of human capital among countries through three factors; knowledge, longevity and purchasing power. (Ivanova, I., Arcelus, F., & Srinivasan, G. 1999)
- **BMG:** is the money supply term m_s (sourcing its data from the WDI) (Galindo & Méndez, 2014)

Equation n°1: basing on the existing literature (Stel, Carree & Thurik, 2005) GDP per capita is used as dependent variable in our first equation where entrepreneurship (E) and innovation (IN) represent the independent variables and as mentioned before (E) is measured via the number of new registered business (Wong et al., 2005; Reynolds et al., 1999), and (IN) as the number of resident patent (Acs and Audretsch, 1989).

The following control variables are chosen from the literature : private investments (PI) which is usually included in growth models to measure macroeconomic stability (Apergis et al., 2007) gauged by gross fixed capital formation in Millions of constant 2005 US dollars (Bleaney and Nishiyama ,2002) and the quality of human capital has been measured via (HDI) human development index.

Equation n° 2: The innovation equation incorporating the effect of monetary policy through the money supply term (BMG) and the effects of entrepreneurship and per capita GDP. Therefore, this equation takes into account the feedback effect between innovation and GDP per capita. Where (IN) is the dependent variable, (E) and (Y) are the independent variables.

Equation n°3: is the entrepreneurship equation where (E) is used as the dependent variable and both innovation (IN) and economic development (Y) are independents. From literature the subsequent control variables are selected: per capita income (GNIC) which is expressed in (thousands of) purchasing power parities per US\$ (Stel, Carree & Thurik, 2005) and (BMG) refers to the money supply.

We use twelve years data (2006-2017) from eight MENA countries (Algeria, Morocco, Tunisia, Egypt, Jordan Turkey, United Arab Emirates, and Saudi Arabia), the country selection is based on the availability of the necessary metrics for our study. The study's restriction to (2006-2017) was determined by limited data on the number of new companies registered in the fiscal year (NBR). The source of variables appears below each table. We stay close to the model of (Galindo & Méndez, 2014) who used a panel data with fixed effect methodology from 13 developed countries (Belgium, Finland, Denmark, Germany, Ireland Iceland, Italy, Netherlands, Norway, Sweden, United Kingdom, France and Spain) over the period 2002 to 2007. The study concluded that the three variables have positive effects on each other where innovation and entrepreneurship enhance economic growth and this latter promotes entrepreneurship and innovation. We add many features to this model as it will be manageable in our selected countries. The model estimated is as follows:

$$Y_{it} = \alpha_{it} + \sum_{k=1}^k B_{kit} x_{kit} U_{it} \quad (4)$$

The panel statistics method combines cross-sections (information from several individuals at a given moment) for several points in time, where i signify the countries and t the period time. α_{it} is a parameter that represents each cross-section's specific effects, namely each country. U_{it} collects the effects of any missing variables specific to the cross-section and time frame.

We choose panel data methodology for several reasons; first panel data allow for controlling for individual or time heterogeneity by blending inter-individual differences and intra-individual dynamics. Secondly, it usually contains more degrees of freedom and less multicollinearity than cross-sectional data which can be viewed as a panel with ($T = 1$), or time series data which is a panel with ($N = 1$), thus improving the efficiency of econometric estimates (HSIAO, 2005).

5. Results and discussion

5.1. Random versus fixed effects

Our first test is the Hausman specification test to choose between a fixed effects model and a random effects model as the more convenient model of our study. This test evaluates the null hypothesis that the individual country effects are not correlated with the explanatory variables, if the null hypothesis is rejected, then the fixed effects model is the suitable estimator to use, On the other hand, if the test fails to reject the null hypothesis, the random effects model is the appropriate estimator to use. Our findings are as follows:

EQ 1: Correlated Random Effects - Hausman Test

Equation : economic development.

Test cross-section random effects

Test Summary	Chi-Sq.		
	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	45.874737	4	0.0000

In the first equation (GDP per capita), the result of the Hausman test rejects the null hypothesis of an absence of correlation between the individual country effects and the explanatory variables by indicating that the fixed effects model is the optimal estimation technique to use. This is because the test has yielded a value of 45.87 p= (0.0000) with 4 degrees of freedom.

EQ2: Correlated Random Effects - Hausman Test

Equation : Innovation.

Test cross-section random effects

Test Summary	Chi-Sq.		
	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	19.768301	3	0.0002

The Hausman specification test for the innovation equation (IN) yields a value of 19.76 p=(0.0002) with 3 degrees of freedom, therefore, rejecting the null hypothesis of no correlation

between individual country effects and the explanatory variables, and use the fixed effects model as the more efficient estimator.

EQ3: Correlated Random Effects - Hausman Test

Equation : Entrepreneurship.

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.985190	4	0.5603

The suitable model to use is the random effects model because The Hausman specification test for the fixed effects estimator versus the random effects estimator for Entrepreneurship equation yields a value of 2.98 p= (0.5603) with 4 degrees of freedom. In contrast with the two above equation this result fails to reject the null hypothesis.

5.2.The feedback effects results

EQ1: Table 1.

Dependent Variable : LNGDP

Method : Panel Least Squares

Sample: 2006 2017

Periods included: 12

Cross-sections included: 8

Total panel (balanced) observations : 96

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	7.184620	0.303064	23.70661	0.0000
LNIN	0.005109	0.022502	0.227027	0.8210
LNNBR	-0.091803	0.030136	-3.046273	0.0031
GFCF	0.000225	0.002036	0.110708	0.9121
HDI	3.356558	0.507564	6.613073	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.996645	Mean dependent var	8.830480
Adjusted R-squared	0.996206	S.D. dependent var	0.959772
			-
S.E. of regression	0.059120	Akaike info criterion	2.702027
			-
Sum squared resid	0.293594	Schwarz criterion	2.381483
			-
Log likelihood	141.6973	Hannan-Quinn criter.	2.572458
F-statistic	2268.499	Durbin-Watson stat	0.427635
Prob(F-statistic)	0.000000		

Source: GDP per Capita: World Bank national accounts data, and OECD National Accounts data files. Resident patents: (WDI) database and WIPO world intellectual property organization. Fixed capital formation in Millions of constant 2005 US\$: Organization for Economic Co-operation and Development and World Bank. Human development index: WDI.

The least-squares estimate in table 1 shows that the only factors that significantly affect the economic development are entrepreneurship and human development, whereas private investment and innovation have not shown a significant impact on the economic development.

A significant negative impact of newly registered businesses on economic development has been detected in the studied countries during the period under investigation (2006-2017), this result aligns with those of other studies, such as the one carried out by (Stel, Carree & Thurik, 2005) who suggested that entrepreneurship plays a different role in countries in different stages of economic development however it has a negative impact on GDP growth for developing countries. This negative relationship can be attributed to many factors, from the literature generally entrepreneurship can affect negatively the economic development due to two causes first the misallocation of entrepreneurial talent (Acemoglu 1995; Mehlum et al. 2003). Which state that not all kind of entrepreneurship promote economic development, but it depends on whether the entrepreneurial ability is allocated towards productive or non-productive, destructive or ambiguous ends.

Second, the low quality of entrepreneurship (embracing entrepreneurship by necessity) which is the main interpreter factor of our findings, that innovation has no effects on economic development while entrepreneurship has a negative impact. This result is consistent with the

one published by (Acs and Varga 2005; Poh Kam Wong et al, 2005) which found that entrepreneurship by necessity has a negative impact on economic development. Thus the quality of entrepreneurship in our sample of countries must be low and driven by necessity due to the high youth unemployment rate and low income which force individuals to be self-employed in traditional industries.

In addition to that Low-capacity entrepreneurs will have less productive workers who earn lower wages. By reducing wage costs, these entrepreneurs reduce entrepreneurial opportunities and facilitate the entry of more low-capacity entrepreneurs, all of that will result in higher borrowing costs, which impose a negative externality on entrepreneurs of high ability, who will consequently borrow and invest less which might hinder the economic development.

EQ 2 : Table 2. Dépendent Variable : LNIN

Method : Panel Least Squares

Sample: 2006 2017

Periods included: 12

Cross-sections included: 8

Total panel (balanced) observations : 96

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	-23.32759	3.719792	-6.271208	0.0000
LNNBR	0.694581	0.156269	4.444770	0.0000
LNGDP	2.513845	0.448986	5.598933	0.0000
BMG	-0.008487	0.005627	-1.508427	0.1352

Effects Specification

Cross-section fixed (dummy variables)			
R-squared	0.956737	Mean dependent var	5.292626
Adjusted R-squared	0.951647	S.D. dependent var	1.523085
S.E. of regression	0.334917	Akaike info criterion	0.757601
Sum squared resid	9.534391	Schwarz criterion	1.051432
Log likelihood	-25.36484	Hannan-Quinn criter.	0.876372
F-statistic	187.9707	Durbin-Watson stat	0.733602
Prob(F-statistic)	0.000000		

Sources: GDP per Capita: World Bank national accounts data, and OECD. Resident patents: (WDI) and WIPO world intellectual property organization. BMG: is the money supply term ms (sourcing its data from the WDI).

The OLS assumption from the second equation shows that entrepreneurship and economic development have a significant positive impact on innovation which denotes that the higher levels of economic activity produce new business opportunities, which leads entrepreneurs to access new markets and provide the product with a better degree of competitiveness. Innovation facilitates this chance, thereby increasing new businesses yields new innovations possibility, and this positive relationship between entrepreneurship and innovation demonstrates one feedback effect consequence.

Another important result reporting that the sign of money supply is negative; this means if the central banks decrease their money supply, interest rates would rise, and people would be encouraged to save. In this case, entrepreneurs would be more likely to obtain the necessary funding to carry out their innovation processes.

EQ3: Table 3. Dependent Variable : LNNBR

Method: Panel EGLS (Cross-section random effects)

Sample: 2006 2017

Periods included: 12

Cross-sections included: 8

Total panel (balanced) observations : 96

Swamy and Arora estimator of component variances

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	-10.72229	4.496767	-2.384445	0.0192
LNIN	0.206376	0.052298	3.946198	0.0002
LNGNIC	0.829109	0.190334	4.356072	0.0000
BMG	-0.007499	0.003128	-2.397146	0.0186
LNGDP	-0.339025	0.261381	-1.297055	0.1979

Effects Specification		S.D.	Rho
Cross-section random		1.090621	0.9712
Idiosyncratic random		0.187781	0.0288

Weighted Statistics

R-squared	0.534936	Mean dependent var	0.466228
Adjusted R-squared	0.514493	S.D. dependent var	0.267990
S.E. of regression	0.186731	Sum squared resid	3.173021
F-statistic	26.16798	Durbin-Watson stat	0.751631
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	-0.063582	Mean dependent var	9.391770
Sum squared resid	78.70465	Durbin-Watson stat	0.030302

Sources: NBR is entrepreneurship: from International Monetary Fund: GDP per capita: World Bank national accounts data, and OECD. Resident patents: (WDI) and WIPO world intellectual property organization. BMG: is the money supply term ms (sourcing its data from the WDI), GNI per capita: World Bank.

Finally the EGLS test estimates from the EQ3 reveals that both innovation and per capita income have a positive significant effect on entrepreneurship while the money supply has a negative significant impact, and no significant effect of economic development has been detected, hence these result shows a second feedback-effect between innovation and entrepreneurship which confirm that higher innovation creates more competitive firms with more diverse goods and services this result is compatible with the statement of Drukker (1998) “ innovation is a key process of entrepreneurial activity. But the combination of entrepreneurship and innovation is still insignificant to affect positive economic development in the studied countries; reasonably their level of economic development remains too low compared to developed countries and has relatively immature legal, political and financial institutions, resulting in an unclear and uncertain business environment (Marcotte, 2014).

Other notable results are shown in Tab.3 that the money supply has a negative sign, As discussed above, central bank activity plays an important role in the process, as policies of central banks have the potential to provide entrepreneurs with more financial resources to expand or create new businesses, Consequently, if central banks diminish the supply of money, interest rates increase, save money and create a greater supply of financial resources. Entrepreneurs would, therefore, have more opportunities to obtain financing for innovative activities.

We found also that there is a significant positive relationship between per capita income and entrepreneurship meaning that a high level of income per capita allows people who would otherwise be in paid employment to become, independent, creative, and take more advantages to engage in entrepreneurship.

6. Conclusion and Discussion

The goal of our study is to define the relationship between entrepreneurship, innovation and economic development in the MENA countries, the result has shown a positive correlation between entrepreneurship and innovation while a negative effect of entrepreneurship on economic development. These results conduct us to conclude that the predominant type of entrepreneurship in the studied countries is necessity entrepreneurship due to various causes: first, the low incomes that force individuals to embrace entrepreneurship out of necessity or survival. These “necessity entrepreneurs” are more common in economies where employment opportunities and social safety are limited (Acs, 2006; Van Stel et al, 2007) as it is the case of the most MENA countries, this situation corresponds to prisoners’ dilemma problem where companies and entrepreneurs are forced to degrade their behavior because of the disparity between individual rewards and collective sustainability objectives. Second this negative effect may be due the entry of low-quality entrepreneurs plus the misallocation of entrepreneurial ability that might be allocated to unproductive ends which automatically hinder the economic development (Acemoglu 1995; Mehlum et al. 2003), third MENA countries are characterized by a lower level of economic development compared to developed countries and have relatively immature legal, political and financial institutions, resulting in an ambiguous and uncertain business environment(Marcotte, 2014).

However, our second confirmation of the existence of a positive relationship between entrepreneurship and innovation suggests that it could be possible to obtain economic growth by encouraging the appropriate institutions in order to increase entrepreneurship by opportunity. For this instance and considering that more than one-half of MENA region population is under the age of 25 that store the potential for enormous growth opportunities, governments and policymakers should focus on the following underlying elements to enhance the entrepreneurial ecosystem:

Upgrading infrastructure to improve the start-up environment and the business environment in general.

- Training programs should be aimed at self- employed individuals in order to enhance their management and innovative capabilities, Governments must invest more in human capital and skill and provide appropriate conditions to build a certain entrepreneurial ecosystem driven by opportunity.
- Welcome new ideas and engage domestic and foreign entrepreneurs to encourage a free flow of expertise and business and embrace the Diaspora and tap successful entrepreneurs living abroad for their advice and connections.
- Governments should support all kinds of entrepreneurs and eliminate bureaucracy.

Some limitations must be taken into consideration, firstly due to the lack of comprehensive comparable data on entrepreneurship measurements in the selected countries, the number of newly registered businesses has been used, but this proxy may not accurately reflect the level of entrepreneurship in those countries due to the omission of informal sector which attract the focus of many researchers as it has a higher impact on opportunity entrepreneurship than formal institutions (Aparicio, Urbano & Audretsch, 2016) furthermore its well acknowledged that informal institutions play a significant role especially in term of employment in most developing economies. Secondly, it was better to include the rest of MENA countries in our sample for an improved analysis but as mentioned above they have been dropped due to the lack of data.

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