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Article

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Investigating critical resource determinants of start-ups: An empirical study of the MENA region

Abdulaziz Abdulmohsen Alfalih*

Abstract: Purpose: By drawing upon the resource-based view theory, this study investigates the critical resource determinants of start-up companies in the Middle East and North Africa (MENA) region in order to encourage the development of entrepreneurship in the region. **Design/methodology/approach:** A quantitative approach based on multiple linear hierarchical regression analysis was used. Three sets of data were employed. Firstly, the study used the World Bank's Doing Business Report which investigated the *ease of starting businesses, access to electricity and access to credit* across the 23 MENA countries. Secondly, the study also used the human capital index from the Global Entrepreneurship Index as one of the predictor variables of start-ups. Finally, three specific data sets, namely population, Foreign Direct Investment (FDI) and Gross Domestic Product of the 23 MENA countries were used as control variables due to their importance as determinants of entrepreneurship orientation. **Findings:** The results of this study indicate that access to two critical resources, namely electricity and credit, have greatly contributed to the formation of start-ups in the MENA region. However, the current level of human capital in the region does not support entrepreneurial activity, hence its inability to support entrepreneurs in the venture creation process. There is a need to augment entrepreneurship education across the region, as well as the provision of entrepreneurial skill development to current and potential entrepreneurs. **Research limitations/implications:** Firstly, the study depended heavily on secondary data to examine the determinants of start-ups in the MENA region. Even

ABOUT THE AUTHOR

As a doctor in Business Administration – Human Resource Management and Employment Relations, we are investigating researchers in the fields of the labour market, public sector reforms, entrepreneurship, employment relations, human resource management policies and practices. This work is the result of an empirical investigation into the MENA region, in order to determine the determinants of start-ups in this region, due to the importance of entrepreneurship as a field of research.

PUBLIC INTEREST STATEMENT

Start-ups are a major source of new employment in a country. However, it is essential to understand the various factors which foster their survival and growth. This article is one of the few empirical investigations into the resource determinants of start-ups in the MENA region. Using data from ... three main drivers of start-ups namely the available human capital, access to electricity and access to credit were tested the findings indicate that two critical resources, namely electricity and credit, have contributed to the formation of start-ups in the MENA region. However, the current level of human capital in the region does not support entrepreneurial activity, hence its inability to support entrepreneurs in the venture creation process. Understanding the impact of these drivers on start-ups facilitate entrepreneurial growth in the MENA region which would eventually support economic growth.

though the sources of these data are credible, it is impossible to determine any anomalies in the original data. Secondly, the model used in this study is parsimonious in the sense that many more predictor variables could have been explored in understanding the determinants of start-ups in the region. Future research could therefore investigate other factors, such as technology, property rights, the legal system and other important factors in the entrepreneurial ecosystem of the MENA region.

Originality/value: Start-ups are a major source of new employment in a country. However, it is essential to understand the various factors which foster their survival and growth. Even though similar studies have been conducted in various settings, this is one of the few studies which have focused on empirical investigation into the resource determinants of start-ups in the MENA region. The MENA region is noted for its access to abundant oil reserves and other resources. However, this has not culminated in the emergence of successful start-ups. This is what has necessitated this study; to investigate the factors that are responsible for start-up growth in the region. The uniqueness of this study is that it is one of the few studies which have used a three-factor construct in investigating the drivers of start-ups in the MNEA region. This study adopts an exhaustive approach with different variables in different levels of analysis which can provide extra information for further comparative study.

Subjects: Cultural Studies; Sustainable Development; Culture & Development

Keywords: human capital; credit; electricity; Middle East; MENA; resource-based view theory

1. Introduction

Over the past two decades, entrepreneurship literature on the emergence and growth of new enterprises has focused on the various factors which make them successful, and those that are detrimental to their growth (Cantner & Stuetzer, 2013). Studies on start-ups have therefore formed an integral part of entrepreneurial research, where discussions concerning the drivers of venture creation have dominated various policy documents across the globe. Importantly, new ventures are noted to be a source of national economic development. Essentially, they are noted to be responsible for transferring innovations into the market, and introducing employment into an economic system. Research themes involving new ventures include performance drivers, the social embeddedness of the entrepreneur as well as the availability of various financial, psychological and intellectual resources (Davidsson & Honig, 2003; Newman, Schwarz, & Borgia, 2014), the entrepreneur's networks (Okamuro & Ikeuchi, 2013) and managerial leadership experience (Gimmon & Levie, 2010). One of the measures for the growth of entrepreneurship in a country has been start-up rates, as well as the ability of those start-ups to deliver expected services and products (Gries & Naude, 2009).

Business start-ups are essential for economic growth and employment generation. Even though Stucki (2016) argues that most start-ups fail to scale up and create the expected wealth, it is undeniable that start-ups are essential for market expansion and employment generation. Nielsen (2015) argues that start-ups are also recognised as an important source of knowledge spillover and technology transfer in various economies. However, Okamuro and Ikeuchi (2013) observed that many start-ups lack the necessary resources for survival and growth. They argue that even though start-ups increase a country's competition and innovation, they are critically prone to failure due to their acute lack of internal resources during the first few years. It has been estimated that about 50% of all new businesses close within the first three years, and a large number of start-ups remain uninnovative and fail to generate needed employment (Nielsen, 2015). This is because start-ups face scarce financial and human resources, particularly in less developed economies, where these resources are limited or inappropriately developed (Stucki, 2016).

Therefore, many empirical studies over the years have focused on uncovering the various factors behind successful ventures, as well as those that are inhibitive.

One of the factors found to be a major driver of start-ups is the availability of adequate and skilled human capital, in the form of entrepreneurs' knowledge, skill and experience, which supports the venture creation process. Particularly, the human capital of the founder of an enterprise enables the acquisition of start-up funds from banks and other financial institutions (Bates, 1990; Storey, 1994). Similar studies conducted in Japan also provide evidence that a start-up founder's human capital base contributes greatly to the firm's performance and research and development (R&D) (Kato, Okamuro, & Honjo, 2015). Stucki (2016) also argues that the human capital of the start-up is essential for firm internationalisation and export performance. Moreover, it is believed that the level of heterogeneity which exists among the firm's management reflects the dynamic capability of the team and its ability to resolve firm-related challenges successfully (Ughetto, 2016).

Apart from financial resources, access to other critical resources such as electricity is crucial for start-ups. An efficient and cheap source of energy is considered one of the major drivers of start-ups in an economy (El-Katiri, 2014). Other factors, such as growth in a regional economy, improvements of higher rates of return for entrepreneurs and an increase in regional financial concentration, have all been noted in the entrepreneurship literature to have contributed positively to start-up rates (Gries & Naude, 2009).

Therefore, there cannot be a single determinant of start-ups which can be employed across countries or regions. Furthermore, start-up rates differ significantly between countries as well as across regions, hence the need for an empirical investigation into these factors (Kato et al., 2015). Crucially, the various factors which drive start-up formation can increase either the success or failure rate of nascent firms. In the Middle East and North Africa (MENA) region, many studies point to the fact that the emergence of start-ups is affected by myriad factors, which need to be investigated (Al-Dairi, McQuaid, & Adams, 2012). Even though previous studies have attempted to investigate the factors which make start-ups successful, issues surrounding access to energy sources and the role of human capital across the MENA countries have not been properly explored (Okamuro & Ikeuchi, 2013).

Therefore, in this study, the main objective is to investigate the impact of three critical resources: namely, human capital, access to credit and access to electricity, on start-up formation in the MENA region. A detailed look at the MENA countries reveals an imbalanced division between energy-abundant countries and those with limited access to electricity and modern fuels. Qatar, Iran, Saudi Arabia, Libya and Algeria have high access to electricity and modern fuels, whilst Morocco, Jordan, Syria, Tunisia, Egypt and Yemen still face scarcity when it comes to energy sources. (El-Katiri, 2014). As far as the author is aware, few studies have investigated the three critical determinants of start-ups listed above. This study contends that these factors have the ability to promote or inhibit start-up formation in the MENA region. The study emphasises the resource-based view of the firm towards the emergence, growth and survival of start-ups (Barney, 1991).

This paper is divided into three main parts. The first section relates to the theoretical background and the development of research hypotheses. The second section describes the methodology and empirical results. The final section presents a discussion and conclusion based on the results of this study.

2. Theory and hypothesis development

2.1. Human capital and venture creation

In the entrepreneurship literature, it has been argued that venture performance is largely influenced by the entrepreneur's level of education. Thus, highly educated entrepreneurs are known to be more able to perceive and exploit successful entrepreneurial opportunities than those with less education. Nevertheless, other researchers argue that a high level of education alone might not be enough without tailor-made training which provides the necessary hands-on skills in managing

ventures (Nielsen, 2015). The human capital theory argues that an individual's cognitive ability, in the form of knowledge, intelligence and analytical ability, produces the kind of impact which drives a firm's overall productivity and efficiency (Karlsson & Wigren, 2012). Across all countries, it has been theorised that an investment in education (which is a measure of human capital) leads to economic development, without which most economic trajectories would be set back (Madsen, Neergaard, & Ulhøj, 2003).

The recent uprisings in the Arab world raise crucial questions about human capital development issues in the MENA region. This is critical, because the average level of human development in the MENA region is usually equated to the general economic development of the region (Salehi-Isfahani, 2016). Thus, there is a need to investigate key aspects of human development issues, and how these affect regional start-up growth. The entrepreneurship literature recognises an entrepreneur's human capital as an important driver for start-ups and business performance. This recognition stems from the fact that the entrepreneur's knowledge, skills and experience determine the quality of the decisions which go into the management of the venture (Colombo & Grilli, 2009; Ughetto, 2016). The entrepreneur's human capital refers to the range of skills acquired over several years through education, training and work experience, which contribute largely to the generation of tacit and codified knowledge serving as the driving force for superior performance (Ughetto, 2016). Human capital also includes other intangible resources such as intelligence, competencies, experiences, skills, attitude, knowledge and wisdom (Baer, 2012; Hoffmann, Ivcevic, & Maliakkal, 2018; Mohamud & Sarpong, 2016).

Several decades of entrepreneurial research point to the fact that the availability of adequate and qualified human capital in the form of skill, knowledge and experience in the start-up firm is known to induce innovation, which drives venture growth and competitive advantage (Barney, 1991; Costa, Fernández, & Dorrego, 2014). Thus, the presence of skilled and knowledgeable entrepreneurs in a country is found to increase the growth of ventures (Gnyawali & Fogel, 1994). Human capital has been noted to be one of the drivers of successful start-ups because it enables entrepreneurs to use their available knowledge, education, experience and expertise to acquire other needed resources to drive the venture creation process (Colombo & Grilli, 2010). In a similar study which investigated the role of scientific and technological human capital in start-up formation, Corolleur, Carrere, and Mangematin (2004) argue that the presence of renowned scientists in a firm's start-up stage can attract financial and social capital vital for the growth of scientific firms.

Human capital also has the potential to create various synergies in a firm, which are responsible for successful value creation in delivery of the firm's products and services (Engelma, Fracass, Schmidt, & Zen, 2017). De Winne and Sels (2010) also argue that human capital for small businesses, acquired through education, experience and training, is an important driving force for innovation, which is the firm's ability to create, manage and maintain knowledge. This is essential because knowledge is usually created and stored within individuals in the firm.

Therefore, a high premium is always placed on the skills and cognitive ability of the entrepreneur. Particularly, the entrepreneur's industry-specific knowledge remains a valuable asset to the venture creation process (Colombo & Grilli, 2009; Gimmon & Levie, 2010). In developing the entrepreneur's human capital base, on-the-job training, as well as relevant previous experience and competencies, are all relevant (Karlsson & Wigren, 2012). Similarly, industry-specific knowledge and management know-how are essential human capital attributes, directly related to firm product innovation and market penetration (Chorev & Anderson, 2006). Therefore, Bosman, Praag, Thurik, and Wit (2002) underscore the importance of investment in all kinds of human capital-generating activities, which should be a core activity of all start-ups and emerging firms. Based on the above discussion and evidence in the literature, the study hypothesised as follows:

H₁: *The quality of human capital in the MENA region is positively related to successful start-up formation.*

2.2. Access to electricity in the MENA region

Access to efficient energy for the venture creation process has become crucial due to the current levels of technological deployment globally. There is a gap in the literature regarding access to electricity and the emergence and growth of start-ups. Access to efficient and cheap energy provides businesses with the right technological input for efficient production of products and services. Even though new ventures do not operate on a large scale from the start, they need a consistent and reliable energy source for their operations. In a typical production process, energy is needed in combination with other production factors such as financial capital and labour. Therefore access to energy remains one of the major goals of all countries since it became part of the millennium development goals (MDGs). Even though the MENA region is noted for having an abundance of oil reserves, some of the countries in the region—such as Yemen and Egypt—have demonstrated different levels of energy poverty, which has contributed negatively to the growth and operation of businesses (El-Katiri, 2014).

The MENA region is noted to have about 57% of all global proven oil reserves and 41% of all natural gas resources. The abundance of these resources enables the MENA region to have access to unique energy sources compared to other regions. Many of the countries in the MENA region have 100% access to electricity. However, it has been estimated that about 28 million people living in this region still lack access to electricity, and about 8 million people still depend on traditional biomass for domestic use (World Bank, 2010). Even though many countries in the MENA region have access to oil reserves, the cost recovery in generating efficient electricity is low, with consistent distortion in petroleum product prices. The availability of an efficient supply of electricity leaves much to be desired, with renewable energy sources under-explored (World Bank, 2010). It has also been noted that the electricity sector in the MENA region lacks the needed private sector investment, and currently lags behind in implementing various reforms which could lead to the generation of efficient electricity to support business development. Rapid population growth and urbanisation in the region has put excessive pressure on energy generation infrastructure, which currently demands new investment estimated at US\$30 billion over the next 30 years (World Bank, 2010). The high and volatile prices have therefore put excessive pressure on businesses as well as importing countries.

The World Bank therefore proposes that the MENA region needs energy solutions which are tailored to the needs of the individual countries. In this direction, the World Bank (2010) recommends a sustainable delivery of energy services in line with economic growth in the region, which can increase access to energy services. Moreover, there is a need for efficient resource management and the exploration of renewable energy sources (Mohamed & Al-Habaibeh, 2015). Some notable energy projects in the region include the US\$750 million Concentrated Solar Power project; the US\$275 million wind power project aimed at developing the energy sector in Egypt; and the US \$200 million project aimed at developing wind power and energy efficiency in Morocco. In addition, Algeria, Egypt and Morocco are developing Integrated Solar Cycle Combination plants that produce solar energy to support the demand in these countries (OECD, 2009).

Many countries in the MENA region, such as Libya, have begun to diversify their economy and reduce their dependency on unsustainable oil resources. They therefore consider alternative renewable energy sources such as solar and wind energy (OECD, 2009). It is estimated that each square kilometre of desert in the MENA region can produce a solar energy equivalent to 1.5 million barrels of crude oil (Mohamed, Al-Habaibeh, & Abdo, 2013). Wind velocities across the MENA countries are high. For instance, Egypt's total capacity for wind power is estimated at 20,000 MW and Morocco's is estimated at 6,000 MW (OECD, 2009).

Similarly, Libya has the potential to generate an abundance of wind energy due to the levels of wind speed in various parts of the country (Mohamed et al., 2013). The use of renewable energy sources has great potential to reduce carbon emissions and overdependence on oil reserves for energy generation (El Fadel, Rachid, El-Samra, Bou Boutros, & Hashisho, 2013). An attempt to understand energy consumption in the MENA region is crucial for business growth, particularly start-ups which do not have access to large financial resources to acquire renewable energy

sources. Renewable energy sources are likely to close the current access gap to electricity in the MENA region so that small businesses could operate efficiently with cheaper cost of access to electricity usage (Mohamed & Al-Habaibeh, 2015). Currently, only 0.3% of MENA's electric power is generated through a renewable energy source, compared to other countries such as Sweden and Spain which are 30% and 10% respectively (OECD, 2009).

The OECD (2009) also predicts that the demand for energy in the MENA region is set to surge in the next 40 years, which implies that businesses—particularly start-ups—are likely to struggle with access to energy if immediate strategies are not implemented to forestall shortfalls in energy generation. In fact, energy demand in the MENA region is expected to double in the years to come, and overdependence on fossil fuel is not an option to meet such a demand, particularly for those MENA countries which are not oil producers. Table 1 below presents the electricity production and consumption rates across the MENA countries.

Middle-income countries such as Morocco have rural electrification rates of less than a fifth of all households, and the same situation exists in most of the MENA countries, where about 38% of MENA's population lives. Mostly, the lack of access is due to the inability of households to access energy due to its high cost (El-Katiri, 2014). For instance, there is a lack of electricity coverage across many of the low-income MENA countries, whereby an estimated 20 million people lack access to basic levels of electricity. Specifically, this group includes 1 million Moroccans, 1.4 million Syrians, 1 million Iranians, more than 4 million Iraqis and more than 14 million Yemenis (El-Katiri, 2014). Therefore, based on the discussion above and the evidence in the literature, the study hypothesised as follows:

Table 1. Energy production and consumption in the MENA region

Countries	Population (Millions)	Total Electricity Production (TWh)	Electricity Consumption (KWh per capita)	Electrification rate (%)
The Gulf States				
Bahrain	1.3	13,230	9,814	99.4
Iran	74.0	232,955	2,652	98.4
Iraq	32.0	50,167	1,183	86.0
Kuwait	2.7	57,029	18,320	100.0
Oman	2.8	19,819	5,933	98.0
Qatar	1.8	28,144	14,997	98.7
Saudi Arabia	27.4	240,067	7,967	99.0
United Arab Emirates	7.5	97,728	11,044	100.0
Yemen	24.1	7,757	249	39.6
The Mashreq				
Egypt	81.1	146,795	1,608	99.6
Israel	7.6	58,566	6,856	99.7
Jordan	6.0	14,779	2,226	99.9
Lebanon	4.2	15,712	3,569	99.9
Syria	20.4	46,413	1,905	92.7
North Africa				
Algeria	35.5	45,560	1,026	99.3
Libya	6.4	31,613	4,270	99.8
Morocco	32.0	22,308	781	97.0
Tunisia	10.5	16,096	1,350	99.5

Source: Adapted from El-Katiri (2014)

H₂: *Access to electricity in the MENA region is positively related to successful start-up formation.*

2.3. Starts-ups and access to financial capital

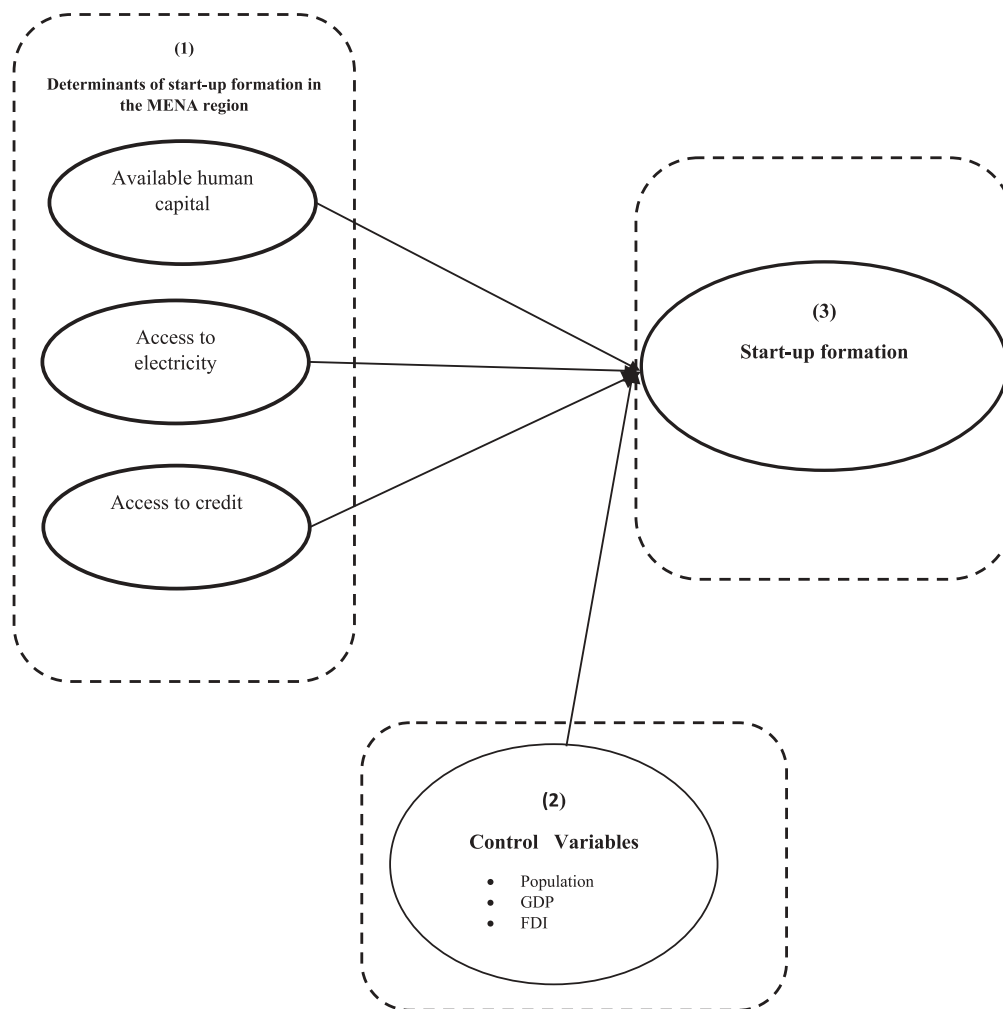
Adequate financial development is one of the most important factors which affects the growth of start-ups globally, and the MENA region is no exception. Effective financial development delivers financial capital to start-ups in the venture creation process. Financial development refers to the policies, factors and institutions that facilitate the efficient intermediation and delivery of financial services to businesses. A sound financial system supports effective risk management and resource allocation (Sarma & Pais, 2011). It also promotes the mobilisation of savings for business start-ups (Kuta, Samargandi, & Sohag, 2017). Financial development is noted to be one of the main drivers of national economic growth and its attendant poverty reduction (Adu, Marbuah, & Mensah, 2013; Chemli, 2014). Financial capital remains one of the most important resources in the business start-up process. It combines creatively with other resources to support the entrepreneur's idea exploration. Notwithstanding the size and age of the venture, financial capital is used either in the start-up process or for further expansion which comes with the growth in demand of products and services (Kuzilwa, 2005). Typically, financial capital is regarded as one of the most important of all resources needed at the start-up stage, and in most cases is largely made up of the entrepreneur's own savings or through assistance from family and friends (Baughn & Neupert, 2003). Therefore, it is expected that financial development in the MENA region could promote the establishment of new ventures, which would support job creation across all the countries. A well-functioning financial system could promote economic growth and job creation particularly among the low-income countries in the MENA region (Andrianova, Demetriades, & Shortland, 2008). This is because financial development affects poverty reduction efforts directly by creating access to credit and other sources of financing for the venture creation process. This implies that the entrepreneur would not have to depend on expensive sources of funding, which might increase the cost of business start-up. However, the level of a country's financial development ultimately depends on structural characteristics such as income, population, demographics and institutional factors such as the soundness of financial institutions and microeconomic indicators (Tayssir & Feryel, 2018). Other factors include trade openness, favourable national investment profile and per capita income of citizens (Tayssir & Feryel, 2018). Based on the discussion above and the evidence in the literature, the study hypothesised as follows:

H₃: *Access to credit in the MENA region is positively related to successful start-up formation.*

2.4. The resource-based view theory (RBV) and start-ups

Entrepreneurial research conducted over the years provides evidence that the availability of adequate firm resources is known to enhance a firm's competitiveness, growth and expansion. The Resource-Based View Theory (RBV) introduced by Barney (1991) argues that a firm's competitiveness and performance are largely based on the availability of internal resources and capabilities. However, these internal resources should be Valuable, Rare, Inimitable, and Non-substitutable (VRIN). Typically, these resources are heterogeneous in nature and come in various forms, including intangible resources such as human capital, organisational processes, information, and other tangible assets like financial resources, which are inevitable in the venture creation process. The contention is that, by applying these resources, the firm can adequately execute its strategies to achieve organisational objectives (Talaja, 2012). However, when it comes to the RBV, there is much emphasis on the presence of specialised human capabilities, which are unique in nature and thereby drive competitiveness. Start-ups, in particular, need these specialised human capabilities to identify, explore and exploit various entrepreneurial opportunities. Ultimately, the success of a start-up depends largely on available human capabilities to drive performance and innovation (Chorev & Anderson, 2006). Undeniably, specialised knowledge is needed to create and manage successful ventures in the MENA region, in order to create employment and contribute to regional economic growth. It has been argued that resource difficulties, particularly for small

Figure 1. Critical resource determinants of start-ups in the MENA region.



businesses, hinder the ability to scale-up beyond the ordinary level (Lin & Chang, 2015). It is therefore expected that available resources in the MENA region represent the major driving force for start-ups and this is likely to augment their expansion drive to create jobs and support economic development. Based on the above discussion, and considering the major findings from the literature, the following conceptual framework as shown in Figure 1 is proposed for this study, in relation to the hypotheses presented above.

3. Research context and methodology

3.1. Sample and sources of data

The sample for this study consists of data for 23 countries in the MENA region that were covered by the World Bank's Doing Business report, which investigated various business issues across over 191 countries (World Bank, 2018). The MENA region includes 18 countries in the Middle East and 5 in North Africa. It exhibits a high degree of diversity across various sectors. At one end of the spectrum are some of the richest countries in the world, with high GDPs, while the other end includes several low-income countries. From the Global Entrepreneurship Survey 2017, this region is considered to have a high rating compared to most advanced countries (except for Jordan, Lebanon, Morocco, Algeria, Egypt, Iran, and Libya). The most entrepreneurial economy in this region is Israel, followed by the UAE and Qatar. Egypt, Iran and Libya are amongst the lowest entrepreneurial economies in the region (GEDI, 2017).

Three sets of secondary data were used in this study. Firstly, the study used the World Bank's Doing Business Report (2018) which investigated *ease of starting businesses*, *access to electricity* and *access to credit* across the 23 MENA countries. The ease of starting business variable measures all the official procedures required for an entrepreneur to formally start a business, as well as the time and cost to complete these procedures. The access to credit variable measures the collateral laws and information on credit systems across the MENA region. The access to electricity variable measures the procedures, time and cost to connect electricity to businesses.

Secondly, the study also used the human capital index from the Global Entrepreneurship Index (GEDI, 2017) as one of the explanatory variables. The GEDI is an annual survey, covering 137 countries, which measures entrepreneurial intensity across all economies globally. The human capital variable measures the quality of available human capital in the MENA region, using indicators such as the educational level of participants, labour market efficiency, staff training provided and general labour freedom across the 23 countries.

Finally, three specific data sets: namely population (2018), Foreign Direct Investment (FDI) and Gross Domestic Product (2017) of the 23 MENA countries from UNCTAD (2017) were used as control variables. Table 2 below provides a summary of the data sources and variables used in the study. These three predictor variables (electricity, credit and human capital) are important because globally all start-ups depend on these three main capitals; access to energy, financial and human capital. It is therefore important to investigate how these drivers affect start-up formation and growth in the MENA region.

3.2. Constructs and measures

3.2.1. Dependent variable

The ability of an economy to support start-up formation is an important factor in generating entrepreneurial growth and employment. The dependent variable *ease of starting a business* was used to measure all the official processes required of an entrepreneur to formally start a business (World Bank, 2018). Five items were used to measure this variable: *procedures*, *time*, *cost*, *paid-in minimum capital* and *reforms*. Firstly, *procedures* refers to all official requirements with which an entrepreneur has to comply to obtain the necessary approvals, licenses and permits with the relevant state authorities, lawyers, agencies and auditors, and from spouses (if required) across the 23 MENA countries.

Secondly, *time* is recorded as the number of calendar days. It captures the median duration needed to complete each procedure involved, including follow-ups. It is assumed that the minimum time required to complete a single procedure is a day, except for online procedures. A formal procedure is deemed to be completed once the entrepreneur receives the formal document applied for. However, the time involved in gathering the necessary information and documentation is not counted.

Table 2. Summary of data sources and variables

Variables Used	Indicator	Unit	Data sources
Start-Up Formation	Independent Variable	Index	World Bank, 2018
Available Human Capital	Explanatory Variable	Index	GEDI, 2017
Access to Credit	Explanatory Variable	Index	World Bank, 2018
Access to Electricity	Explanatory Variable	Index	World Bank, 2018
GDP	Control Variable	\$	UNCTAD, 2017
FDI	Control Variable	\$	UNCTAD, 2017
Population	Control Variable	Millions	UNCTAD, 2018

Thirdly, *cost* is measured as a percentage of the per capita income in the country. It includes all the official fees paid by an entrepreneur for legal or other professional services, if such services are required by law or commonly used in practice. Thus, all incorporation costs involved in setting up a venture are calculated and taken as a percentage of the per capita income of the country. This cost also includes all bribes given as part of complying with government procedures and regulations.

Fourthly, *paid-in minimum capital* refers to the amount of money an entrepreneur is required to deposit with a bank or a deposit service provider before registration, or up to three months after business registration, as part of meeting a legal requirement for registration. This is calculated as a percentage of the economy's per capita income.

Finally, *reforms* tracks the changes introduced in each of the economies in support of incorporating and operating limited liability companies on a yearly basis. Two types of reforms were identified and recorded, namely those that make it easier to do business and those that make it more difficult to do business. Each country was therefore scored on the basis of these reforms. These data were collected using a paper-based questionnaire by the World Bank experts across the participating countries. These economies were then ranked based on the aggregate scores obtained from the above variables. The average of these data (mean) is then used to compute for the dependent variable.

3.2.2. Independent variables

This study employed three explanatory variables: human capital, access to credit, and access to electricity, as predictors of new venture formation in the 23 MENA countries. While the human capital variable is sourced from the Global Entrepreneurship Development Institute (GEDI, 2017), access to credit and electricity were sourced from the World Bank's Doing Business Report (World Bank, 2018). These three explanatory variables are thought to represent the most critical resources needed by start-ups. The World Bank's Doing Business Report 2018 investigates various national regulations, laws and administrative requirements that promote or constrain business activity. It presents quantitative data on 11 business areas, including access to credit and electricity. It covers 190 countries, including the 23 MENA countries used in this study. The methodology for measuring each variable is discussed below.

As noted above, the availability of high-quality human capital in an economy is vital for business growth, particularly for start-ups. Start-up formation requires an educated, experienced and healthy workforce (Davidsson & Honig, 2003). The human capital index sourced from the GEDI (2017) is measured by two variables (level of education and labour market efficiency) across the 23 MENA countries. It aggregates the percentage of individuals with higher than secondary education and having the ability to train employees, combined with labour freedom in each country. Labour market efficiency is comprised of two components: the level of investment in staff training and labour freedom. While labour freedom measures effective regulatory mechanisms relating to labour in a country, staff training measures the amount of investment in staff training in each country.

The access to credit variable measures the collateral laws and effective credit systems in each MENA country and how these systems facilitate access to credit for venture creation purposes. Four items: namely, strength of legal rights, depth of credit information, credit bureau coverage and credit registry coverage, are used to measure access to credit in each economy.

The access to electricity variable captures *the procedures, time and cost* to connect electricity services to a business. This variable is measured using five items: *procedures for connection, time spent on connection procedures, cost of supply, reliability of electricity supply and transparency of tariffs* (World Bank, 2018). Data were collected from utility distribution firms, independent professionals such as electricians, electrical engineers and construction companies in each MENA country.

3.2.3. Control variables

The study was controlled using three main country-specific variables: GDP, population and FDI for the 23 MENA countries. These variables were used because they are considered able to influence start-up

propensity in each MENA country (Djankov et al., 2002). It is therefore important to understand the nature of the influence of these variables on venture creation across the MENA region. While GDP and FDI were sourced from UNCTAD (2017), population data was sourced from UNCTAD (2018).

4. Statistical analyses and results

Table 3 below presents the descriptive statistics (i.e. means and standard deviations of the dependent and independent variables, minimum and maximum values, skewness, and Kurtosis of the variables). The results of the regression analysis for start-up formation in the MENA region and its predictor variables (available human capital, access to electricity and access to credit) are presented in Table 4. In this study, two regression models were executed. Model 1, the restricted model, was executed with the dependent variable (start-up formation) and the three control variables (population, GDP and FDI). In the execution of the extended model (Model 2), all the predictor variables were added to Model 1 to ascertain its overall fitness.

In the full regression model (Model 2), human capital ($p = 0.365$, $\beta = 2.864$) is statistically insignificant in determining start-ups in the MENA region. Hypothesis H1 is therefore not accepted. Thus, the current level of human capital development in the MENA region does not support start-ups and business growth. Secondly, access to electricity ($p = 0.008$, $\beta = 0.177$). A unit increase in electricity supply would lead to a 17.7% increase in start-up formation in the MENA region. Hypothesis H2 is therefore accepted. Finally, access to credit ($p = 0.000$, $\beta = 0.215$). A unit increase in access to credit facilities and other sources of start-up funding would lead to a 21.5% increase of start-up formation in the MENA region. Hence, hypothesis H3 is accepted.

Regarding the control variables, while population and GDP do not influence start-up formation in the MENA region, the results show that FDI level does have an influence.

The R^2 signifies the fitness of the regression model of this study. Deduced from the full regression model (Model 2), the R^2 value is 0.431, and its adjusted value is 0.345. This means that using the adjusted value, the full model explains 34.5% of the variance in start-up formation in the MENA region. Table 3 and IV below present the descriptive statistics, correlations and results of the regression analysis respectively.

5. Discussion of empirical results

Table 4 above shows the results of the determinants of start-ups: namely, available human capital, access to electricity and access to credit, in the MENA region. The results of these determinants on start-up formation are presented below.

5.1. The current quality and level of human capital in the MENA region does not support new business formation

The results indicate that human capital does not support start-up formation in the MENA region. As noted in the discussion above, the availability of adequate and skilled human capital in a country is expected to drive start-up formation (Ughetto, 2016). Thus, the entrepreneur's knowledge, skills and experience play a critical role in start-up formation, survival and growth of new businesses. However, in the MENA region, this is not the case. The results of this study show a deficiency in the level and quality of human capital in the region. H3 hypothesis regarding human capital is therefore rejected. This is likely to be the result of the various uprisings which characterised the region, with their attendant insecurity and low emphasis on entrepreneurial training and education (Salehi-Isfahani, 2016). This situation demands a renewed emphasis on human capital development, particularly in the development of entrepreneurial skills, which would improve entrepreneurs' knowledge base and cognitive ability to risk the venture creation process and its attendant effect on growth and scaling up (Colombo & Grilli, 2009). There is also a need to improve the delivery of entrepreneurship education across universities and other higher education institutions in the MENA region. This is essential, because if graduates were equipped with the right venture creation skills and knowledge, they would be able to create start-ups with the right support from the entrepreneurial ecosystem (Laforet, 2011; GEDI, 2018).

Table 3. Descriptive statistics and correlations

	Variable	Range	Minimum	Maximum	Mean	Skewness	Kurtosis	1	2	3	4	5	6	7
(1)	Start-up formation	4.63	78.07	82.70	79.3591	.858	-1.204	1.000						
(2)	Available human capital	59.87	.13	60.00	14.3630	1.224	-.287	-.183**	1.000					
(3)	Access to electricity	36.71	54.08	90.79	63.9165	.895	-1.050	.279**	.030	1.000				
(4)	Access to credit	65.00	5.00	70.00	23.9130	1.227	-.420	.126***	.099	.289**	1.000			
(5)	Population	107,103.00	432.00	107,535.00	29,735.1304	1.290	.591	.119	-.256**	-.077	-.012	1.000		
(6)	GDP	850,432.00	2034.00	852,466.00	183,917.2174	1.946	3.318	-.165	.044	-.196	-.010	.348**	1.000	
(7)	FDI	23,986.00	-5032.00	18,954.00	3100.1304	1.812	4.481	.199	.137	.403*	.562**	.191	.432**	1.000
	Valid N (listwise): 23													

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Regression analysis of the critical resource determinants of start-ups in the MENA region

Variable	Model 1					Model 2				
	Unstandardized Coefficients (ß)	Std. Error	Standardized Coefficients (Beta)	t	Sig. (p)	VIF	Unstandardized Coefficients (ß)	Std. Error	Standardized Coefficients (Beta)	t
Available human capital										
Access to electricity										
Access to credit										
Population	1.321	0.562	0.023	0.102	0.920	1.199	2.864	0.005	0.124	.953
GDP	2.332	0.000	0.291	1.147	0.266	1.474	0.177	0.053	0.391	3.352
FDI	0.000	0.000	0.450	1.902	0.072	1.278	0.215	0.029	0.903	7.390
R	0.265						2.32	0.000	0.143	1.040
R ²	0.223						2.41	0.000	0.101	0.870
Adjusted R ²	0.201						0.001	0.000	0.520	3.896
ANOVA F	25.311						0.165			
Sig. F Change	0.000						.431			
N	23						.345			
							20.258			
							0.000			
							23			

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5.2. The current energy levels in the MENA region support venture creation

The MENA region is noted for the availability of various forms of energy, which is its greatest asset. Even though some of the countries in the region, such as Egypt and Yemen, are struggling with their energy levels, the results indicate that general access to electricity in the region supports venture creation and business growth (El-Katiri, 2014). The MENA region is noted to boast of about 57% of all global oil reserves and 41% of all natural gas sources. This remains the greatest resource for entrepreneurs in the venture creation process. Energy is crucial for start-ups. It is however expected that the region could further improve these resources, in order to increase access as well as reduce cost. This is essential because the cost of energy determines accessibility. It has been noted that the cost of electricity in the region is high compared to other jurisdictions, even though the region has abundant oil reserves (World Bank, 2010). It is therefore recommended that renewable energy sources be developed to augment the current supply of energy, as well as reducing the cost of electricity (Mohamed et al., 2013; OECD, 2009).

5.3. The current level of financial resources in the MENA region supports venture creation

The venture creation process critically depends on the availability of adequate and cheap financial resources for the entrepreneur (Kuta et al., 2017). Such financial resources need to be flexible, cheap and accessible to the entrepreneur without much trouble (Adu et al., 2013). The results indicate that the current level of financial resources in the MENA region supports entrepreneurs adequately in the venture creation process. Access to credit is noted to be flexible, probably due to the Islamic banking concept and the general availability of financial resources (Mohamed and Hassanudin, 2016). However, the region could improve upon current credit access levels by reducing barriers to the bare minimum. The removal of these barriers could further reduce the cost of credit facilities from banks and other financial service providers. By so doing, entrepreneurs in the region would be able to create successful ventures to create jobs, which would have a bearing on poverty reduction.

6. Conclusion

This study investigated three determinants of start-ups in the MENA region: available human capital, access to credit and electricity. The MENA region provides a unique context to study the determinants of start-ups, due to its unusual abundance of oil resources, as well as the incidences of violence which are likely to negatively affect entrepreneurial appetite in the region. It is therefore not surprising that the available human capital does not support venture creation. However, access to electricity and credit are found to contribute significantly to the emergence of start-ups. This study contributes to the start-up literature by examining the factors responsible for start-up formation in the MENA region. The study also highlights the resource-based view of firms, which prescribes the availability of required resources in firms to generate a competitive advantage (Barney, 1991; Choev & Anderson, 2006). This study has implications for policy and practice.

It is imperative for the governments in the MENA region to focus on human capital development efforts. Particular emphasis should be placed on entrepreneurship education in universities, which is likely to produce graduates with the requisite knowledge and skill to undertake successful venture creation. There is also a need to embrace alternative renewable energy technologies such as biomass, biogas, solar or wind, which are currently considered much more promising than the non-renewable energy sources which the region heavily depends on.

This study has a few limitations. Firstly, it depended heavily on secondary data to examine the determinants of start-ups in the MENA region. Even though the sources of these data are credible, it is impossible to determine any anomalies in their aggregation. Secondly, the model used in this study is parsimonious in the sense that many more predictor variables could be explored in understanding the determinants of start-ups in the region. Future research could, therefore, investigate other factors such as technology, property rights, the legal system and other important indicators in the entrepreneurial ecosystem.

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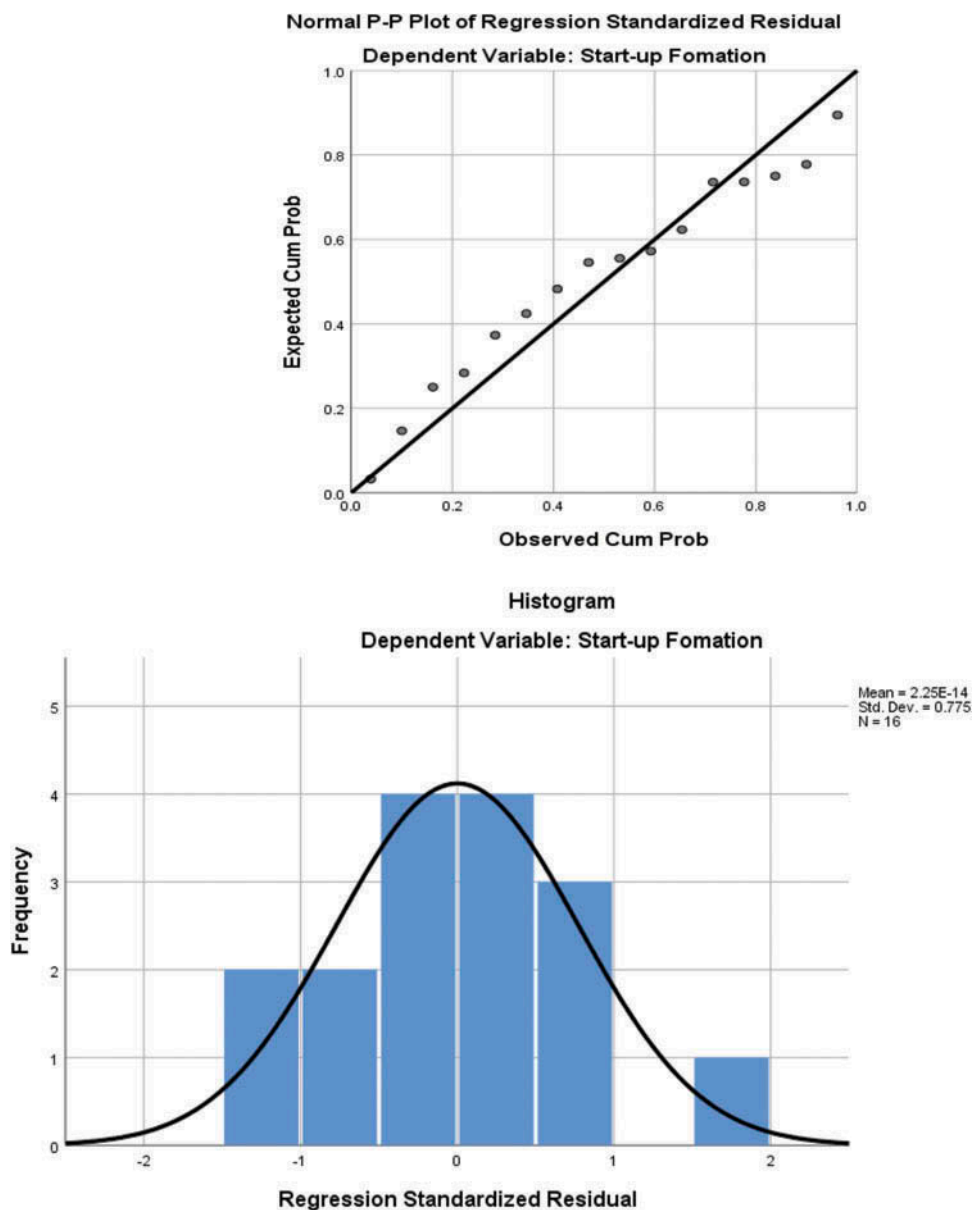
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Appendix I



Appendix II. Description of variables

Variable	Description	Items Used
Ease of Starting Business	Measures all the official processes required of the entrepreneur to formally start a business.	Procedures, time, cost, paid-in minimum capital and reforms
Human Capital	Focus on quality of entrepreneurs as weighing percent of start-ups by individuals with higher than secondary education with a qualitative measure of the propensity of firms in a country to train staff combined with freedom of labour market	Educational level Labour market (staff training, labour freedom)
Access to credit	Measures legal rights of borrowers and lenders with respect to secure transactions and reporting of credit information through credit reporting service providers such as credit bureau or credit registries	Strength of legal rights, depth of credit information Credit bureau coverage, credit registry coverage
Access to electricity	All procedures necessary for a business to obtain a permanent electricity connection and supply for a standardised warehouse. These procedures include applications and contracts with electricity utilities, all necessary inspections and clearances from distribution utility and other agencies, external and final connection works	Procedures to obtain electricity, time required to complete each procedure, cost required to complete each procedure, reliability of supply and transparent tariff, price of electricity
Population	Measures growth of the African population	Population growth
GDP	Measures growth of Gross domestic product of African countries	The growth of gross domestic product
FDI	Measures level of foreign direct investment into various African enterprises	Level of foreign direct investment



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