

# Entrepreneurial activity in the Albertine Graben region of Uganda: the role of infrastructure development and entrepreneurial orientation

Entrepreneurial activities in the Albertine Graben region

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Received 13 April 2020  
Revised 9 September 2020  
Accepted 21 September 2020

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## Abstract

**Purpose** – The purpose of this paper is twofold (1) to establish the relationship between infrastructure development and entrepreneurial orientation (EO) on the entrepreneurial activities in the Albertine Graben region of Uganda and (2) to establish whether entrepreneurial orientation mediates the relationship between infrastructure development and entrepreneurial activity.

**Design/methodology/approach** – Quantitative data were collected from a sample of 118 enterprises, mainly small businesses. The authors sent out 118 self-administered questionnaires of which 93 useable questionnaires were returned, giving a response rate of 79%. Quantitative data were processed and analyzed using SPSS version 21. Analyses such as correlation, hierarchical regression and mediation were carried out to understand (1) the relationship between the variables, (2) the prediction potential of the independent variables to entrepreneurial activity and (3) the mediation role of EO on the relationship between infrastructure activity and business performance.

**Findings** – The authors found out that infrastructure developments are a significant predictor of entrepreneurial activity ( $\beta = 0.432^{**}$ ,  $p < 0.01$ ), explaining 21.6% of entrepreneurial activity in the region. EO was found to have a significant positive relationship with entrepreneurial activity ( $r = 0.580^{**}$ ,  $p < 0.01$ ). The results of a hierarchical regression indicate that both infrastructure development and EO explain 42% of the entrepreneurial activity in the Albertine region. Mediation analysis indicated that EO is a partial mediator in the relationship between infrastructure development and entrepreneurial activity.

**Research limitations/implications** – The results are based on self-report statistics. The model explains 42% of entrepreneurial activity thus there is need to examine the influence of other factors which contribute the 58% to entrepreneurial activity. The study was also limited to public infrastructure, with much attention on transportation (roads) and energy (electricity). Future studies can consider looking at private infrastructure as well.

**Practical implications** – Understanding the role of infrastructure development and EO helps government and other development partners to know the type, quantity and quality of the infrastructure required as well as how to grow the EO of entrepreneurs to boost entrepreneurial activity in the region.

**Originality/value** – This paper provides insights into our understanding of the relationship between infrastructure development, entrepreneurial orientation and entrepreneurial activity using evidence from Uganda's oil rich region. The originality of this paper further lies in the discovery of the partial mediation of entrepreneurial orientation in the relationship between infrastructure development and entrepreneurial activity. This is the first time such a study is conducted in an African developing country such as Uganda whose oil exploration activities are still in their infancy.

**Keywords** Infrastructure development, Entrepreneurial orientation, Entrepreneurial activity, Albertine Graben, Uganda

**Paper type** Research paper



## Introduction

In 2006, the Government of Uganda announced the discovery of commercially viable reserves of crude oil in areas of the Albertine Graben in Western Uganda. This has attracted several infrastructural investments in the region such as transport, energy, communication and other social amenities like education and health meant not only to facilitate further exploration and production of hydrocarbons in-place but also improve the quality of life of the people who live in that area. The Albertine Graben's proven oil reserves are valued at 3.5bn barrels, expected to yield at least \$2bn per year for 30 years once oil production commences. According to the [Economic Policy Research Center Report \(2015\)](#), these are transformative discoveries that are capable of fostering trade and improve economic development of the country. There has been an increase in entrepreneurial activities in the region, especially in the semi-urban centers and towns due to an influx of people, capital as well as infrastructural improvements to support trade. It is expected that enterprises in the oil rich regions would leverage on the infrastructural development to grow. It also follows that new enterprises would spring up, contributing to employment, socioeconomic transformation and the country's gross domestic product ([Turyahebwa et al., 2013](#)). The infrastructure combined with entrepreneurial orientation (EO) can trigger businesses to reorganize, innovate, and improve their performance and startup even under conditions of risk and uncertainties. Generally, entrepreneurial activity is expected at individual or firm, expressed in terms of number of entrepreneurs or innovators in an area, new business ventures, and improved performance of the already existing businesses among others.

Positive relationships between EO and firm performance have been found by different scholars in wider contexts such as in the hospitality and manufacturing industry ([Jantunen et al., 2005](#)), small and medium enterprises ([Wiklund and Shepherd, 2003](#); [Hughes et al., 2007](#)) and foreign direct investments ([Su et al., 2011](#)). In all these studies, researchers found out that EO with all its constructs (innovative, risk-taking and proactiveness) in concert with other factors such as infrastructure development and knowledge creation are positively linked to business performance. Some of these factors directly, mediated or in moderation have been found to predict entrepreneurial activities in a variety of contexts unlike in the oil and gas exploration. Therefore, this study will investigate the role of infrastructure development and EO on the entrepreneurial activities in the Albertine Graben region of Uganda with the view to identify the relationship between the variables.

Studies have been conducted to understand how entrepreneurial infrastructure and other environment contexts affect entrepreneurial activity ([Gilbert et al., 2006](#); [Wiklund et al., 2009](#); [Delmar et al., 2003](#)), but a few have listed physical infrastructure as one of the drivers of entrepreneurial activity. Indeed [Bennett \(2019\)](#) cites [Audretsch et al. \(2015\)](#) as the only authors who explicitly explored the relationship between physical infrastructure and entrepreneurship. Thus, the two prominent studies that consider physical infrastructure have all been done in the developed countries, leaving a gap for such studies in the least developed world. According to [Ahmed and Donovan \(1992\)](#), the term infrastructure acquired several distinctions such as hard infrastructure, soft infrastructure, physical infrastructure, social infrastructure, economic infrastructure and institutional infrastructure to emphasize specific aspects that scholars intended to explain with their findings. This study will focus on the physical/hard infrastructure, mainly transport and energy as these are the outstanding in the Albertine region. Whereas the infrastructural developments in oil-rich areas in most developing countries are predominantly meant to facilitate the exploitation of the underlying hydrocarbons, the infrastructural facilities have direct/indirect positive externalities to the growth of business enterprises. These externalities include reduced costs of transportation of people and their goods, improved and increased diffusion of technology into marginal areas, increased specialization and commercialization, increased entrepreneurial opportunities.

This study aims at assessing the extent to which entrepreneurs in the Albertine region have leveraged on the oil-related infrastructural developments, combined with their entrepreneurship orientation to spur entrepreneurial activities. The study specifically sought to assess the effect of the road network and electricity development projects in the area on the entrepreneurial activity in the Albertine Graben region.

## Literature review

### *Theoretical foundations*

According to the traditional theory, in a competitive market economy, firms are confronted with higher marginal costs at every level of production when the infrastructure is inadequately developed and hence the output is inherently low. When the stock and quality of infrastructure is improved, the marginal costs of production reduce whereas the production of goods/services increases. The cost reduction usually emerges from the interaction of infrastructure with the directly productive inputs of firms such as the reduction in transaction costs, increased specialization and commercialization, new combination of outputs and inputs, changes in consumption patterns as well as increased entrepreneurial capacity. Public infrastructure is rarely a barrier to entry as any enterprise has the right to use it. Therefore, the Albertine region of Uganda having explored huge oil deposits, increased infrastructure development and increased entrepreneurial actions becomes an interesting area to test the applicability of this theory.

### *Infrastructure development and entrepreneurial activity*

Public physical infrastructure, although highly capital intensive, serves to reduce barriers to new entry for individuals or firms since it facilitates connectivity, interaction and exchange of knowledge between market actors. According to Audretsch and Keilbach (2007), such developments influence entrepreneurial opportunities that are available to individuals or firms and, their ability and willingness to pursue those opportunities is what creates a difference.

It is important to note however that specific types of infrastructure are related to entrepreneurship and market entry in disparate ways, as discussed by Audretsch *et al.* (2015), reflecting the inherent heterogeneity within the different types of infrastructure. In their paper, they show that certain industries such as manufacturing will flourish more when transport or energy infrastructure is improved whereas the telecommunications sector for instance will flourish more when broadband infrastructure are put in place. Improvement of transport infrastructure of an area inherently connects distant markets, eases movement within and, facilitates the diffusion of people and their goods into an area. In addition, improvement of infrastructure directly affects the costs of transport, irrespective of other factors such as fuel prices. For example, Djankov *et al.* (2010) claimed that infrastructure development reduces transport costs either directly or as a result of reduction in delivery time of goods. It is therefore expected that the infrastructural developments that have come with the emergence of the oil industry present opportunities to businesses in the Albertine region and thus spur entrepreneurial activity in the region.

*H1.* Infrastructure development is positively related to entrepreneurial activity.

### *Entrepreneurial orientation and entrepreneurial activity*

Enterprises must pursue excellence in every aspect of business such as maximizing profits while creating superior value for customers. Mamun and Fazal (2018) in their study defined business performance as the extent to which an organization copes with the fluctuating environmental factors such as profits, productivity, employee satisfaction, social

responsibility and business survival. Enterprise or business performance, a multidimensional construct encompasses both operational and financial outcomes. Zehir *et al.* (2015) characterized EO as an inimitable resource that business owners/managers possess that helps them to explore opportunities in the market, utilize them and facilitate firm performance, and operationalized EO as creativity, risk-taking and autonomy.

Creativity is a main factor typifying entrepreneurship as it encourages organizations to look for new opportunities or solutions that require continuous study, experimentation and innovativeness in the invention of new products and services or improvement in certain technical aspects of the existing products or services. To exploit business opportunities, entrepreneurs exercise their inventive ability to create solutions out of problems and challenges in uncertain situations and as a result, it has been associated with entrepreneurial activity in terms of; introduction of new products or services, continuous improvements in existing strategies and systems and firm adaption in an ever-changing environment.

Risk-taking propensity has been defined by Miller and Friesen (1982) as the degree to which business owners/managers are willing to make substantially large and risky resource commitments which have a reasonable chance of costly failures. It can be measured using the managerial competence in projecting the firm's inclination toward risky projects and their preferable actions to achieve organizational objectives in a critical environment. Risk-taking propensity is an essential predictor of entrepreneurial intention and behavior, which bears considerable influence on entrepreneurial activity.

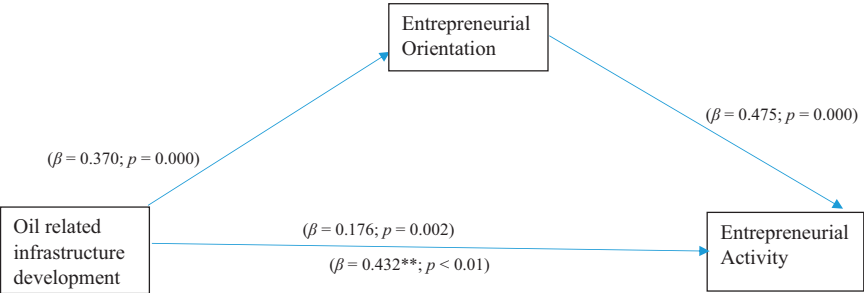
Autonomy, which is the ability and willingness to take self-directed actions in pursuit of market opportunities, allow firms to make quick and self-reliant decisions that discover or grow new markets for the firms' products or services. In fact, firms in the same industry usually perform differently as their resources and employee capabilities differ. Autonomy is usually closely related to the management and development of the firm's employees, which basically facilitates their access to vital information that enables them to make sound decisions. Empirically, inherent autonomy has been found to have a positive effect on entrepreneurial activity.

*H2.* Entrepreneurial orientation is positively related to entrepreneurial activities.

*H2(a).* Risk-taking propensity is positively related to entrepreneurial activities

*H2(b).* Autonomy is positively related to entrepreneurial activities

*Conceptual framework.* As indicated in Figure 1, the independent variable is the development of oil-related infrastructure in the Albertine region whose major goal is to facilitate the smooth exploration for, development and production of the hydrocarbon resources in the region. Transport infrastructure has been specifically used in this study and it includes the major oil roads being developed in the district. These are intended to transport



**Figure 1.**  
Mediation analysis

people as well as equipment and technology to be used in the industry but also, to foster social development such as schools, hospitals, markets, fishing and farming. Empirical evidence from studies carried out worldwide posits the positive impacts of infrastructure on economic growth and development of communities, and nations at large. This kind of physical infrastructure has a marked influence on the standards of living and the trade flows of goods, people or services between different areas. Transport infrastructure such as roads reduce on the travel time and costs, bringing people and their businesses closer to their market. Health and standards of living of the people also improve since some basic amenities such as health centers become more accessible, which in turn increases their labor productivity. Road infrastructure also increases on the interconnectivity of markets and the market actors therein which further improves on the environment of doing business. Ultimately, the costs of doing business reduce further, markets expand and business thrives. The framework also posits a moderating variable, the EO of the small business managers, which influences the rate and extent to which these managers leverage on the opportunities in the region to identify new business opportunities and improve on the performance of small businesses in the area. Energy infrastructure includes the Nkenda–Fort Portal–Hoima 220 kV power line, a 9 MW Buseruka mini-hydropower plant across river Wambabya to be refurbished and stepped-up to produce over 20 MW whereas several substations such as Kinubi have also been established.

## Methodology

### *Design, population and sample*

This study adopted both cross-sectional and correlational survey design. Our major interest was to capture data on the variables under study at a given specific point in time. Secondly, we were interested in understanding the extent to which these variables were related. According to [Bananuka et al. \(2020\)](#), researchers use the cross-sectional survey design so that they can understand the impact of the variables studied. In this case, the cross-section survey design helped us to understand the impact of infrastructural development and the entrepreneurial activities on the performance of business activities in the Albertine region since the beginning of exploration activities. The population of study was 177 small businesses in Hoima Municipality. These small businesses include retail and wholesale shops, hotels, bars and restaurants, private health-service facilities such as pharmacies and clinics, rentals, amongst others. The small businesses of interest included in the study are those with 2–50 employees, which were either registered or unregistered. From this population, we surveyed 118 small business owners/managers in the Albertine region out of which we managed to get 93 useable responses, giving us a response rate of 79%. This sample size was determined based on Krejcie and Morgan's formula for sample size determination ([Krejcie and Morgan, 1970](#)). We used a stratified random sampling, whereby we subdivided the target population (small business owners/managers) according to the different business categories they are involved in. As a result, each subgroup in the study area was included in the exercise ([Ackoff, 1953](#)).

*The questionnaire, response characteristics and variable measurements.* In an attempt to measure the opinions or attitudes of respondents ([Burns and Grove, 2009](#)), a 5-point Likert scale was used to obtain self-reported information on EO, infrastructure development and business performance. These scales were hinged on a 5-point Likert Scale of “strongly agree”, “agree”, “neutral”, “disagree” and “strongly disagree”. Using semi-structured interviews, we collected quantitative data from owner/manager of the business since the enterprises that constituted this study were small businesses. The questionnaire included questions such as “There has been an improvement in the road network in my area”, “There is a decrease in

transport costs in terms of time and money” and “I am willing to try new methods of doing things and implement unusual and novel solutions that suit the new business environment”.

*Response characteristics.* The findings showed that 42% of the respondents were female and 58% were males. In terms of age; 58% were aged between 21 and 30 years, 17% were between 31 and 40 years, 7% were between 41 and 50 years and 9% were above 50 years of age. In terms of education levels, 1% had master’s degree, 19% had bachelor’s degree, 21% had diplomas, 14% had advanced level while 39% had ordinary level education. In terms of marital status, the majority (55%) of them were married while 42% were single. In terms of working experience, the majority (61%) of them had worked for not more than five years, 23% had worked between 5 and 10 years, and 16% had worked for 11 years and above. In terms of the number of employees working in these small businesses, the majority (96%) employed between 2 and 15 people while 4% employed between 16 and 25 people. These are well presented in [Table 1](#).

*Measurement of variables.* Infrastructure development was measured based on the extent to which related infrastructure such as the road and electricity network have been setup or improved in the study area. EO was conceptualized according to ([Covin and Slevin, 1989](#); [Hughes and Morgan, 2007](#)). They looked at EO in three dimensions of autonomy, risk-taking propensity and creativity. Competitive aggressiveness and pro-activeness were ignored for this study. Items developed in the questionnaire were modified to suit the study objectives and subjected to a 5-point Likert scale in order to measure the EO of the owners/managers of the small businesses operating in the study area. Business performance was also

Variables	Categories	Count	%
Gender	Male	35	38
	Female	58	62
	Total	93	100
Highest level of education	Others	4	4
	Master’s	1	1
	Bachelor’s	19	20
	Diploma	20	21
	Advanced level	36	14
	Ordinary Level	13	39
	Total	93	100
Age	Below 21 years	9	9
	21–30 years	54	58
	31–40 years	16	17
	41–50 years	6	7
	Above 50 years	8	9
	Total	93	100
Marital status	Married	39	55
	Single	51	42
	Divorced	03	03
	Total	93	100
Working experience	Below 5 years	57	61
	5–10 years	21	23
	Above 11 years	15	16
	Total	93	100
Numbers of employees	2–15	89	96
	16–25	4	4
	26–35	0	0
	36–50	0	0
	Total	93	100

**Table 1.**  
Respondents’  
characteristics

conceptualized into four dimensions. These are return on assets and return on sales which constituted the financial performance; customer relationship management and employee management which constituted the operational performance. These items were similarly modified in the questionnaire to suit the study context and subjected to 5-point Likert scale so as to measure the business performance of the different business entities operating in the study area.

*Validity and reliability of the instruments.* We carried out reliability tests to ensure that the instrument used may produce stable and consistent results under varied conditions (Sekaran, 2003). In this test, the questionnaire items were subjected to the Cronbach's alpha coefficient test and the results are shown in Table 1. Nunnally *et al.* (1978) state that a coefficient result of 0.65 and above implies that items are reliable on average, and they elicit almost similar responses when administered by the same respondents several times.

*Analysis.* We used SPSS version 21 to analyze data. We screened the data by way of missing value analysis, examining outliers and normality of the data. We extracted frequencies, descriptive statistic (mean and standard deviations) and run inferential statistics mainly correlations and regressions as presented in Tables 3 and 4, respectively.

*Findings.* Oil-related infrastructural developments had a composite mean of 4.074 and standard deviation (SD) of 0.580. The means of individual infrastructural developments are relatively high, especially for the road sector, which implies that most of the respondents agree that there have been significant infrastructural developments. The SDs are below one, thus the mean values are coherent with the general opinions of the respondents.

EO of business owners/managers as a composite (Mean = 3.913, SD = 0.550), creativity (Mean = 4.025, SD = 0.815), risk-taking propensity (Mean = 3.655, SD = 0.776) and autonomy (Mean = 4.060, SD = 0.703). The mean values are also relatively high, especially for autonomy, which implies that most business owners/managers that participated in the study had a high level of EO. The high mean value of entrepreneurial activity (Mean = 4.256, SD = 0.542) implies that businesses are faring well. The mean values are based on a 5-point scale ranging from 5 = high to 1 = low. The correlation analysis test reveals significant, positive relationships among the study variables and their constructs. The results of the test are discussed in the subsequent subsection below.

#### *Infrastructure development and its constructs*

In Table 2, infrastructural development is significantly and positively correlated to the EO of small business owners/managers ( $r = 0.370^{**}$ ,  $p < 0.01$ ) and entrepreneurship activity ( $r = 0.459^{**}$ ,  $p < 0.01$ ). This implies that as the infrastructure in the area improved, there was an increase in the EO of the business owners/managers and in the entrepreneurial activity. Transport infrastructural development (roads sector) is significantly and positively correlated to creativity ( $r = 0.388^{**}$ ,  $p < 0.01$ ) and entrepreneurial activity ( $r = 0.505^{**}$ ,  $p < 0.01$ ). This implies that as the road networks in the area improved, then so did the creativity of business owners/managers and the entrepreneurial activity. Energy infrastructural development (electricity sector) is significantly and positively correlated to creativity ( $r = 0.332^{**}$ ,  $p < 0.01$ ), risk-taking propensity ( $r = 0.232^{*}$ ,  $p < 0.05$ ) and

	Cronbach's alpha	No. of items
Infrastructure development	0.683	8
Entrepreneurial orientation	0.720	12
Entrep. activity	0.720	12
Average	0.846	32

**Table 2.**  
Reliability tests



**Table 3.**  
Mean, standard  
deviations and the  
correlation matrix

Variables	Mean	SD	1	2	3	4	5	6	7	8
ID	4.074	0.580	1							
Roads	4.363	0.653	0.771**	1						
Energy	3.784	0.777	0.845**	0.312**	1					
EO	3.913	0.550	0.370**	0.311**	0.291**	1				
Creativity	4.025	0.815	0.441**	0.388**	0.322**	0.818**	1			
Risk-taking	3.655	0.776	0.233*	0.138	0.232*	0.721**	0.436**	1		
Autonomy	4.060	0.703	0.099	0.128	0.040	0.602**	0.278**	0.081	1	
Entrep. activity	4.256	0.542	0.459**	0.505**	0.261*	0.580**	0.527**	0.243*	0.481**	1

**Note(s):** \*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed)

**Table 4.**  
Hierarchical regression  
analysis

Dependent variable: Entrepreneurial activity								
Variable	Model 1		Model 2		Model 3		Model 4	
	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig
Constant	4.461	0.000	2.557	0.000	1.424	0.001	0.075	0.973
No. of employees	0.009	0.540	0.019	0.179	0.012	0.343	0.012	0.330
Work experience	-0.158*	0.039	-0.092	0.187	-0.117	0.053	-0.119	0.051
ID			0.432**	0.000	0.258**	0.003	0.605	0.286
EO					0.487**	0.000	0.836	0.143
ID*EO							-0.089	0.534
$R^2$	0.049		0.242		0.446		0.448	
$R^2$ change	0.049		0.193		0.204		0.002	
$F$ change	1.883		23.826		35.208		0.664	
Adjusted $R^2$	0.028		0.216		0.420		0.416	
Sig. $F$ change	0.107		0.000		0.000		0.534	
Std. error of estimate	0.53680		0.48211		0.41453		0.41600	

**Note(s):** \*\*Significant at the 0.01 level ( $p < 0.01$ ); \*Significant at the 0.05 level ( $p < 0.05$ )

entrepreneurial activity ( $r = 0.261^*$ ,  $p < 0.05$ ). This implies that as electricity became more available and accessible, the creativity and risk-taking propensity of the business owners/managers increased, so did entrepreneurial activity.

Concerning the development of transport infrastructure, especially the roads network, the results of the study show a significant, positive relationship with both the EO and entrepreneurial activity. Most respondents agreed to the general improvement of the road network in the area; which had significant impact on the ease of doing business. More businesses were created inherently in the transport sector; these include taxis, motorcycling, travel agents and shops. The respondents also affirmed to the relative ease involved in the transportation of people and their goods between different markets as well as the reduction in travel times between distinct destinations, such as from the region to Kampala which is now on average, a three-hour journey, down from five hours a decade ago. Most respondents also affirmed that due to the influx of people and new goods, the number of business transactions in their firms had increased. This was especially significant for restaurants, guest houses and bars. The respondents intimated that the transport costs did not reduce as a result of betterment of the roads network in the region, but instead increased overtime. This however, did not have much impact on the returns derived from the businesses.



Concerning the development of energy infrastructure, especially supply and distribution of electricity in the study area, the results show positive, significant relationships exist with both EO and entrepreneurial activity. Most respondents reported a general increase in the availability and accessibility of electricity in the municipality. Most respondents also reported that their businesses could afford the availed electricity, despite it still being too costly. Businesses such as supermarkets, hotels, bars, guesthouses, electrical shops and those involved in the trade of perishable food stuffs, that have a high affinity of electricity, reported greater business returns as a result of the improvement of energy infrastructure in the area. This further reasserts the heterogeneity of the effects of different infrastructure in an economy. Infrastructural development as a whole is also observed to have positive, significant relationships with both EO ( $r = 0.370^{**}$ ,  $p < 0.01$ ) and entrepreneurial activity ( $r = 0.459^{**}$ ,  $p < 0.01$ ). It can be inferred therefore, that these new infrastructures have created several entrepreneurial opportunities, which the entrepreneurs have recognized and exploited.

#### *Entrepreneurial orientation and its constructs*

In Table 2, EO is significantly and positively related to entrepreneurial activities ( $r = 0.580^{**}$ ,  $p < 0.01$ ). This implies that as the EO increases, the entrepreneurial activity also increases. All the constructs of EO yielded positive significant relationships with entrepreneurial activity (creativity  $r = 0.527^{**}$ ,  $p < 0.01$ ; risk-taking propensity  $r = 0.243^{*}$ ,  $p < 0.05$  and autonomy  $r = 0.481^{**}$ ,  $p < 0.01$ ).

#### *Hierarchical regression analysis*

In order to determine the effect of independent variables on entrepreneurial activity, we performed the hierarchical regression analysis. Each construct was entered one at a time, creating four models to explain the variation in business performance. The results of hierarchical regression are shown in Table 3.

We first entered demographic variables into the model to see whether they have any effect on business performance. The model was not significant which implies that the number of employees and work experience did not have any confounding effect on entrepreneurial activity. In Model 2, we input infrastructural development. It turned out to have a significant effect on entrepreneurial activity ( $\beta = 0.432^{**}$ ,  $p < 0.01$ ), explaining 19.3% ( $R^2$  change = 0.193) of the entrepreneurial activity.

In model 3, we input EO, which turned out to have a significant effect on business performance ( $\beta = 0.487^{**}$ ,  $p < 0.01$ ), explaining 20.4% ( $R^2$  change = 0.204) of business performance.

Infrastructural development and EO combined explain or predict 42.0% of the variation in business performance (Adjusted  $R^2 = 0.420$ ), and the overall model (Model 3) is significant. It is important to note however that in the overall model (Model 3), EO had larger effects ( $\beta = 0.487^{**}$ ,  $p < 0.01$ ) on business performance, followed by infrastructural developments ( $\beta = 0.258^{**}$ ,  $p < 0.01$ ). We also note that when entered in Model 3, EO reduces the effect of infrastructural development by a big margin. This indicates the invariable significance of EO in improving business performance.

Model 4 was meant to test the interaction effect (moderation) of infrastructural development and EO, but the interaction turned out not to be significant. The reason we did this was based on the logic that an entrepreneur with EO will easily take advantage of the infrastructural developments. However, this logic did not hold in this study, hence EO is not a moderator in this model. We instead found some evidence for EO as a mediator. The mediation path is explained in Figure 1.

*Mediation results*

Mediation was tested following the steps and conditions set by Kenny and Baron (1986). In Step 1, the effect of infrastructure development and entrepreneurial activity was tested and found to be significant ( $\beta = 0.432^{**}$ ;  $p < 0.01$ ). In Step 2, infrastructural development yielded an effect on EO ( $\beta = 0.370$ ;  $p = 0.000$ ), fulfilling the second condition for mediation.

In Step 3 and 4, EO (the mediator) yielded a significant effect on entrepreneurial activity ( $\beta = 0.475$ ;  $p = 0.000$ ), while a regression of both entrepreneurial activity on both infrastructural development and EO in the same model indicated that the effect of infrastructural development on entrepreneurial activity reduced ( $\beta = 0.176$ ;  $p = 0.002$ ) though remained significant. We can therefore conclude that EO is a partial mediator in the relationship between infrastructure development and entrepreneurial activity.

**Discussion**

Previous studies (Calderón and Servé, 2010) have recorded the poor infrastructure in sub-Saharan Africa, which has stifled entrepreneurial activities. Studies that explore the effects of other environmental conditions or contexts on entrepreneurship activities are equally well documented. The missing link has been (and still is) the fact that the effect of the physical infrastructure on entrepreneurial activity has been largely overlooked, and thus received sparse attention (Bennett, 2019). This study attempts to close the link by relating infrastructural development, together with EO to entrepreneurial activity more so from a developing country context like Uganda.

From the descriptive statistics of this study, we can conclude that indeed the oil-related activities in the Albertine region have resulted into infrastructure developments, mainly roads and electricity. The means also suggest that the EO is consequently high among the businesses, likewise the entrepreneurial activity. However, we observed that risk-taking was not so high among the firms, probably because the firms considered in this study were small businesses. This is in line with Morris and Kuratko (2002) who asserted that small businesses are usually constrained in terms of available resources, which limits their opportunities to diversify their risk portfolio and as a result, reduces their willingness to invest in risky ventures. This however, does not mean that the businesses were inherently not risk takers; rather, they were more constrained by the resources at their disposal.

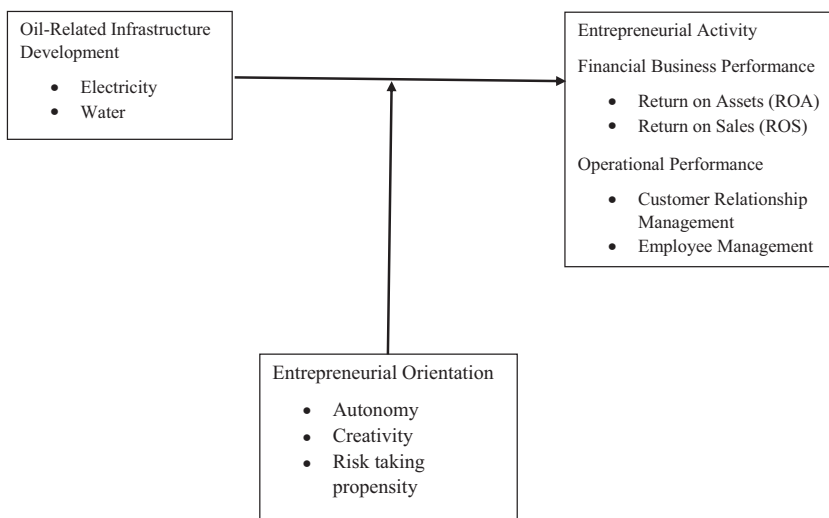
Correlation analysis showed significant relationship between the infrastructural developments with both the EO and entrepreneurial activity. The results of the hierarchical regression confirmed significant positive effects of infrastructure development on entrepreneurial activity. This means that the roads and energy infrastructural developments in the Albertine region have facilitated entrepreneurial activity in the region. Increased availability and accessibility of the infrastructure has provided opportunities to the existing enterprises to grow both operationally and financially, as well as enabling the cropping up of new enterprises. Businesses reported increased connectivity, increased number of people and goods, which inherently increased the number of business transactions in almost all kinds of businesses, increased access to markets and sources of raw materials, faster transportation of merchandise, improved living and working conditions which translate into increased productivity and returns at the workplace. This finding is in line with Audretsch and Keilbach (2007) who contend that infrastructural developments bear numerous spatially dependent characteristics that usually present entrepreneurial opportunities to individuals or firms, as well as their ability and willingness to pursue those opportunities. This argument further supports Audretsch *et al.* (2015) who suggested that infrastructure can enhance startup activity.

The key infrastructural developments that are evident in the Albertine region are transport (roads) and energy (electricity) infrastructure. Given the heterogeneity within

different types of infrastructure (Audretsch *et al.*, 2015), the entrepreneurship activities that have sprung in the Albertine region are mainly trade and manufacturing. The service enterprises have mainly been hotels and restaurants, and a bit of businesses related to tourism activities. This is true because specific types of entrepreneurship will flourish more with support of specific infrastructure.

Improvement of transport infrastructure of an area inherently connects distant markets, eases movement within and, facilitates the diffusion of people and their goods into an area. As a result, the initial opportunities arise when there is an influx of people, in market terms, customers, who oftentimes require to consume certain products or services from within or out of the said area. Different entrepreneurial opportunities will sprout as it will be easy to transport the people and the goods to be traded. Gibbons *et al.* (2019) further posit that when transport network is accessible, employment frequency of the natives increases as a result of the increase in the number of establishments and the new opportunity that come with the new establishments. Thus, the multiplier effect of infrastructural developments cannot be underestimated. The fact that quality and quantity road infrastructure reduces delivery time of goods, the overall transport costs reduce. This assertion is supported by Djankov *et al.* (2010), who estimated that trade will decrease by 1% for every extra day taken to move goods from the warehouse to the destination point. We suppose the figure would even be higher for the least developed countries especially where the delays take several days given the poor infrastructure. Improvement in the roads network also has other direct effects such as the reduction in costs of maintenance of vehicles; this translates into more savings which can be used for entrepreneurship. On the other hand, electricity infrastructure drives the everyday running of a business. Electricity drives not only manufacturing but also hotel and commercial sub-sectors like trade. Electricity has further improved the livelihoods of the people in the region, leading to increased productivity. Thus electricity has spurred investment, which has grown entrepreneurial activities in the Albertine region. This finding is in line with Lorde *et al.* (2010) who found that electrical energy consumption was important in driving economic activities (see Figure 2).

Regarding EO, the results indicate significant positive correlations between all the components of EO and entrepreneurial activity. It is also evident that EO turned out to have



**Figure 2.**  
Conceptual framework

larger effects on entrepreneurial activity, and explained the biggest variation in entrepreneurial activity. Thus, when entrepreneurs show high degrees of creativity, autonomy and risk-taking propensity, they will grow their businesses both in terms of performance and start-ups. Indeed, the study found that entrepreneurs that demonstrated a high degree of autonomy took self-directed actions to pursue market opportunities, that is grew new markets for their products there by increasing entrepreneur activity. In the same respect, entrepreneurs that were more willing to try new products, introduce new services or to discover as well as employ new methods of doing new things were in position to grow their businesses. It is also true that infrastructural developments have pushed the business to be more creative and take substantially large and risky resource commitments in order to exploit the available opportunities in the marketplace (Miller and Friesen, 1982). This has created more entrepreneurial activity and improved both financial and operational performance of a business. Thus, EO can be a partial mediator in the relationship between infrastructure development and entrepreneurial activity. These findings are in line with earlier studies that found a significant relationship between EO and entrepreneurial activity/business performance (Mahmood and Hanafi, 2013; Ferreira and Azevedo, 2007; Okpara, 2009; Hughes and Morgan, 2007; Ngoma *et al.*, 2017; Buli, 2017). In most of these studies, firms with high entrepreneurship orientation achieved superior performance, profitability, growth, competitive advantage and were able to sieve opportunities ahead of the others.

### Conclusions and recommendations

While the infrastructure is being put in place mainly to facilitate the smooth exploration for and exploitation of the hydrocarbons in the Albertine region, the study identified a positive, significant relationship between the development of infrastructure and entrepreneurial activity. The results confirm that the improvements in the road networks in the area have increased the trade flows, the number of people as well as the number of business establishments in the area. Concerning energy infrastructure, the study results confirm the increased availability of and accessibility to electricity in the area has increased the number of hours for doing business, and improved the living conditions of the people. This has had a direct bearing on labor productivity. The increased availability of electricity has also had a direct impact on businesses that deal in perishables, restaurants, supermarkets as well as electrical shops, due to their high dependence on power to preserve their products. The study also revealed that the EO of business owners/managers does not only partially mediate (instead of moderating) the relationship between the infrastructural development and entrepreneurial activity but also individually affects entrepreneurial activity. This implies that the infrastructural developments increase the EO of the businesses, which in turn increases the entrepreneurial activities and business performance. However, even in the absence of EO, infrastructure development would still have an effect on the entrepreneurial activity. Since entrepreneurship is one of the drivers of employment and economic growth, it is imperative that government and other development partners put in place mechanisms and conditions to spur entrepreneurship activity in the country. Infrastructure development and increasing the EO should be considered among the government interventions.

The emergence of the oil industry in Uganda has led to development of infrastructure in the Albertine region. This has presented several entrepreneurial opportunities. Entrepreneurs in the region need to combine an EO with the opportunities presented by the infrastructural developments to spur entrepreneurial activities in the region. Given the immense benefits of infrastructure, it is also important that enterprises that heavily rely on electricity and transportation services locate in those areas where such infrastructure is in abundance.

### *Theoretical implications*

This study suggests a theory of long-run development based on infrastructure development and EO as the engine of growth. Besides the improvement in roads, electricity, water and industries which accelerates economic growth, there are a number of social services such as education, health and employment opportunities that come as a result of infrastructure development initiatives and EO. The multiplier effect of both infrastructure and entrepreneurial activities in the region will be the growth of economy, the improved social services which consequently, improves the standards of peoples' living.

### *Practical implications*

Investment in infrastructure induces entrepreneurial actions which serve as an enabling function of economic growth. Oil resource countries such as Norway, the United States, the UK and the Arab World have succeeded in resource exploration majorly because of their initial and continuous investment in public infrastructure. Developing countries such as Uganda need accelerated growth and improvement of peoples' lives which according to Dollar (2004) may come as a result of increased investment in infrastructure which will increase entrepreneurial actions. Therefore, the Albertine region presents a good opportunity from a developing country context like Uganda where the country's growth can be achieved if there is enough concentration on infrastructure development and entrepreneurial activities.

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