

REPEATABLE SCALABLE BUSINESS MODELS: CAN INNOVATION DRIVE AN ENTREPRENEURS UN-VALIDATED BUSINESS MODEL?

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ABSTRACT: *Can the level of innovation use drive un-validated business models across regions? To what extent does industrial sector attractiveness drive firm's success across regions at the time of start-up? This study examines the role of innovation on start-up success in six regions of the world (namely Sub Saharan Africa, the Middle East and North Africa, Latin America, South East Asia Pacific, the European Union and the United States representing North America) using macroeconomic variables. While there have been studies using firm level data, results from such studies are not suitable for national policy decisions. The need to drive a regional innovation policy also begs for an answer, therefore providing room for this study. Results using dynamic panel estimation show that innovation counts in the early infancy stage of new business life cycle. The results are robust even after controlling for time fixed effects and the study present variance-covariance estimation robust standard errors.*

KEYWORDS: Industrial Economics, Entrepreneurship, Innovation and Un-Validated Business Models

JEL Classification: C23, O31

INTRODUCTION

Background of the Study

Does innovation use count in the early stages of a firm's life cycle? Is there a need to drive regional specific innovation policy to improve regional economic growth? Innovation use could reduce cost and make an un-validated business model- attainable. More and more entrepreneurs are beginning to rely on high skill and innovative ideas to drive growth of new firms which in this study we term start-ups. Macroeconomic data can provide proof for innovation use and its effects on new business growth. Firm level data are not likely to be sufficient in proffering solutions on a regional and national scale for full policy implementation for countries and policy makers. Therefore this study provides an alternative empirical insight, on the relationship between innovation use and new business growth for regions. The People's Republic of China has also designed a five-year plan to re-energize its national economy, which is based on collective mass action and small business development through driving an innovative business environment and increasing access to credit. Also on rising from the 2015 G20 summit, in Antalya Turkey, World leaders have realized that creating some mechanism for young entrepreneurs is necessary to allow innovators have access to capital for highly scalable business models (startups).

Start-ups are now playing a strong role in youth employment and creating more competition across industry, with their entry to various markets. Bringing with them new ideas and innovation, coupled with low cost production capabilities. Innovation use for new businesses with low capital could also have meaningful impact on the long-run performances of the firm's

throughput. Repeatable scalable business models are documented business model processes that are reliable and can be re-implemented in the future. Many new start-ups often come with business models that have not been validated. There is also a current debate on the extent to which innovative ideas can drive enterprise development and make many business models realizable. This study investigates the role of innovation on start-up growth. Start-ups are often termed un-validated business models since they come with unique ideas that are only attractive to the creator (who invests seed funds) and angel investors. Four basic factors are identified as major drivers of new business growth in this study. They include, access or cost of capital, the level of innovation capabilities present in the industrial sector in countries across regions, industrial output across sectors which will make new firm entry attractive across sectors in regions and macroeconomic factors that depict the riskiness of the immediate business environment such as inflation rate. The study also provides a provocative discuss for those who wish to understand what nature of macroeconomic variables will affect new business growth across regions and proffer regional policies for private sector business growth. New businesses will consider vibrant economic sectors in countries and therefore will consider sectorial output since this will depict sectorial attractiveness for entry. The cost of capital will also affect new businesses since new businesses often come, to the market with a relatively short history and little collateral, preventing them from gaining access to credit except in exceptional circumstances, where countries provide special credit schemes for soft loans to new firms. Macroeconomic data is obtained from data market of Iceland and the World development indicator (WDI) of the World Bank, for six regions. The method of estimation used is the dynamic panel estimation technique which provides robust heteroscedastic standard errors. The rest of the paper is divided into the scope and objectives of the study, the review of literature, data section, theory and methodological section, the results presentation section and the concluding sections.

Scope and Objective of the Study

The study examines the relationship between innovation use and new business model scalability, by investigating the effect of innovation and new business growth for six regions of the World namely European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub- Saharan Africa. The broad objective of the study is to determine if the current level of innovation use across regions affects new business viability, the specific objectives of the study are:

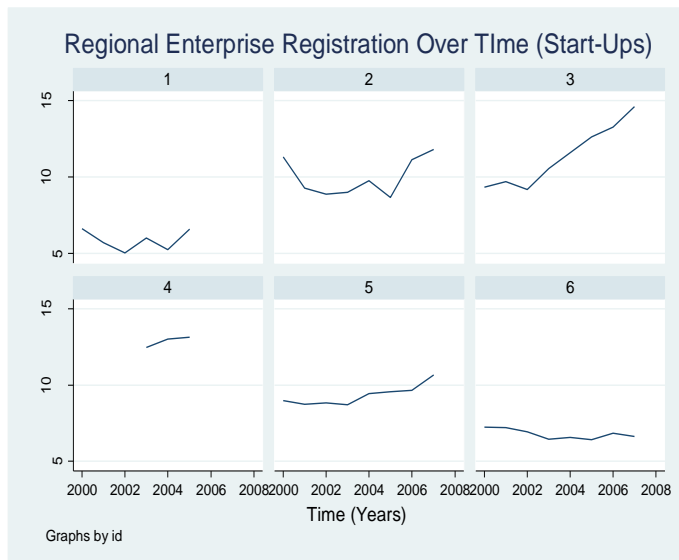
- a.) To determine if the current level of innovation use drive un-validated business models across regions
- b.) To examine to what extent does industrial sector attractiveness, drive firm's success across regions at the time of start-up.

REVIEW OF LITERATURE

World Bank (WDI) data 2013 already show that new business registration is on the increase across five of the six regions in the study see Fig 1 below. However while not all new businesses are startups, statistics depicts that new entrants to markets increases sectorial competition among firms with many new business bringing with them less capital and new innovative ideas. Fig. 1 also show new enterprise registration for the six regions used for the

study, which include Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively. Fig. 1 below show that enterprise registration, is on the increase, for all regions except Latin America (see id 6 fig. 1).

Fig. 1 Regional Enterprise Registration over time



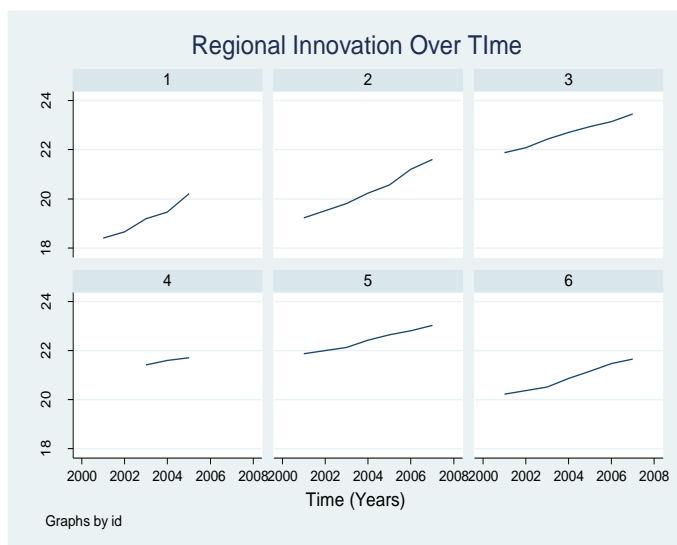
Note: The trends above show enterprise registration for Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively. The trends reveal that new business registrations are on the increase in all regions. Trends show that startups are on the increase in all the six regions used in the study except for Latin America (see id 6 for Latin America).

The implication of this is that regions were currently experiencing increases in competition, across the different sectors of their economies. While this presents a good outlook, it is not clear how many of these new business entrants survive up to the middle life cycle of their existence. There is also compelling results from World Bank data 2013 that the use of technology is significantly increasing across the six regions namely Sub Saharan Africa (SSA), the Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent the North America region (NA), the European Union (EU) and Latin America (LA) respectively. This portends that innovation use is likely to be strongly responsible for industrial growth (specifically private enterprise growth) across regions (see Fig. 2). Innovation increases also show that firms were also cutting cost, utilizing less of manpower and employing the use of smart technology in their production capabilities.

Specifically the East Asia Pacific region appears to have surpassed the Middle East and North Africa in the number of new business growth from 2002 onwards depicting more investment friendly environment and easier access to technological capabilities for innovation that enable young firms drive growth for the region (see Figure 1 id 2 and 3 respectively for the Middle East and North Africa and East Asia Pacific respectively). Also Sub Saharan Africa lags behind considerably in new business growth this is attributable to a host of factors such as poor business climate and a high level of macroeconomic instability such as inflation, poor credit

facility to new firms with short history and low level of investment in technology capable of driving innovative capabilities that many young firm need for growth (see Figure 1 id 1). Steady increases and sustained high level growth among new businesses feature prominently among the highly developed economies (i.e. the European Union and North American countries) specifically the United States with high noticeable growth exceeding 14 percent (see Figure 1 id 4 and 5). Figure 2 below also depict increases in innovation use across regions. There are also consistent studies which show that innovation can drive economic growth across regions. East Asia Pacific appears to be experiencing the strongest increases in innovation use followed by the European Union they both have experienced 23 percent and 22 percent growth in innovation use as at 2008 respectively (See Figure 2, id. 3 and 5 respectively). Ojeaga (2015 a) on investigating the relationship between entrepreneurship innovation and economic growth for Africa finds that innovation has strong significant effect on growth for the African continent. This depicts the usefulness of innovation in the enterprise growth and industrial output development process. Other works Ojeaga (2015b), also identify innovation and startups as probable drivers of enterprise and industrial growth for regions after considering six regions worldwide which include the European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub- Saharan Africa.

Fig.2 Regional Level of Innovation Use



Note: The trends above show enterprise registration for Sub Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia Pacific (EAPC), the United States to represent North America region (NA), the European Union (EU) and Latin America (LA) respectively. It depicts that all regions are currently engaging innovation across sectors with the use particularly high for Europe, United States and South East Asia Pacific.

Other study results also show that innovation quality can affect economic growth Aghion P. and Howitt P. (2004). While other panel studies OjeagaP., Odejimi D., George O. and Azuh D. (2014) also show that innovative capabilities can drive growth particularly for the energy generation sectors across regions using regional panel data. Access to capital can also drive growth and improve firm performance Ojeaga P., Odejimi D. O., Okhiku J. and Ojeaga D. (2013). Therefore increasing access to capital and reducing the cost of capital through low interest rates for new firms could drive industrial growth in general.

Un-validated business models are new business models that have not been tested and repeatable scalable models are business models that have throughput (leading to high profits) that are replicable though differently with a high degree of ingenuity Ojeaga (2015a and b). In this study un-validated business models are startups and are depicted using data for new business registration even though we admit that not all new businesses are startups, which is a limitation of the study. While technology use is measured using access to fixed and mobile phone use across the six regions utilized in the study. The specific problem the study addresses is if innovation (in this case innovation use) can drive un-validated business model (startup) growth across the six regions of emphasis in the study.

THEORY AND METHODOLOGY

One of the earliest theories of start-up is the Jopvanovic (1982) two startup theory, it stated that firms start and end with zero employees and the number of employees that firms retain at the peak of production and growth is often the maximum they employ in their history. It also states that firm's also have the capability of hiring and laying-off staff during periods of decline and growth respectively, meeting their specific organizational needs. Other studies have identified labour inputs as having strong consequences for private sector growth Griliches, Zvi and Lichtenberg, Frank. (1984)including such in their model specification. Jorgenson, Ho, and Stiroh (2005, Chapter 6, pp. 201-290) also study the implicative effect of capital price on firm productivity utilizing different types of capital mix, they find a relation between capital mix and firm growth. Haltiwanger, John, Ron S. Jarmin, and Javier Miranda, (2008) have studied the relationship between firm and job creation for US firms using time series data, finding that firm age matter for job creation.

This study utilizes panel data for regions, similar to other studies that have used panel data which include Aghion P. and Howitt P. (2004) who studied the effect of quality innovation with growth enhancing capabilities on economic growth, OjeagaP., Odejimi D., George O. and Azuh D. (2014) who also argue that, innovative and modern utilization of renewable energy production plants can drive economic growth using panel data. In this study knowledge platforms (*Know. Platf.*) is assumed will depend on information technology infrastructural cost (*IT Infrs. Cost*) which will represent the cost of building information technology infrastructure such as laying fibre optic cables and setting up of mobile telecommunications work stations. It will also be affected by ability of firms and individuals to access such information technology platforms (*IT Infrs. Access*) such as its readily availability and spread among individuals and firms in countries across regions plus the cost of access to firms and individuals expressed below in equation 1.

$$\text{Know. Platf.} = \text{IT Infrs. Cost} + \text{IT Infrs. Access} \dots\dots\dots(1)$$

The level of innovation which will affect the application of innovation by firms and individuals to the business transaction business will also depend on the quality and cost of knowledge platforms (*Know. Platf.*) and level of education and training (*Educ. Levels*) present in countries across regions allowing firms to utilize high quality manpower to access such platforms expressed accordingly in equation 2 below.

$$\text{Level of inn.} = \text{Know. Platf.} + \text{Educ. Levels} \dots\dots\dots(2)$$

Startups will depend on attractiveness and profits associated sectors (*sec. out*) in countries, ease and cost of capital for starting and maintaining new businesses (*Cap. Access*) and finally the level of innovation accessible (*Level of Inn.*) in countries across regions.

$$Startup = Sec. Out + Cap. Access + Level of Inn. \dots\dots\dots (3)$$

In the study startup growth is a function of innovation use (*Innv*), industrial output (*indout*), inflation(*inf*), and gross capital formation(*gcf*) which can be expressed below as

Startup growth f(Innv, indout, inf, gcf).

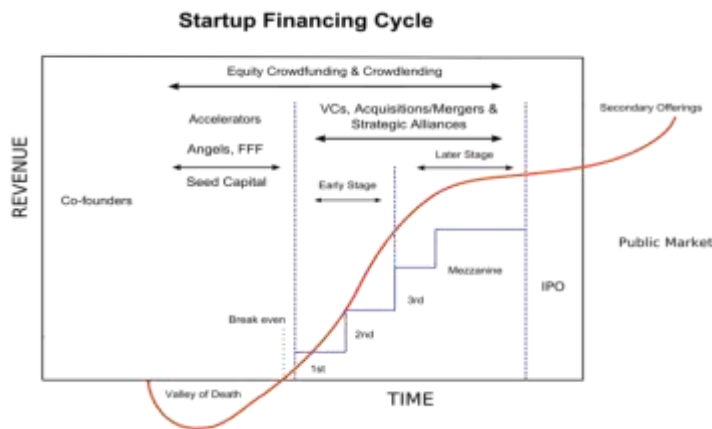
Where startup growth will be an increasing function of innovation ≥ 0 , industrial sector output ≥ 0 and gross capital formation ≥ 0 and a decreasing function of inflation ≤ 0 . This is likely to be true since startup will be a function of regional specific level of innovation which represents regional specific application of innovation in business and industrial activity, country specific industrial output across regions that is likely to attract new entrants across attractive sectors of their national economies, regional specific cost of accessing capital which will depict the ease of access to funds for initial development of ideas and enterprise startup and finally the business climate or the riskiness of the countries across regions immediate business environment which will inform the willingness for new businesses to enter into completion in the such environments. The model to be estimated can now be written as

$$Startup_{it} = \alpha_0 + \alpha_1 Inn_{it} + \alpha_2 X_{it} + u_{it} \dots\dots\dots (4)$$

Where X_{it} include the other explanatory variables such as gross capital formation, inflation rates and industrial output. The method of estimation used in the study is the dynamic panel estimation techniques. It is suitable since it addresses issues such as the presence of endogenous regressors, omitted variable bias and heteroscedasticity.

Repeated Scalable Models

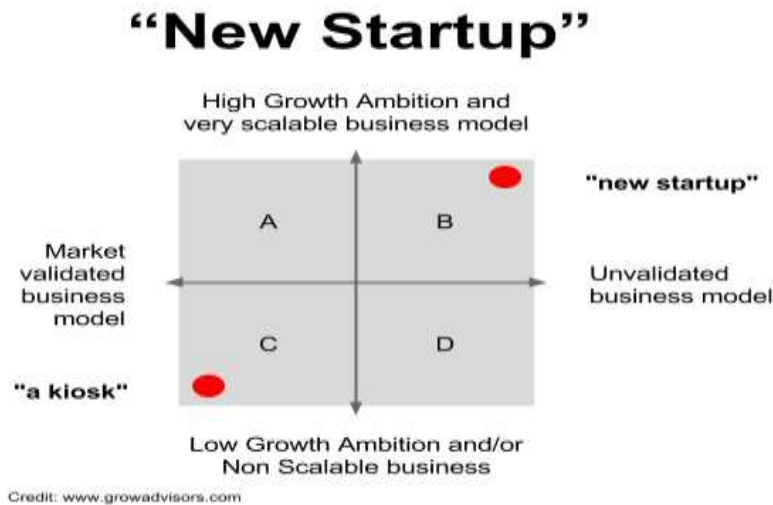
Repeatable scalable models as started earlier are highly scalable business model with high profits that are replicable. The difference between repeatable scalable models and other startup business model simply rest on the premise that they have been implemented and yet are capable of pulling through, with slight modification and still produce high profits making them a unique type of startup. Ojeaga (2015b) already state that most new startups do not pull through to the startup middle cycle attributing this to a host of factors and risky business environment that affect private enterprise growth, access to low interest capital, and finally the level of innovation use across firms in regions after studying six regions using panel data. Scalable models are therefore business models that have been tested and have high probability to succeed. They are models with high probability of attracting equity crowd funding and crowd lending in the early stages of their life cycle and the ability to maintain this attraction of such funds to the middle stages of their life cycle.

Fig.1 Start-Up Financing Cycle

Source: Obtained from “Credit” Growth Advisors online (see also the paper by Ojeaga (2015) “Do specific drivers exist for Firms”)

Note: The above depicts that startup financing cycle. The figure above show that before the break even stage in the early life of a firm it receives just seed capital and angel funds and as soon as the firm breaks even it receives venture funds and later stages receives funds through IPO and other secondary offerings.

In the figure 1 above the startup financing cycle is presented. It depicts that firms receive only seed and angels funding in the early stages of their development. They however receive venture capital as soon as they become established and finally they receive funds from initial public offering and also results to secondary offerings to attract funds in their fully developed state. It is less likely that such models are likely to slip into the valley of death and wind-off as an unsuccessful firm. The greatest advantage the model possesses is that they utilize a high level of innovation to drive growth towards making profits. This makes them more attractive to receive funds and growth at low cost. Low cost startups with high innovation capabilities can attract huge funding since they are likely to succeed due to the use of medium scale technology to drive growth. Other factors that drive scalable business model include ambition and the high profit associated with such ventures. Therefore scalable models according to Ojeaga (2015b) are those with high return to investment capable of attracting funding in their early life cycle stages making such startups to be termed market un-validated business models.

Fig.3 Scalable and Non Scalable Business Models

Source: Obtained from “Credit” Available on www.growadvisors.com.

Note: The above depicts that ambitious growth desires is the key driver of new start-ups. This is fueled by the desire for high profit (making such models to be highly scalable). With high profit levels also comes a high risk.

It will be reasonable to state at this point, that since many startups are likely to slip into the valley of death, it is the need to succeed and also to grow in conjunction with the high profit available with success that drives the ambition of such firms to succeed.

Data and Sources

Panel data for the study is obtained from the data market of Iceland, for the period of 2000 to 2008 (Nine Years), for six regions, which include the European Union, Latin American, East Asia Pacific, the United States to represent North America, Middle East and North Africa and finally Sub- Saharan Africa. Some years of data are missing across panels however which reduces the number of observation and limit the degree of freedom. The summary statistics of data used are shown below.

Table -1 Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Start-Ups	41	9.10	2.45	5.02	14.61
Industrial Output	48	32.69	8.05	21.57	51.37
Innovation	36	21.23	1.35	18.39	23.45
Inflation	48	4.74	2.61	0.78	13.73
GrossCapital Formation	48	21.96	3.36	16.09	28.17

Note: Descriptive statistics is derived from author’s dataset obtained from data market of Iceland and WDI data of the World Bank.

The dependent variable is new business registration which is the measure for startups. Other explanatory variables include enterprise growth measured using industrial output from regions, innovation (measured using the total number of phone lines both fixed and wireless population), gross capital formation (which is the total capital available in banks and the real sector in constant United States Dollars), and inflation rate which depicts the riskiness of the business environment across regions (which is the annual variation in percentages in prices of goods and services). These variables are based on studies by Ojeaga (2015b) which utilizes similar variables however the technology variable is excluded in this case.

RESULTS PRESENTATION

The result for the study is presented in this section. The dynamic panel estimation (GMM) is utilized in the study as stated earlier. The Arrelano Bond test for serially correlated errors and the Hansen Over-Identification tests were also conducted, and the null hypothesis for no serially correlated errors and instrumental validity were accepted (at P-values of 0.00 and 0.001 respectively). Industrial sector output was found to contribute significantly to startup growth, contributing 11 percentage points to startup increases across regions (see P- values of 0.113* and 0.113*** in Table 2 Columns 2 and 3 respectively). The use of innovation was found to count most for startup growth contributing about 85 percentage points to startup growth across regions (see P- values of 0.850* and 0.850*** in Table 2 Columns 2 and 3 respectively). The risky business environment as measured by inflation, were found to reduce startup growth by approximately 12 percentage point in countries (see P- values of -0.117 and -0.117*** in Table 2 Columns 2 and 3 respectively).

The use of year control was employed to control for unobservable time effects such as differences in regional specific policy towards new business as well as differences in the use of innovation and technology across regions, the year controls were found not to be significant depicting that regional specific effect were significantly affecting the results of the study which is a limitation of the results. Past entry into the business environment across regions, were found to affect new entries. This showed that new startups actually tried to measure other startups success before entering into operation across regions with the one period lag of startups (the measure of past startup growth) contributing about 67 percentage point to startup growth (see P- values of 0.617*** and 0.617*** in Table 2 Columns 2 and 3 respectively).

Table -2 Regression of Innovation on Start- ups Across Regions

Variables	(1) Sys. GMM Startups	(2) Sys. GMM Startups	(3) Diff. GMM Startups
One period lag of Startup	0.429** (0.193)	0.617*** (0.149)	0.617*** (0.206)
Two period lag of Startups	0.463* (0.259)		
Industrial Output	0.125 (0.219)	0.113* (0.0610)	0.113*** (0.0207)
Innovation	2.973*** (0.955)	0.850* (0.460)	0.850*** (0.312)

Inflation	-0.0804 (0.124)	-0.117 (0.0999)	-0.117*** (0.0246)
Gross capital formation	-0.158 (0.311)	-0.0758 (0.150)	-0.0758 (0.0619)
Year Controls	No	No	No
Constant	-55.03*** (18.78)	-15.93 (9.715)	-15.93*** (5.850)
Observations	23	35	35
Number of id	5	6	6

*Note: Standard errors in parentheses*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The results show that industrial sector output. Innovation and inflation rates affect startup growth in countries across the six regions considered in the study.*

Results show that three major variables have significant effect for new firms and by implication startups, namely: industrial sector output which depicts sectorial output and encourages entry of new firms across sectors in countries across regions permitting new firms to want to take advantage of such attractiveness across sectors, innovation which shows that new firms are likely to be driven by the use of high innovative capabilities and low cost strategies in their early life cycle, and the business environment riskiness captured using inflation which shows how sensitive new firms are, to risky business environment. Gross capital formation had no significant effect on startups depicting that firms in the early stages of development are not likely to receive significant funds such as loans; IPO generated funding as well as to be able to raise capital on the secondary market. Entry into the business the environment, across regions was also found to depend on past entries. This was clearly true, since the lag of startup from one period lag (or past) was found to have significant effect on startups in the present. Although two period startups lag (or past) did not show significant effect, on startup increases. The results support past findings such as those by Haltiwanger, John, Ron S. Jarmin, and Javier Miranda, (2008) which states specifically that firm's capital mix matter for firm growth and the study by Aghion P. and Howitt P. (2004) which states that innovation quality affects economic growth.

CONCLUSION

In this section the study is concluded. The objectives of the study are to examine if a.) The level of innovation-use drives un-validated business models (startups) across regions b.) The extent to which industrial sector attractiveness drives firm's success across regions at the time of start-up.

It was found that the level of innovation across regions have significant effect of un-validated business model (startup) growth and that industrial sector output the measure for industrial sector competitiveness matter for firm profits and success across the regions utilized in the study.

However, unobservable differences in innovation use and access to capital across regions also affect un-validated business model growth. These factors were: regional use of innovation, regional industrial output due to how developed regional domestic markets were, and were found to be responsible for differences in regional startup growth respectively.

The implication of the results is that countries across regions should improve access to different capital mix for young firms with short history and as well as create cheap knowledge sharing platforms for firms in general. Policies to make the business environment friendlier should be considered and encouraged by improving macroeconomic policy management. This could reduce inflation rates particularly for the Sub Saharan African and Latin American regions with high inflation rates and high cost of conducting business.

Finally it was concluded that innovation and capital access to new businesses count for firms growth and startups in particular in the countries across the regions studied and that knowledge sharing platforms such as the internet and provision of useful technology, such as medium scale manufacturing equipment should be given priority with particular emphasis on Africa while increasing the access in already developed regions such as the European union and North America.

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