RESEARCH ARTICLE

ENTREPRENEURIAL BEHAVIOR AS A CAUSAL FACTOR OF DEVELOPMENT

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ARTICLE INFO	ABSTRACT
	Economic and social development is a common theme pursued by the human race. The United Nations (UN) has adopted a far more robust and inclusive measure of comparability of human development amongst countries, the human development Index (HDI) which incorporates socio-economic, political and related themes. The HDI measure is a more appropriate tool for comparative measure of the development of the human race across countries as opposed to Per capita GDP measures. Whereas, entrepreneurial activities are critical to economic development and indeed social, cultural, political, technological and environmental improvement of the society, we are not clear on the extent or nature of the relationship that may exist between the two phenomena. Our study would attempt to filter critical components, characteristics, activities and attitudes in entrepreneurship and set up a hypothesis to test if there is a causal relationship between both phenomena, and to isolate specific variables that best discriminate and or describe the behavior of the groups amongst the dependent variable cases.

INTRODUCTION

The Global Entrepreneurship Monitor (GEM) report for 2012 states " entrepreneurship process is a complex endeavor that is affected by many factors including the prevailing attitudes within society, the rate of activity, the kind of opportunities available, and the growth aspirations of entrepreneurs" Therefore, different societies present different entrepreneurship environment and conditions for business possibilities and advancement. The prevailing conditions in the environment dictates the perception of the people as to the opportunities of enterprise in the environment. Society is concerned with creating jobs and economic prosperity. The enabling environment that would promote entrepreneurship to hone their skills and convert opportunities is of great concern to society. The results of entrepreneurship adds value to the economy in terms of employment, growth in national economy and indirectly to social, political, technological, and environmental improvements in the society. To the extent of the plural and diverse importance of entrepreneurship to the society, we must strive to understand and appreciate the characteristic behavioral components and activities of entrepreneurs and how these pans out in real action that may affect their output- setting up enterprise, creating new jobs and enhancing the gross national product. The world over, economic and social improvements rank top in the mind of all governments. Security as a component of the social contract between government and its

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people constitute the most important function of government. Threat to security is heightened in an environment of massive unemployment. The art of creating employment is thus critical to government and the entrepreneurial attitudes and behavior determines whether additional jobs are created or not. The level of progress and development of citizens is measured not only in terms of financial rewards but also in terms of the level of social, security, political, technological and environmental benefits at their disposal. Therefore, the right measure of development might be stultified by a GDP measure. The HDI[2] measure would be more appropriate in relating a rather social pattern variable with the entrepreneurship variable which in itself is also a social index. The purpose of the study is to determine the nature and extent of a causal relationship between the activities and behavior of entrepreneurship and the level of Human development in society, and to isolate variables that best describes and discriminate specific group behavior amongst the observable countries in our sample data.

MATERIALS AND METHODS

The purpose of the study is to ascertain the existence, nature and extent of a causal relationship between entrepreneurship behavior and the Human development index. We shall start off with the literature review that provides the context and background to the two phenomena under review and draw lessons from similar works where they exist. We believe we have an apriori rationale that explains the relationship under study as would be inferred in the literature review which would

provide the context and rational for the study, and would proceed to form our null and alternate hypothesis. We shall be using an assemblage of secondary data from both the World Bank and the Global Entrepreneurship Monitor (GEM) Consortium. The data on entrepreneurship, we obtained from the GEM 2012 Report and comparable data on the Human development Index (HDI) was also obtained from the World Bank for the period 2012. We shall set up an analytical framework (model) to facilitate an amenable data set and variables for appropriate statistical analysis and mining with a view to providing evidence based conclusion from our analysis. Our first task is to ascertain if there is a trend and consistency in the data set obtained to give credibility and reliability to the data. A time series analysis is performed for selected countries (Schumpeter is regarded as the father of Entrepreneurship with his classic in 1934) and for a sample country across the various entrepreneurial states with a view to ascertaining the trends in the behavior of entrepreneurship across countries over time and within a country over the entrepreneurship spectrum. In all instances, we shall be testing our data for reliability, using the cronbach's and inter item correlation matrix for internal consistency and reliability. The IBM SPSS statistical tools, the linear regression analysis model would be employed to ascertain the nature and extent of the casual relationship under study. Subsequently, we shall employ the discriminant analysis model to isolate variables that best describe the behavior of particular groupings within the sample cases. The results would be analyzed and explained to give meaning to the observations and appropriate deductions and conclusions made. We shall round up with our recommendations

Literature review

There is hardly a uniform acceptance to the meaning of the term entrepreneurship as different schools of thought hold different meaning to it. But a common thread runs through the terminology. The common dictionary definition of entrepreneur "someone who starts their own business, especially when this involves seeing a new opportunity" resonates well in the distinction between the two main schools of thought in entrepreneurship. The Schumpeterian (Kirzner 1997) versus the Kirznerian (Heuristic model of opportunity recognition 2010) schools hold that entrepreneurship can best be understood from the prism of how opportunities are recognized, analyzed and exploited to create value and their impact on the economic system. Schumpeter, in the Theory of Economic Development believes that entrepreneur is an "agent of change that is the source of creative destruction" Entrepreneur is someone who generates the change to the existing order and all the resulting vibrations in the economic system are attributable to their actions. The entrepreneurial state is always at a disequilibrating state in relation to the general economic state. Kirzner on the other hand emphasized that entrepreneur tend to generate a restoration process to the system or create a new equilibrating pattern but not disruption to the system. This argument hinges on the position that the Schumpeter school maintains that entrepreneurship results to innovation that disrupts the existing order of production while the Kirznerian school emphasizes that innovativeness does not disrupt rather its merely a process of opportunity recognition of

a need gap in the market that has just been realized and the entrepreneurial act simply restore the system back to equilibrium. There is however, agreement that entrepreneurship starts with the opportunity recognition process. There is also agreement that opportunity recognition has an elaborate work process before the decision that an opportunity exist, is recognized and explored. The heuristic (hbr.org/1985/03/the-heart-of entrepreneurship/ar/1) model for opportunity recognition maintains that an entrepreneur is prepared by knowledge of his environment, market conditions technology cultural forces which empowers them to evaluate and modify situations that lead to decision to recognize an event or activity as an opportunity for recognition and exploitation.

The Schumpeter school also emphasizes that entrepreneurship is based largely on innovation whereas evidence exist that many successful enterprise have little innovation to show for their success. In this sense, entrepreneurship is about the alertness to and foresight of market conditions which must necessarily precede actions taken in accordance with that alertness (The Knowledge spillover theory of entrepreneurship by Lucas 1978). The ability to identify the right opportunity is the most important profile component of successful entrepreneurs and they may or may not innovate a new technology in the process of filling the gap so identified. Lucas (Julian Lincoln Simon 1981) pointed out that indeed, opportunity is not an exogenous factor which the human alertness allows us to recognize and exploit but rather opportunity is an endogenous factor remaining in the realm of mental alertness. This is consistent with the position of Julian Simon (Journal of Enterprising Culture 2008) who maintains that the ultimate entrepreneurial resource is the human mind which allows the conceptualization and conversion in the mind of all situations that are open to the human. This position is of interesting dimension compared with the strategic actions of governments in the Nordic (Finland) countries to deliberately promote entrepreneurship as a means of economic development (The GEM Report 2012). Nationally designed programs at encouraging and stimulating the growth of entrepreneurshipis embarked upon by Government through policies that deliberately encourages innovationby the establishment of the science policy council in 1979 and the subsequent regionalization in 1994 to create 14 regional centers of expertise to promote innovation. In spite of a deliberate public policy to stimulate this specific type of entrepreneurship, there was a dismal failure in the growth of entrepreneurship to match the level of Government spend. This implies that other types of entrepreneurship not coming out of innovation also exists and must be looked and mined if entrepreneurial practices is to be optimized for economic development in a country. This distinction between entrepreneurship arising from the dust of innovation and entrepreneurship of other business concerns that has no innovation slant have implication for the similar distinction between the classification of entrepreneurship as adopted by the GEM report (Economics Letters 1998) into an innovation led entrepreneurship or necessity led entrepreneurship. The classification highlights the level of employment in the respective economies and general HDI level which motivates people to take to entrepreneurship as a necessity or as an

opportunity to innovate and exploit the economic gains from innovation.

In all events, entrepreneurship results to wealth creation for the entrepreneur. When entrepreneurship is successful, then follows great wealth and when unsuccessful, comes financial challenges given the investment outlay considered sunk and forgone. However, there are studies that have proven that this causal relationship between entrepreneurs and wealth creation may actual hold for the reverse position. Evans and Jovanovic (Journal of Business Venturing 2006) posits that there is a causal positive correlation between wealth and entrepreneurship. They maintained that the most well read, educated and wealthy people are more likely to take to entrepreneurship than people with little wealth. The justification being that the wealthier are likely to have a better shock absorber in the event of failure and the fear of failure is at the most minimal level in the scheme of considerations to take up entrepreneurship. The link between entrepreneurship and economic development is the studyat hand. Demographic considerations being a key socio economic variable may play an important role in the entrepreneurship process. Hamilton (Academy of Management Journal 2009) showed from empirical studies that younger people are more likely to start a business than older people. So the age distribution of the population may be an important consideration to consider in looking at the rate of growth of new firms in an economy. Clearly, entrepreneurship results in the creation of new businesses, new jobs, increased productivity and all the stakeholders, including Government, supplier' sbuyer's regulators, and pressure groups have keen interest in ensuring success of entrepreneurship. There is therefore, a social function by each of the stakeholder if the gains of entrepreneurship is to be realized. Government as a major stakeholders must provide the enabling environment including education, legal framework physical infrastructure to make entrepreneurship thrive. In the midst of these building block enablers, would-be entrepreneurs must possess certain base qualities that sets them apart. These include, clear intentions, cognitive capacity, motivation, passion, knowledge and opportunity recognition capabilities. Xiao Ping Chen (Steve Job. Former CEO of Apple) (2009) in their study concluded that preparation (cognitive alertness) and not passion drives potential investors from funding entrepreneurial ventures. Notwithstanding this conclusion, other practitioners like Steve Jobs[15] have maintained that "it is so difficult to build a company without passion". It is safe to maintain therefore that all these ingredients affect entrepreneurship.

There are consistent themes that run around all the perspectives on entrepreneurship and the core are opportunity recognition, mental alertness, strategic understanding of resource availability and use and the creation of a valuable good or service. In all events this add to enhanced production in the economy and further employment. It is these consistent themes of opportunity, capacity, attitude of society to entrepreneurship that goes into the measurement of intention to become entrepreneurs and these are indeed the measure adopted by GEM in measuring intention at entrepreneurial stage. We are therefore presented with a context that recognizes that entrepreneurship adds to economic development and employment. This context may provide some level of sense making to provide further answers to whether this provides scientific evidence for a relationship between entrepreneurship attitudes and activities with that of economic development.

Conceptual framework-building the model

Economic development is typically centered ongeneration of production, employment and assurance of macroeconomic stability. A more robust and inclusive measure of human well-being however, is the human development index which incorporates other social, political and environmental measures as life expectancy, literacy, educational opportunities, rule of law, universal adult suffrage and availability of democratic institutions in a country. There is a logic to the assertion that high employment levels tended to create stable polity (the evidence stares us in the face today with all the industrial strikes and mob actions across Europe, South America and North Africa), increased productivity and higher standard of living for the generality of the citizens. Therefore, any activity that is constitutesa nexus to creating employment and enhancing productivity in the economy requires deep understanding for policy makers to be able to deploy resources in addressing the needs of the people. Entrepreneurship bears a direct link to increased productivity and employment in the economy. The level of entrepreneurship is buoyed by the attitude and confidence of its people that opportunities exist and can be exploited, the social acceptance of entrepreneurship and the enabling environment presented by government and the social order to encourage entrepreneurship. The engagement of entrepreneurs are such that boost productivity either by directly increasing the yield of existing production processes by new technology or by an entirely new product introduction in the market. In either event, employment is enhanced. There is therefore, some sense making that employment can have serious bearing on general well-being of society and the activities that creates employment must similarly be impactful on that well-being. What manner of relationship could exist between entrepreneurial activity and societal well-being is the basis of the model we are attempting to put together. We have defined societal well-being by the human development index (HDI). Entrepreneurship as a working variable for the purpose of our analysis is a slightly more complex issue. But we have seen a thread of common acceptance of a unit of measurement of entrepreneurship in terms of their activities, intentions, opportunity recognition, social order and perception of society about entrepreneurship amongst others as a possible measure of the state of entrepreneurship in any economy. Therefore, we plan to apply the defining characteristics of the attitude and activity of entrepreneurs as working variables for the purpose of this study.

The GEM conducts surveys yearly in member countries that include both Adult population Survey (APS) and National Expert Survey (NES) to ascertain the attitude and activity of entrepreneurs. The general logic behind the surveys are that society benefits from the activities of these special breed (entrepreneurs) who are able to sense valuable business opportunities, have the guts to create business out of the opportunities and nurture these from the nascent stage to real

businesses that creates employment and enhance productivity. Therefore, the survey questionnaire are geared towards eliciting responses that provides a sense of the level of entrepreneurship in the various countries within the context of its developmental stage. The conceptual model adopted by the GEM is a multiphase approach to understanding the entire process to sustainable entrepreneurship. The phase approach tracks entrepreneurial efforts and activities from the conception, idea or intention stage of potential entrepreneurs to matured functional entrepreneurs. There are five phases which typifies the life cycle theory starting from birth to death (business discontinuity of failure). It is instructive to point out that the stages are not a continuum in the sense that input at the potential entrepreneurial stage or any for that matter may not translate to a linear output at the next as businesses can fail or never commence beyond a particular level. The schematics in Figure 1 illustrates the process;
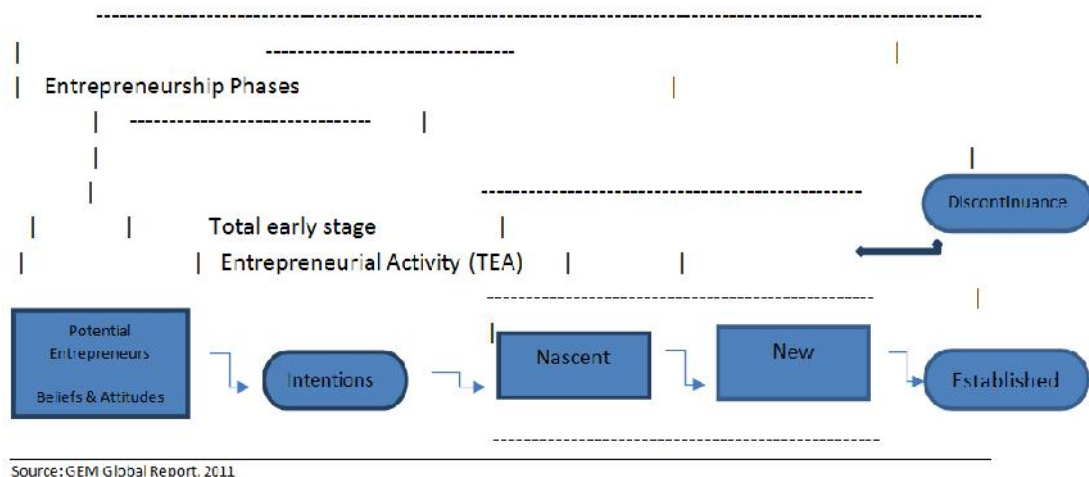
Business stage makes up the total early stage entrepreneurial activities.

4. Established Entrepreneurs are those that have gone on for about 4 years and beyond and have become stable. The entrepreneurs may or may not remain but the business has been established. Some entrepreneurs move on to set up other new entrepreneurial ventures once the job is done as it were.

5. Discontinuity of Entrepreneurship. Some business may close up and the promoters move on to paid employment, or make them to join forces to start up a new entrepreneurship venture or go it alone. In all events the experience of failure itself is an essential attribute to the entrepreneurial process. It generally reenergizes prospective entrepreneurs' at a new start.

Source: GEM Global Report, 2011

Figure 1.

1. Potential Entrepreneurs are those who believe they have the capabilities to explore and exploit, but most times not so obvious, business opportunities and have the guts to take on the challenge. For these class of people, they would typically attach importance to the perception society has of entrepreneurs, the level of support they believe they are likely to get from civil societies like favorable media reporting of their engagements. These intentions may be realized, and in which case they set up a business and move to the nascent stage or may remain on the planning board and remain mere wishful plan.

2. Nascent Entrepreneurs are those entrepreneurs'activities that moves from the planning stage to actual businesses but are less than 3 months. Given the relative challenges of starting a new business, not many gets to start not to mention that many die before a few months

3. New Business Entrepreneurs. The nascent business which are able to make it past 3 months are considered thriving new businesses. But typically after three and a half years are considered stable. Most entrepreneurs would confirm that the first two to three years are the litmus test for the business as typically those who are able to make it across those early years stand a good chance of survival to mature business. The entire spectrum of Nascent and New

Data collection

We are using secondary data collected from the web sites of the World Bank and the Global Entrepreneurship Monitor Consortium and Google. The GEM is a loosely formed association with membership doing the field work under guidance from experts from GEM headquarters. Reports are produced for countries where they have membership affiliations. The 2012 report contains report for 66 countries but with missing information in a couple of countries that is not statistically significant. Whilst the World Bank report cover for virtually all the countries in the world, our data coverage has been limited to the 66 countries covered by GEM in order for us to be able to achieve a comparative analysis of the various variables from both sources

Data handling for the analysis

The entrepreneurship process is phased into two main categories, activity category and attitude (or behavior) category. The activity stages relates to actual businesses in action and covers the following phases; nascent stage, the new business stage and the established business stage. The nascent and new business stages are together referred to as the total early stage entrepreneurial activity phase (Figure 1) and of

course, the discontinuance stage when and if we have business failures. The attitude phase relates to the potential entrepreneurial stage when to- be- entrepreneurs have intentions which are capable of being transformed to actual businesses. Therefore, the enumeration for the activity stages produced results from actual businesses that were monitored and reported while the potential phase must report based on a set of socio cultural questionnaire that elicits the level of entrepreneurial capacity in the respondents. In this wise, we have ready- to- use enumeration statistics with respect to the activity phases. On the other hand, we have 7 variables reported on the potential entrepreneurship phase. (Table 1).In our opinion, and to progress the analysis, using all seven variables at the same level as the other four from the activity phases would produce a heavily biased analysis towards the potential entrepreneur phase variable. Therefore, we decide to have a summation of the 7 potential entrepreneurship variables into a variate. Therefore, these 7 variables collectively, would be used to identify the certain representative behavior of a potential entrepreneur. Similarly, whereas the data source gave statistics on the nascent, new business and the total early stage entrepreneurial phases, we have decided for the same rational as above to use statistics on nascent and new businessesonly. Recall, total early stage entrepreneurial phase is simply the summation of the nascent and the new business stages and so to use all would be to unduly skew the analysis and relationship to these related variables and crowd out or impair the importance of other variables in the model. The 7 variables on which responses were obtained from respondent on the potential entrepreneurship stage are listed in Table 1 below. The summated scale of the 7 variables is termed X1, potential entrepreneurship phase.

Generally, attitude towards entrepreneurship may tend to give an indication of the propensity to which people in a particular country tended to engage in entrepreneurship. Important to mention at this point is the three distinct stages of economic development identified in the GEM report which might have defined the response pattern. They are factor driven economy, efficiency driven economy and innovation driven economy. Suffice to say that the very developed economies fall into the innovation led economy while the very poor and under-developed economies fall into the extreme of factor led economy. The response profile showed that the factor led economies tended to have higher opportunities and less fear to failure. This behavioral pattern is explained by the fact that emerging economies have higher unemployment rate and so people are more daring to seek out opportunities and make a go at entrepreneurship. This gives meaning to the further distinction of necessity and opportunity driven entrepreneurship made by the report. Necessity entrepreneurs are those pushed into entrepreneurship because they have no other work to do whereas, opportunity are those who see opportunities to exploit. This reasoning is consistent with the status of the more developed economies where we have higher employment rate and opportunities to change jobs easily and so people are not motivated to seek entrepreneurship out of necessity as alternatives exist, but strictly out of opportunity led motives to exploit a situation or introduce newly discovered technology. In the final analysis, the opportunity available at entrepreneurship, the belief that the pursuit is worthwhile, approval of society which may influence the level of support by citizens and governments alike would impact on the outcome of the level of entrepreneurship rate in any society.

Data treatment-missing data

Our review of the data indicated at least 27 missing data in the data set presented at the potential entrepreneurship stage representing 5.8% of the data set. The missing data were reasonably randomly dispersed and would not likely materially affect our analysis. However, we have opted for treatment of the missing data to provide a more realistic position of the data set. We employed the mean of the nearest 5 items to the missing data to sort out the missing data. All missing data have therefore been replaced and the data set 100% complete. The

Table 1. Potential entrepreneurial Phase

OPPORTUNITY	A1	PERCENT OF THE SAMPLE SIZE WHICH PRECEIVES OPPORTUNITY OF ENTREPRENEURSHIP	
CAPABILITY	A2	PERCENT OF THE SAMPLE WHICH PERCEIVE THEY HAVE THE CAPABILTY AT GOING ENTREPRENEURIAL	
FEAR OF FAIL	A3	PERCENT OF THE SAMPLE SIZE WITH FEAR OF FAILURE AT ENTREPRENEURSHIP	
ENTRE INT	A4	PERCENT OF THE SAMPLE SIZE WITH ENTREPRENEURIAL INTENTIONS	
CAREER CH	A5	PERCENT OF THE SAMPLE WHO BELIEVES ENTREPRENEURSHIP AS A GOOD CAREER CHOICE	
HIGH STATUS	A6	PERCENT OF THE SAMPLE SIZE WHO BELIEVES THAT SOCIETY ACCORDS HIGH STATUS TO ENTREPRNEURS	
MEDIA ATTEN	A7	PERCENT OF THE SAMPLE SIZE WHO BELIEVES	

Table 2. Activity phases(Nascent, New Businesses and Established Businesses)

NASCENT		X2	PERCENT OF BUSINESS IN OPERATION BUT LESS THAN 3 HALF MONTHS
NEW		X3	PERCENT OF BUSINESS IN OPERATION BFOR ONLY 3 AND HALF YEARS
ESTABLISHED		X4	PERCENT OF BUSINESS FOR MORETHAN 3 AND HALF YEARS

Table 3. Four predictor (independent) variables

POTENTIAL		X1	PERCENT OF INTENTIONS AT ENTREPRENEURSHIP (VARIATE)
NASCENT		X2	PERCENT OF BUSINESS IN OPERATION BUT LESS THAN 3 HALF MONTHS
NEW		X3	PERCENT OF BUSINESS IN OPERATION BFOR ONLY 3 AND HALF YEARS
ESTABLISHED		X4	PERCENT OF BUSINESS FOR MORETHAN 3 AND HALF YEARS

variate, potential entrepreneurship was computed by the simple mean of the 7 variables to derive X1 per the justification for the variate computation we earlier alluded to. At this point we have 4 independent variables with complete data set and a response variable Y1 (HDI)

The model

Given the rationalization as presented above, we have summated the 7 variables into a variate, the potential entrepreneurship phase, as shown in Table 1 above. Table 2 shows the three other entrepreneurship phases while Table 3 brings together the 4 independent or predictor variables in our model. The model is made up of the response variable, the HDI and the predictor variables. We can depict the model mathematically as;

$$HDI = Y = f(X1, X2, X3, X4,)$$

The null hypothesis

The null hypothesis is to ascertain that HDI is explained significant by the entrepreneurship phases; X1….X4

Thus,

Null HypothesisHo: HDI: Y=f(X1……….X4)
Alternate Hypothesis   H1: HDI: Y f(X1……….X4)

The alternate hypothesis therefore is that HDI is not explained by X1…X4 but rather explained more by lurking variables which have not been captured in our model.

The analysis

The purpose of the paper is to ascertain the nature and extent of the relationship between the level of the human development index and the entrepreneurship phases in an economy. And to discriminate variables which best describes the sample cases.

We have established a nexus which provides a priori rationalization for the relationship between these concepts but will have to scientifically test the hypothesis that indeed a relationship does exist, the nature and extent of the relationship and that our presumption is not a spurious contemplation in futility. Having developed the framework of the paper and have the information necessary to explore such relationship, we need to use the appropriate tools in seeking meaning to the form of relationships. We start off with confirming the reliability of the data set and then perform a time series to ascertain a directional relationship amongst all the variables with respect to time. The linear regression model is then employed to establish a line of best fit that explains the model relationship and finally, we employ the discriminant analysis to establish which of the labels or variables best explains the behavior of the sample cases or classes of countries involved in the study

Reliability test

We commence our analysis by testing for the reliability of the data set obtained for the study. The reliability test is a measure of the level of internal consistency of the data which provides a basis for reliability. Reliability test would indicate whether we have measured the same construct to the level of the variance of the data within the model. If similar scales are used, then, it is apparent that there should be some semblance of internal consistency and familiarity or correlation between the data items except of course different scale or construct are being measured. The reliability test is measured by the Cronbach's Alpha which defines the proportion of the variability in the responses to a survey that is the result of differences in the respondents. In other words the test refers to the measurement coefficient that causes it to give similar results from similar inputs such that a difference in result must be as a result of difference in the respondent position and not out of any misrepresentation or interpretation conflicts. The closer to 1 the Cronbach's Alpha, the better the reliability measure gets. There are different levels of test for the reliability of data. We will restrict ourselves to the Cronbach's Alpha and the Inter item correlation matrix. Table 4 below summarizes the position;

Table 4. Reliability test

Variable/measure	Cronbach's alpha	Cronbach 's alpha std item	Inter item correlation	REMARKS
Universe data for regression/discriminant	0.754	0.381	STRONG	The relevant measure, Cronbach's Alpha is strong and sufficient.The assumption of equal variances for all the observations in the standardized item Alpha makes it unreliable. The data set is reliable
Established bus for time series	0.499	0.715	GOOD	A fair Alpha measure but strong inter item correlation. Provides a fairly robust and reliable data set
New entrepre for times eries	0.659	0.738	WEAK	Good Cronbach's alpha but weak correlation. The weak items however comes out of two country observation rather than the whole sample data
Nascent entrepre for times eries	-1.363	-0.172	NEGATIVE	There is no consistency within the data observation and would suggest a rather weak and unreliable data. However, the GEM report confirms the disproportionate level of this variable in low HDI countries in comparison to high HDI countries as consistent with the distinction between necessity and innovation led entrepreneurship
South africa for time series	0.793	0.836	STRONG	The data set is pretty reliable as both the Cronbach's Alpha and the inter item correlation items are all strong

Details are attached in the Appendix

Time series analysis

Times series is basically a study of the trend of a particular variable over time. By observing the trend of a particular variable, we can attempt to construct the future possible behavior or trend of same variable over time. Therefore, it is all about a measure or ability to make predictions about the future trend based on observed past trend of a variable. The objective of the study is to measure the extent and nature of the causal relationship between entrepreneurship and HDI. To do this, it is our opinion that we should first establish whether in the first place there is evidence of a continuous growth in entrepreneurship endeavors in the different countries over time as a basis to test our hypothesis of a relationship with another variable (HDI) that has shown growth in most countries across the world over time. The time series analysis will help to define that trend. The figures below defines the trend of entrepreneurship growth in selected countries for a period of 12 years;

From Figure 2 through to 4, we can see a clear trend of growth in entrepreneurship regardless of the state of entrepreneurship measurement, from established to new and nascent businesses, we can infer if a straight-line is drawn across that there is indeed some small but steady growth trend in entrepreneurship over the years apart from the outlier in Uganda with disproportionate growth trajectory. Similarly, there is a positive growth of entrepreneurship in South Africa (sample country) for all the entrepreneurship states over the 12 years trend period

Linear regression analysis model

The linear regression analysis tool simply measures the nature and extent of the relationship between a response (dependent) variable and a predictor (independent) variable. Our model has one dependent variable and 4 independent variables which are all numeric and so amenable to the model. The major assumptions of the linear regression model that requires;
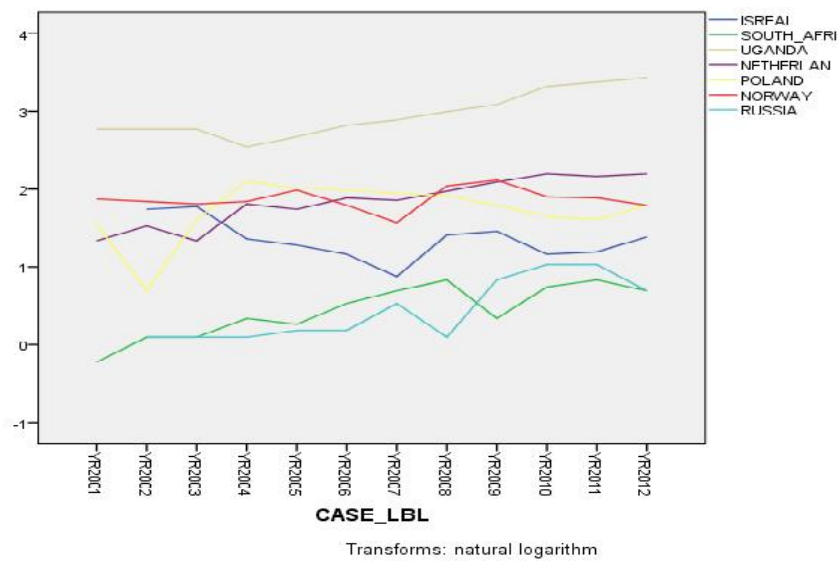
Figure 2. Time series for established entrepreneurship
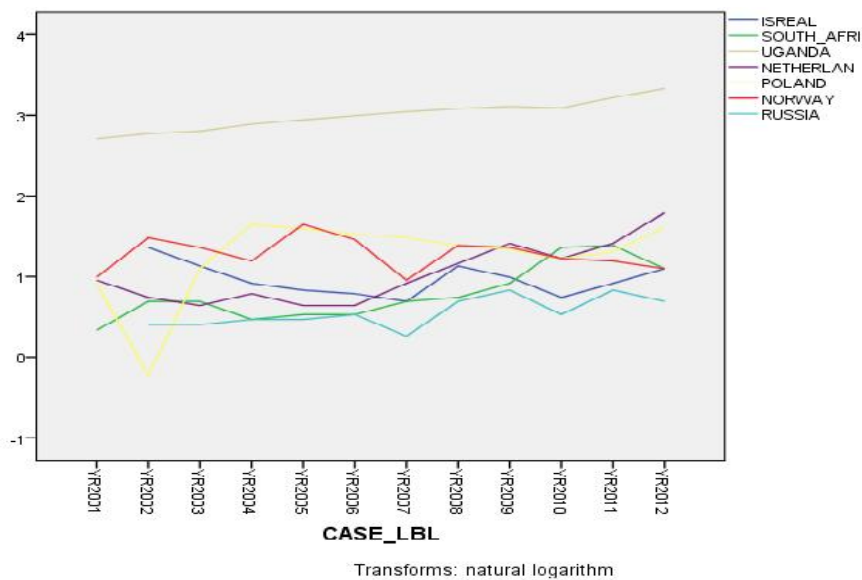
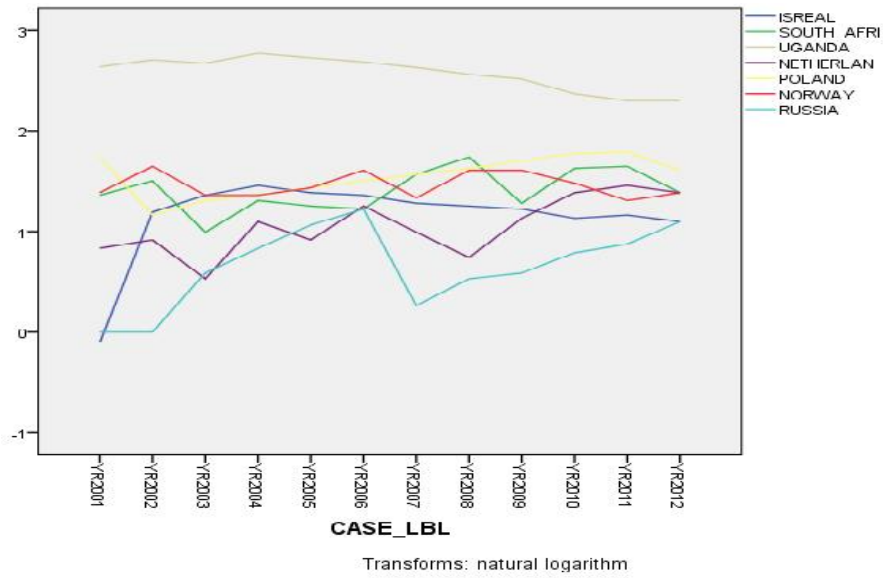**Figure 3. Time series for new entrepreneurship**
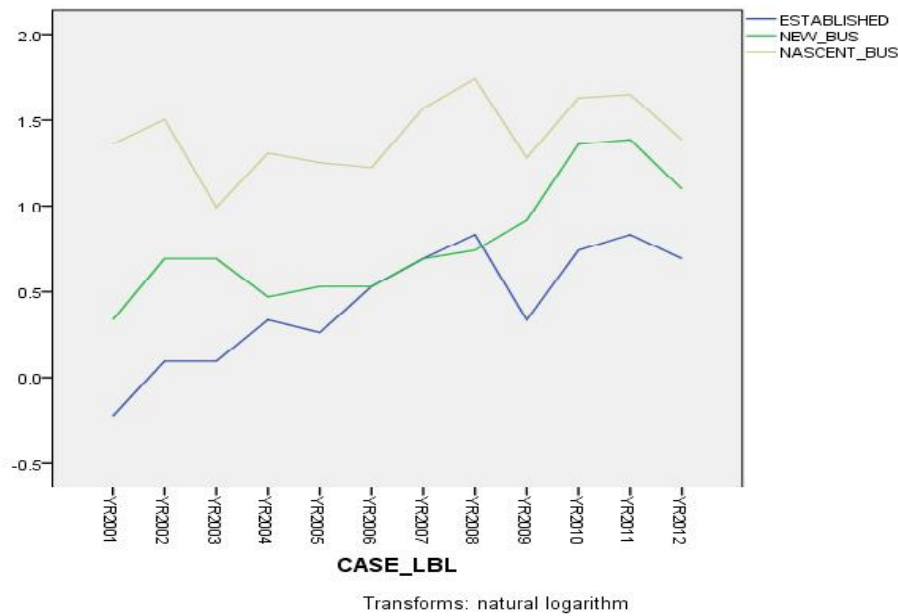
Figure 4. Time series for nascent entrepreneurship

Figure 5. Time series for south africa

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.821[a]	.675	.653	.08242	.675	31.604	4	61	.000	1.866

a. Predictors: (Constant), X4, X2, X1, X3
b. Dependent variable: Y1

Table 6. ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	.859	4	.215	31.604	.000[b]
1	Residual	.414	61	.007		
	Total	1.273	65			

a. Dependent Variable: Y1b. Predictors: (Constant), X4, X2, X1, X3

1. That the error should have a normal distribution
2. Variance of the error term should be constant across cases (countries) and across the independent variables (homoscedasticity) and;
3. The value of the error term is independent of the values of the variables; have been reasonably met. Please see the Probability plot in Appendix 1 which indicates the distribution of the residue and the concentration of the expected value around the actual observation. The following summary output from IBM SPSS package helps to describe the relationship between the dependent and independent variables as well as the power of the estimates in explaining the model.

R Square Statistics

This statistics gives the coefficient of determination. That is the proportion of the model that is explained by the predictor variables. The R Square coefficient of 0.675 indicates that 67.5% of the model is explained by the predictor variables while the balance 32.5% is possibly explained by some other lurking variables. Thus 67.5% of changes in HDI is explained by the predictor variables. The explanatory power of the predictor variables of the model is quite strong and we can safely maintain that the relationship so formed by the regression line of best fit is strong and can be relied upon as good explanation for the relationship between the response variable and the predictor variables.

ANOVA

The ANOVA test helps to determine whether there are significant differences between the means of two or more independent variables. The high F statistics indicates a strong relationship between the HDI and the predictor variables which is supported by the fact that the significance value of F is at 0.000 which is less than 0.05, indicating that there is a linear relationship between HDI and the four entrepreneurship phases in our analysis

Thus the equation Y1 gives the overall model description at any values of the independent variables. It is noteworthy however that the absolute values of the various coefficients does not describe the relative importance of the coefficient to the model. Rather, it is the standardized coefficient and the associated significance level that tells us the relative importance of the various variable.

Table 7 provides statistics that gives us an overall model explanation as well as the individual effect of ach of the variables. The standardized coefficient associated with X3 (-0.635 appears to be the highest coefficient and so does a better job than any of the other variables in explain the behaviour of the response variable. Next in order of importance is the X1 variable at coefficient levels of -0.422. This is followed by the X4 (0.286) and lastly the X2 (0.025). Therefore the order of importance of the independent variables in explaining the behaviour of the response variable is ordered as;

Variable Significance

Highest power of explanation X3   0.000
Medium power of explanation X1   0.001
Low power of explanation   X4   0.015
Poor power of explanation   X2   0.818

The departure of the significance from the 95% confidence level range also confirm the non-linearity of the variable in the model. X3 is at 0.000 which is far lower than the 0.05 significance range and this indicates that there is a strong linear relationship between the dependent variable and the X3. Similarly X2 has a significance level at 0.818 which is far above the 0.05 significance level and thus indicates a non-linear posture to the dependent variable. Overall Table 7 provides the measure of the relationship between the dependent and the independent variables as well as providing measure to test linearity of the equations and the relative importance of the various coefficient in explaining the behaviour of the

Table 7. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.095	.067		16.422	.000		
	X1	-.006	.002	-.422	-3.534	.001	.375	2.669
	X2	.001	.003	.025	.232	.818	.452	2.213
	X3	-.017	.004	-.635	-3.781	.000	.189	5.281
	X4	.006	.002	.286	2.513	.015	.413	2.423

a. Dependent Variable: Y1

From Table 7, we can draw our equation for the line of best fit, which is how exactly HDI is regressed against the four explanatory variables; the terms are defined as follows;

The constant coefficient1.095
The Potential Entrepreneur Coefficient (X1)-0.006
The Nascent Business Coefficient (X2)0.001
The New Business Coefficient (X3)-0.017
The Established Business Coefficient (X4)0.006

Thus our line of best fit is explained by the formula;

$$Y1 = 1.095 - 0.006X1 + 0.001X2 - 0.017X3 + 0.006X4$$

dependent variable. The Durbin-Watson statistics at 1.866 also indicates the strength of the data as there is no autocorrelation between the independent variables. The tolerance statistics also show that the variable A has a stronger explanatory power at0.811 (1-.189). General the smaller the tolerance statistics, the more redundant is its contribution to the regression. Recall also that Table 5 gave us the coefficient of determination which measured the explanatory power of the model variables in explaining the phenomena at study. Therefore we have statistics that measures the power of the model as a system as well as the power of the various independent variables in determining their relative importance in explaining the power

of the model. Consistent with the conclusions drawn from the other statistics, the tolerance statistics also rank X1, X4 and X2 in that order of importance in terms of its explanatory power to the regression model.
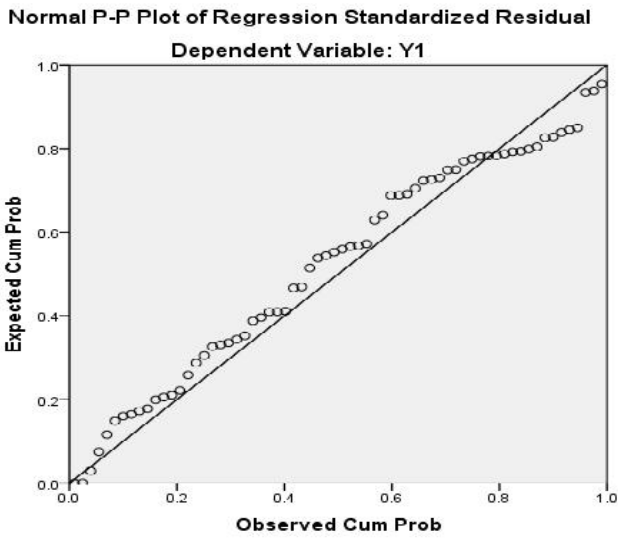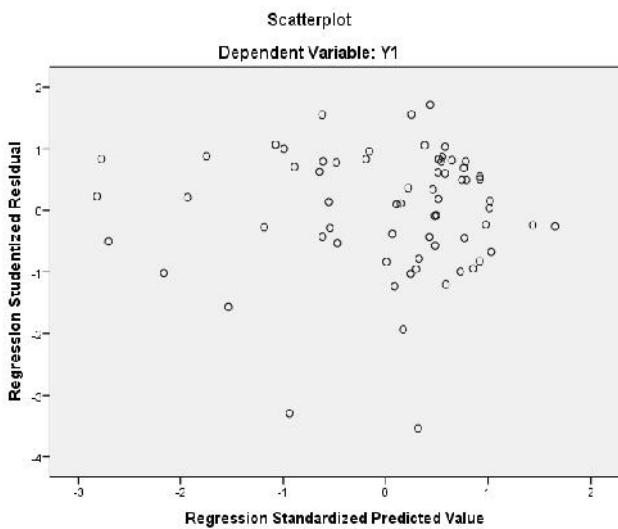
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Y1

Figure 6.

Scatterplot

Dependent Variable: Y1

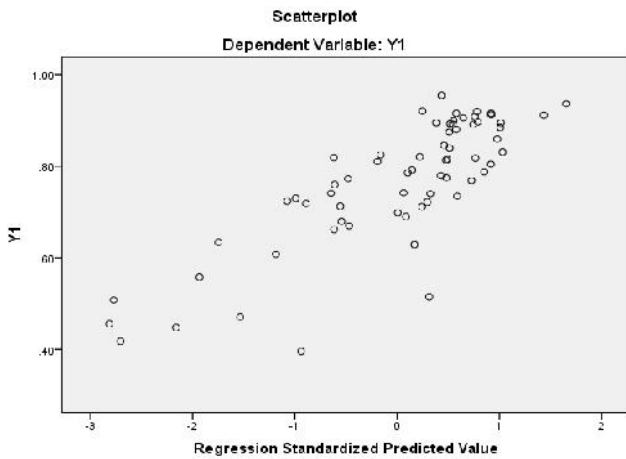

Figure 7.

Scatterplot

Dependent Variable: Y1

Figure 8.

Discriminant analysis

Discriminant Analysis is used to model the value of a dependent categorical variable based on its relationship to one or more predictor variables (independent variables). In discriminant analysis the dependent variable is dichotomous or multichotomous. In our model, we defined three states as indicated by the UN HDI report; 1) Advanced economies (High HDI), 2) Emergingeconomies (Medium HDI) and 3) Developing economies (Low HDI). The three states, High, Medium and Low HDI of the dependent variable are mutually exclusive and exhaustive. The variable Y1 has been broken down into three groupings to denote the three states as;

High HDI   1
Medium HDI   2
Low HDI   3

The independent variable Y1 for the 66 cases have been categorized into three groupings as denoted above. The three grouping of the dependent variable would have to be explained by the independent variable so we can understand the differences between the three groups and perhaps the relationship. Understanding the difference(s) of the three groups helps to determine the variables that best describes each group better and the extent to which such variables describes the different groups in comparison to each other. Consequently, the analysis should throw up which of the four variables best describes the three groups as distinct from each other out of the 66 sample countries making up the overall population. In doing this we should be able to postulate a relationship that best explains the behavior of all variables to the dependent group casing of the variable Y1 and how this behavior is escalated in the different groups

A discriminant function is formed;

$$Z=a+W1X1+W2X2+\dots\dots\dots\dots\dots\dots\dots\dots\dots WnXn$$

Where Z is the discriminant Z score of the discriminant function

a=intercept; W=discriminant weight for independent variable and X1….X4=independent variable

The discriminant is a variate which gives a summated position of all the weighted independent variables to explaining the behavior of the discriminant function and takes the form of the equation as above. The result of the discriminant analysis executed on IBM SPSS is attached in Appendix 2 Discriminant analysis is used as a technique in testing the hypothesis that the group means (centroid) of a set of independent variables for two or more groups are equal. By comparing the group means of the three groups for the four variables, we can see whether the groups have marked differences across each group and across each variable; we can do this check of the group difference by checking the level of significance. Typically any variable with a significance level greater than 0.10 may be statistically insignificant for use in the model as they may not be contributing much to the explanation of the model behavior. From the Tests of Equality of Group Means we can see that all

the variables X1 trough to X4 have significance level much lower that the threshold of 0.10 and so are all good explanation for the discriminant function. More so the order of departure from the threshold suggest that their explanatory relevance is in the descending order of X3, X1, X2 and X4. The Wilks' Lambda statistics similarly supports our choice of a more potent discriminatory variable in X1, X3, X2 and X4 in that specific order as the Lambda coefficient are lowest in X1 through the other variables as stated above. Consistent with the results above the standardized canonical discriminant function coefficient of X3, XI, X2 and X4 are largest in that order. The standardized canonical coefficient measures the overall model fit. The larger the coefficient the greater it's discriminating ability of the groups within the dependent variable. The classification Function coefficient Matrix provides weights that can be assigned to the variable to form the multivariate equation describing the relationship under study. Reproduced from the appendix 2 is the classification function coefficient on which basis the discriminant equation can be formed

Classification Function Coefficients

	X5		
	1.00	2.00	3.00
X1	1.109	1.339	1.239
X2	-.254	-.422	-.475
X3	-1.424	-1.355	-.604
X4	.474	.527	.106
(Constant)	-24.157	-35.967	-32.817

We actually can form a discriminant function from this table in a manner where we take the coefficient that is maximized corresponding to a particular variable. From this we can form three distinct equations for the three different groups using the four variables and the associated coefficients calculated in the table above in a manner that the equation for group 1 will be;

GR 1: W1= -24.157=1.109X1-.254X2-1.424X3+.474X4
GR 2: W2= -35.967+1.339X1-.422X2-1.355X3+.527X4
GR 3: W3= -32.817+1.239X1-.475X2-.604X3+.106X4

It is interesting to note that each of the group retained the same directional regression relationship between the predictor variables and the response variable. Some negative in response and others positive in response to the changes in the explanatory variables

Conclusion on the analyses

The purpose of our study is to ascertain the nature and extent of the relationship between entrepreneurship attitude and activities with the HDI measure of development and in doing this explore which of the possible predictor variables best describes the state of development as represented by HDI measure. We set up a frame work to test the hypothesis and employed the regression analysis along with the discriminant analysis to achieve both objectives. The line of best fit as represented in the regression equation indicates a relationship which posits directional positive relationship between HDI and nascent business entrepreneurship (X2) and matured business entrepreneurship (X4). And a negative relationship between HDI and Potential business entrepreneurship (X1) and new business entrepreneurship (X3). Does this have any meaning

drawing from our sample data? The GEM 2012 report had made an interesting distinction of entrepreneurship into necessity driven and innovation driven entrepreneurship. This distinction has significant implication for our results. Poorer and emerging economies tended to have a significantly larger number of startups than the developed economies. Part of the research findings is that because of the high level of unemployment in poorer countries, there is a necessity driven desire to start a new business rather than stay unemployed for the unforeseeable future, and most of the entrepreneurship ventures are subsistent at best and pretty small in terms of scale. This accounts for why we have a higher number of potential businesses in existence which did not necessarily translate to matured businesses. On the other hand, there are more opportunities at getting better paid jobs in the developed countries in relative terms and so the desire to start up is not very strong and people generally are led to start business on only new discoveries or invention exploitation rather than necessity to survive on a business. Therefore, the theoretical position per the model equation is consistent with the reality on ground. Suffice to posit that in similar terms, you have a positive relationship between HDI and matured business entrepreneurship which implied that you have more thriving matured entrepreneurial activities in relative terms in the developed economies than the emerging ones. This is self-explanatory on how this translates to higher HDI. The linear relationship can be relied upon to the extent that the R squared at 0.675 provides evidence that the predictor variables gives a good explanation of the model. At least 67.5% of the response of HDI can be explained by the model variables and this is statistically significant, enough to make the model reliable. Our standardized coefficient also addresses the strength of each of the explanatory variables in the model and we can confirm the superior explanatory power of new business entrepreneurship (X3) in the model. This is followed by Potential Entrepreneurship (X1), matured business (X4) and nascent entrepreneurship (X2). The Durbin Watson statistics at 1.86 provides some assurance that there is reasonably no auto correlation amongst the predictor variables.

The data available for the study had grouped the cases (countries) into certain categories, High HDI, Medium HDI and Low HDI countries by measure of the HDI scores. On the basis of this grouping, we attempted to use the discriminant analysis framework to see if there are specific explanatory variables that best separates each group from the other. The conclusion we obtained points to, and is consistent with the logic of the distinction of necessity and innovation led entrepreneurship endeavors. At 95% confidence level, the significance of our data suggest that new business entrepreneurship (X3) is about the strongest discriminant amongst the variables. A look at the classification coefficient table confirms the apparent absolute variances of that variable amongst the different variables, suggesting it's the most discriminating variable in explaining the behavior of the various groupings in the cases

Recommendation

Entrepreneurship is a multidisciplinary field of study. The perspective of our study has been to achieve some sense-making into the seeming a priori preposition that a relationship

might indeed exist between the HDI and the explanatory variables used for the study. The results are interesting and points to further studies in many other areas. For example, is there a relationship between the quality of education and entrepreneurship? Does the level of democratization affect entrepreneurship? Is there a link between institutional frameworks, governance and social issues to entrepreneurship development? Is there a relationship between the robustness of the financial sector to entrepreneurship growth? The study is specific and we have drawn some interest but rather self-obvious conclusion from our knowledge of economic history. What we haven't done is to test alongside many other variables and see how the efficacy of some of these other variables might affect the study we have done. For example, the GEM reports from enumeration done over its affiliate countries that entrepreneurs finds as critical some 8 pillars to effective entrepreneurship. These factors include;

1. Financing
2. Government Policies and Programs
3. Level of Education and Training
4. Research and Development transfers
5. Availability of Commercial Infrastructure
6. Internal Market openness
7. Physical Infrastructure
8. Cultural and Social norms

Cognizance of these considerations and how critical they are to the entrepreneurship stages and development were absent in the study, whereas, these are the components that informs the level of entrepreneurship in the first place. There is a whole new world of study of entrepreneurship components ahead. Therefore the level of the interaction effect of the study has not been taken into account and would be an interesting area of study for the future. We noted that there was a reasonable level of correlation amongst the independent variable which might have affected at some level the results but not sufficient to invalidate the strength of the conclusions reached from the evidence. Notwithstanding the study is more of re-establishing a suspected fact which might indeed help policy makers especially in the less developed world, in understanding better the behavior of entrepreneurship relative to the stages of economic and human development and how they in turn can adopt policy measures to fast track and catch up with the more advanced countries in handling the discriminant characteristics of developed economies

End notes

1. GEM. Global Entrepreneurship Monitor. 2012 Report, page 18 Chapter 2. https:/www.gemconsortium.org/ Reports
2. HDI is a comparative measure of standard of living and well-being for countries worldwide. And was developed in 1990 by Pakistani economist Mahbub and Indian Economist Amartya Sen. It ranks countries into four basic category by the measurement, Very high HDI, High HDI, Medium HDI and low HDI
3. The time series analysis was performed for few countries because of paucity of information for most countries on a long term basis. In doing this, we noted that all most all the

low HDI countries are new members in GEM and so have only latest year's information. Therefore, we had to reduce the time series analysis to a fewer countries that had track record in the GEM data base

4. Schumpeter is regarded as the father of Entrepreneurship with his classic in 1934, Model of Economic growth
5. Kirzner is regarded as the father of Austrian Economics holding views on entrepreneurship that is aid to be opposite to Schumpeter. Together they constitute the tow lenses from which entrepreneurship is viewed. In an interview Kirzner gave to the Austrian Economics Newsletter in the spring of 1997 " Let me recognize that in my 1973 book I was perhaps overeager to draw a distinction between Schumpeter and myself. In later writings, I have pulled back somewhat from that…." There now appear to be a convergence in the polar position of entrepreneurship from the two schools. See http://www.mises.org/journals/aen/ aen17_1_1.asp
6. Heuristic model of opportunity recognition. Journal of Business Venturing, Vagheli, 25(2010) 73-86. Management Sciences, Baron, September 2006 vol. 52 No 9 1331-1344
7. The Heart of Entrepreneurship- Harvard Business Review by Howard H. Stevenson an David E. Gumpert. hbr.org/1985/03/the-heart-of entrepreneurship/ar/1
8. The Knowledge spillover theory of entrepreneurship by Lucas (1978) Zoltan J Acs. Small Business Econ (2009) 32:15-30
9. The Ultimate Resource by Julian Lincoln Simon published at Princeton university press 1981. Pg 360-390
10. Journal of Enterprising Culture. Vol.10, No. 1 (March 2008) 55-87
11. The GEM Report 2012
12. Economics Letters. Vol. 58, issue 1, Jan 1st 1998. Pg 91-95
13. Journal of Business Venturing. Vol. 21 issue 2 March 2006. Pg177-194
14. Academy of Management Journal. 2009, Vol. 53, No. 1 pg 199-214
15. Steve Job. Former CEO of Apple

REFERENCES

Academy of Management Journal. 2009, Vol. 53, No. 1 pg 199-214

Business Statistics, Second edition by Sharpe, De Veaux and Velleman

Economics Letters. Vol. 58, issue 1, Jan 1st 1998. Pg 91-95

GEM. Global Entrepreneurship Monitor. 2012 Report, page 18 Chapter 2. https:/www. gemconsortium.org/Reports

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Heuristic model of opportunity recognition. Journal of Business Venturing, Vagheli, 25(2010) 73-86. Management Sciences, Baron, September 2006 vol. 52 No 9 1331-1344

http://en.wikipedia.org/wiki/Cronbach's_alpha

http://en.wikipedia.org/wiki/list_of_countries_by_human_Development_Index retrieved on August 8th, 2013

http://www.mathematicstatistics.science.dictionary.org/dictionary-of electronic-statistics. Retrieved on August 17th, 2013

http://www/pesd.isr.umich.edu/psed/ retrieved on august 8th, 2013

https://www.cia.gov/library/publication/the-world-factbookretrieved August 8th, 2013

IBM SPSS Tutorial

Journal of Business Venturing. Vol. 21 issue 2 March 2006. Pg177-194

Journal of Enterprising Culture. Vol.10, No. 1 (March 2008) 55-87

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Multivariate data Analysis, seventh Edition by Joseph F. Hair Jr., William C. Black, *Barry J. Babin*, Rolph E. Anderson

Schumpeter is regarded as the father of Entrepreneurship with his classic in 1934, Model of Economic growth

Steve Job. Former CEO of Apple

The GEM Report 2012

The Heart of Entrepreneurship- Harvard Business Review by Howard H. Stevenson an David E. Gumpert. hbr.org/1985/03/the-heart-of entrepreneurship/ar/1

The Knowledge spillover theory of entrepreneurship by Lucas (1978) *Zoltan J Acs*. Small Business Econ (2009) 32:15-30

The Ultimate Resource by Julian Lincoln Simon published at Princeton university press 1981. Pg 360-390

Understanding Basic Statistics, Fourth Edition by Brase and Brase

www.worldbank.org Retrieved on august 8th, 2013

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