RESEARCH ARTICLE

DETERMINANTS OF EARLY STAGE ENTREPRENEURSHIP ACTIVITY INVOLVEMENT: GLOBAL PERSPECTIVE ON GENERAL ENTREPRENEURSHIP MONITORING ADULT POPULATION SURVEY

Niño Datu
De La Salle University

Abstract : Total early stage entrepreneurial activity (TEA) refers to entrepreneur's involvement in early-stage entrepreneurial activity. GEM reported that TEA is vital to boosting economic activity as it creates job and foster well-being in the community. However, limited research has been conducted to explore why entrepreneurial potential and support can increase TEA. This research examined the association of entrepreneurial potential and support, demographic factors, and geographic locations to TEA among 181,281 respondents across 59 participating countries in GEM Adult Population Survey. Findings showed that entrepreneurial intention, experienced a shutdown of business in the past, known someone who started a business in the past, seeing opportunities, and beliefs on having the required knowledge/skills to start a business can increase the likelihood of involvement in the early stage entrepreneurship activity. However, fear of failure will decrease the likelihood of involvement in the early stage entrepreneurial activity. Addition in years of age, higher income, higher educational attainment, and gender specifically males can increase the likelihood of involvement in the early stage entrepreneurial activity. Lastly, the United States among all the participants of GEM Adult Population Survey have higher likelihood of involvement in early stage entrepreneurial activity except for countries such as Australia, Philippines, China, Canada, Cameroon, Luxembourg, Latvia, Estonia, Guatemala, and Israel. Findings of this research emphasizes the entrepreneurial benefits of cultivating entrepreneurs' capability to deal with daily entrepreneurial hassles.

Keyword: GEM Adult Population Survey, Total Early Stage Entrepreneurial Activity (TEA), Entrepreneurial Potential and Support

INTRODUCTION

Developed economies was seen to have a declining numbers of entrepreneurship rates. The higher level of competitiveness and alternative job options is seen in the developed economies such as Europe and North America. However, US and Canada are the highest in their respective geographical locations. The entrepreneurial activity can increase the economic status of a country mainly because it creates job and well-being to the community. Hence, the there is a need to explore the factors that can increase the entrepreneurial activity including its antecedents and its impact in the economic activity (GEM, 2018).

The purpose of the research is to determine the entrepreneurial support and support factors that is needed to strengthen the total early stage entrepreneurship activity (TEA). The researcher hypothesizes that planning to start a business, knowing someone who started business, someone who learned from shut down of business in the past, have a good sense of opportunity in the environment, and perception of having the knowledge/skills in starting a business will most likely increase the probability of predicting the total early stage entrepreneurship activity (TEA). However, being pessimist on failure of business can decrease the involvement in TEA. The demographic factors such as age, income, education, gender, and geographic location will be explored. It is expected that higher income, higher educational attainment, and males, and located in US can increase the probability of involvement in TEA while will decrease the probability as they get older.
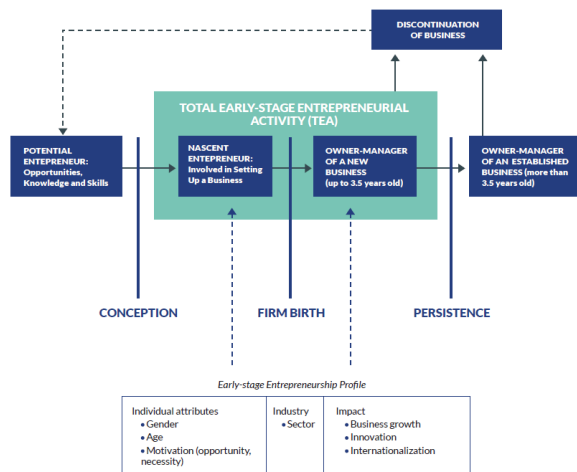
2. Research Framework

Figure 1. GEM Entrepreneurship Indicators

2.1. Total Early Stage Entrepreneurial Activity (TEA)

Entrepreneurial activity framework of GEM identified three types of activities such as total early stage entrepreneurial activity (TEA), social entrepreneurial activity (SEA), and employee entrepreneurial activity (EEA) (GEM, 2018). TEA is one of the most explored indicators to predict the potential entrepreneurial activity (Draghici & Albulescu, 2014;

Pawęta & Kirillov, 2016; Dvouletý & Orel, 2019; Kotzeva, Schmiemann, & European Commission Eurostat, 2012; Diana Rusu & Roman, 2017; Velilla, 2018; Morris & Lewis, 1995).

2.2. Entrepreneurial Potential and Support

The dimensions of entrepreneurial potential and support includes societal attitudes, self-perceptions, affiliations, and intentions. These dimensions can identify potential entrepreneurs in the society. In the current study, intentions, affiliations, and self-perceptions only will be explored (GEM, 2018).

The self-perceptions pertain to how people see opportunities around them. This reflects the opportunities sees by the potential entrepreneur. GEM the perception of people of their knowledge/skills necessary in starting up a business. The fear of failure is being asked al

The affiliations refer to knowing an entrepreneur that will serve as role model and sharing range of experiences. Also, knowing an entrepreneur help for searching for meaning in life and something other people do.

Intention is the best indicator of the entrepreneurial potential. This is the intend of people to start a business in the future. The entrepreneurial intention asks the respondents of working adults (18-64) planning to start a business in the next three (3) years (Kotzeva, Schmiemann, & European Commission. Eurostat., 2012; Velilla, 2018;

Dvouletý & Orel, 2019; Pawęta & Kirillov, 2016; Winiata, n.d.).

3. Research Methodology

3.1. Research Design

The current study is a descriptive-explanatory research. To answer the research queries, a non-linear regression will be used to determine the likelihood of involvement in the early stage entrepreneurial activity. The data from GEM report is purely categorical in nature. The codes can be found in Table 1. The aim of the study is to determine the breadth of the entrepreneurial potential and support factor that will boost the involvement in early stage entrepreneurship activity.

3.2. Data Collection

The data was obtained from the Adult Population Survey (APS) of the General Entrepreneurship Monitoring (GEM). The current study made use of the latest data which is year 2025. The definition of the variables is presented in Table 1.

Table 1. Definition of variables

Variable	Description	Code
TEA	Involved in total early-stage entrepreneurial activity	0 = No 1 = Yes
DISCENT	Shut down a business in the past 12 months, business did not continue	0 = No 1 = Yes
FUTSUP	Expects to start business in the next three years	0 = No 1 = Yes
KNOWEN	Knows a person who started a business in the past 2 years	0 = No 1 = Yes
OPPORT	Sees good opportunities for starting a business in the next 6 months	0 = No 1 = Yes
SUSKIL	Has the required knowledge/skills to start a business	0 = No 1 = Yes
FRFAIL	Fear of failure would prevent respondent to start a business	0 = No 1 = Yes
Age	Respondent exact age	
Income	Household income: recoded into thirds	0 = Lowest 33% 1 = Middle 33% 2 = Upper 33%
Education	Highest educational attainment	0 = Graduate experience 1 = None

3

		2 = Some secondary
		3 = Secondary degree
		4 = Post Secondary

Gender		
	Respondent gender	0 = Female
		1 = Male
Country	Origin country	
		0 = US
		1 = Otherwise

3.3. Econometric Procedure

3.3.1. Descriptive Statistics

The measures of central tendency and measures of variability were used to summarize the numerical measures in the data sets. Frequency distribution was utilized for the categorical variables in the data sets.

3.3.2. Leverage and Influential Data

Leverage has an impact on the covariance patterns on the model. It appears when the jth covariance pattern is separated for others in terms of the outcome variables. The leverage depends on x's and predicted value specifically if it is detected as extreme value. The data is extreme if the leverage score exceeds 0.5 and if the standardized deviance exceeds 2. It is still best to check for the influential data points because leverage will not be that useful if the predictors are categorical variables. The data point is influential if the Pregison's DBeta is greater than 1 or less than -1. Once the leverage and influential data points was identified, it will be removed and the model will be refitted.

3.3.3. Goodness of fit

The goodness of fit will be measured through Pearson χ^2 test, likelihood ratio χ^2 test, and the deviance χ^2. Pearson χ^2 will be computed to check if the data is fit with model. The likelihood ratio χ^2 test is carried out for the overall fit of the model. The deviance χ^2 was used to see the fitting of the data (Hair, Black, Babin, & Anderson, 2014).

3.3.4. Logistic Regression Model

Logit models were primarily used for a binary dependent variable (e. i. 1 or 0). It is a non-linear regression model that requires the output to be either 0 or 1 (Hair et al., 2014). The model estimates the probability of the outcome to be 1 (Y = 1) which is the probability that the desired outcome will happen which is as follows:

Pr(TEA = 1 | FUTSUP, DISCENT, KNOWEN, OPPORT, SUSKIL, FRFAIL, Age, Income, Education, Gender, Country) = β0 + β1FUTSUP + β2DISCENT + β3KNOWEN + β4OPPORT + β5SUSKIL + β6FRFAIL + β7Age + β8Middle 33%tile + β9Upper 33%tile + β10None + β11Post Secondary + β12Secondary Deg + β13Some Secondary + β14Male + β14Egypt + β15South Africa + β16Greece + β17Netherlands + β18Belgium + β19Spain + β20Hungary + β21Italy + β22Romania + β23Switzerland + β24United Kingdom + β25Sweden + β26Norway + β27Poland + β28Germany + β29Peru + β30Mexico + β31Argentina + β32Brazil + β33Chile + β34Colombia + β35Malaysia + β36Australia + β37Indonesia + β38Philippines + β39Thailand + β40South Korea + β41Vietnam + β42China + β43India + β44Iran + β45Canada + β46Morocco + β47Tunisia + β48Senegal + β49Burkina Faso + β50Cameroon + β51Barbados + β52Botswana + β53Portugal + β54Luxembourg + β55Ireland + β56Finland + β57Bulgaria + β58Latvia + β59Estonia + β60Croatia + β61Slovenia + β62Macedonia + β63Slovakia + β64Guatemala + β65Panama + β66Ecuador + β67Uruguay + β68Kazakhstan + β69Puerto Rico + β70Taiwan + β71Lebanon + β72Israel

3.3.5. Predictive Ability of the Model

3.3.5.1. Validity

The results of the sensitivity which is the proportion of true positives over the true positives plus false negatives and the specificity which is the proportion of the true negatives over the true negatives plus the false positives (Hair et al., 2014).

3.3.5.2. Predictive values

The positive predictive values (PPV) is the proportion of the true positives over true positives plus false positives. The Negative predictive values (NPV) is the proportion of true negatives over the true negatives plus false negatives. The ROC curve is a plot showing the relationship between the sensitivity (true positive rate) and the 1-specificity (false positive value) for difference probabilities of the outcomes variables. Each of them represents the best pair of sensitivity/specificity. Another method is the Area Under the Curve (AUC) with the requirement of .5 and higher values (Hair et al., 2014).

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 shows the summary statistics of the numerical measure. Among all the variables, only age is a numerical measure. The average age of respondents are $M = 40.96$ years of age; $SD = 14.74$.

Table 2. Summary Statistics of Numerical Measures

VARIABLES	N	mean	sd	min	max
age	170,922	40.96	14.72	18	99

Table 3 presents the frequency distributions of the constructs. The involvement of entrepreneurs in early stage entrepreneurship activity (TEA) is very low at 7.83% only. Only 2.74% of the respondents had an experience of discontinued business for the past 12 months. The respondents planning to start a business in the next three years is 20.47%. 37.40% know someone who started a business for the past three years. 34.70% of the respondents sees an opportunity in setting up a business in the next 6 months. The belief that they have the required knowledge/skills to start a business is higher at 47.34%. The fear of failure in starting a business is quite high at 39.12%. Most of the respondents came from a low-income household at 46.93%. The highest educational attainment is secondary degree at 36.44%. Lastly, there is a good gender mix of the respondents at 50.95% females and 49.05% males.

Table 3. Frequency Distributions

Variable	Categories	Frequencies	Percent
TEA	Yes		7.83
	No	13,380	92.17
		157,542	
DISCENT	Yes		2.74
	No		97.26
		4,679	
		166,243	
FUTSUP	Yes		20.47
	No	34,994	79.53
		135,928	
KNOWEN	Yes		37.40
	No		62.60
		63,917	
		107,005	
OPPORT	Yes		34.07
	No		65.93
		58,227	
		112,695	

SUSKIL	Yes		47.34
	No	80,921	52.66
		90,001	
FRFAIL	Yes		39.12
	No	66,867	60.88
		104,055	
Income	Lowest 33% tile		46.93
			26.95
	Middle 33% tile	80,221	26.11
		46,072	
	Upper 33% tile	44,629	
Education	Grad Exp		4.94
	None		12.41
	Post Second	8,452	29.59
	Second deg	21,218	36.44
	Some Second	50,579	16.61
		62,277	
		28,396	
Gender	Female		50.95
	Male	87,081	49.05
		83,841	

4.2. Leverage and Influential Data

No missing data was reported out of 181,281 sample size. The important observations were examined to see the influential data points. After evaluating the outliers, leverage, delta χ^2, delta deviance, and delta betas, 10,359 observations were removed and 170,922 remained.

4.3. Goodness of fit

The Pearson χ^2 ($\chi^2 = 130,810$, p > 0.05) indicates that the model fits the data. The likelihood ratio χ^2 ($\chi^2 = 36,024.09$, p < 0.0001) showed that the model as a whole fit significantly better than a model without any predictors. However, the deviance ($\chi^2 = 25,482.88$, p < 0.0001) showed incorrect fitting of the data. The results revealed that there are 130,884 covariance patterns detected which might pose a potential problem in the model. It is also possible that the large sample size is naturally replicating the responses creating more covariance patters in the current data sets.

4.4. Regression Model

Table 4. Logistic Regression Model

Variables	Logit Coefficient	Odds ratio
FUTSUP	0.954***	2.596***
	(0.0227)	(0.0590)
DISCENT	0.201***	1.222***
	(0.0449)	(0.0549)
KNOWEN	1.431***	4.183***
	(0.0255)	(0.107)
OPPORT	0.706***	2.025***
	(0.0226)	(0.0459)
SUSKIL	3.206***	24.69***
	(0.0590)	(1.456)
FRFAIL	-0.550***	0.577***
	(0.0256)	(0.0148)
Age	-0.0165***	0.984***
	(0.000876)	(0.000862)
Income		

Middle 33%ti	0.184***	1.202***
	(0.0282)	(0.0339)
Upper 33%ti	0.357***	1.428***
	(0.0274)	(0.0392)
Education		
NONE	-0.250***	0.779***
	(0.0577)	(0.0449)
Post Secondary	-0.156***	0.856***
	(0.0484)	(0.0414)
Secondary Deg	-0.233***	0.792***
	(0.0493)	(0.0391)
Some secondary	-0.267***	0.766***
	(0.0558)	(0.0427)
Gender		
Male	0.209***	1.232***
	(0.0220)	(0.0271)
Country		
Egypt	-0.633***	0.531***
	(0.147)	(0.0780)
South Africa	-1.076***	0.341***
	(0.144)	(0.0491)
Greece	-1.110***	0.330***
	(0.204)	(0.0672)
Netherlands	-1.004***	0.366***
	(0.165)	(0.0604)
Belgium	-0.646***	0.524***
	(0.182)	(0.0953)
Spain	-0.777***	0.460***
	(0.0969)	(0.0446)
Hungary	-0.707***	0.493***
	(0.168)	(0.0831)
Italy	-1.307***	0.271***
	(0.232)	(0.0628)
Romania	-0.556***	0.574***
	(0.141)	(0.0808)
Switzerland	-1.695***	0.184***
	(0.222)	(0.0407)
United Kingdom	-1.175***	0.309***
	(0.116)	(0.0358)
Sweden	-0.982***	0.375***
	(0.138)	(0.0517)
Norway	-1.359***	0.257***
	(0.199)	(0.0511)
Poland	-0.791***	0.453***
	(0.148)	(0.0669)
Germany	-1.559***	0.210***
	(0.173)	(0.0365)
Peru	0.237**	1.268**
	(0.109)	(0.139)
Mexico	0.713***	2.041***
	(0.102)	(0.207)
Argentina	0.233**	1.262**
	(0.111)	(0.140)
Brazil	0.386***	1.470***
	(0.114)	(0.168)
Chile	0.514***	1.672***
	(0.0941)	(0.157)
Colombia	0.754***	2.125***

	(0.0999)	(0.212)
Malaysia	-3.334***	0.0357***
	(0.460)	(0.0164)
Australia	-0.139	0.870
	(0.134)	(0.116)
Indonesia	-0.293***	0.746***
	(0.0981)	(0.0732)
Philippines	-0.141	0.868
	(0.113)	(0.0982)
Thailand	-0.367***	0.693***
	(0.121)	(0.0837)
South Korea	0.274*	1.316*
	(0.149)	(0.196)
Vietnam	-0.739***	0.478***
	(0.130)	(0.0622)
China	0.0943	1.099
	(0.115)	(0.126)
India	-0.641***	0.527***
	(0.122)	(0.0640)
Iran	-0.853***	0.426***
	(0.115)	(0.0491)
Canada	0.0129	1.013
	(0.113)	(0.115)
Morocco	-3.380***	0.0341***
	(0.348)	(0.0119)
Tunisia	-1.495***	0.224***
	(0.156)	(0.0349)
Senegal	0.554***	1.741***
	(0.103)	(0.179)
Burkina Faso	0.241**	1.272**
	(0.108)	(0.138)
Cameroon	-0.0118	0.988
	(0.105)	(0.103)
Barbados	0.379***	1.461***
	(0.111)	(0.162)
Botswana	0.821***	2.274***
	(0.104)	(0.236)
Portugal	-0.568***	0.566***
	(0.147)	(0.0834)
Luxembourg	-0.0151	0.985
	(0.136)	(0.134)
Ireland	-0.468***	0.627***
	(0.142)	(0.0889)
Finland	-1.342***	0.261***
	(0.186)	(0.0485)
Bulgaria	-2.045***	0.129***
	(0.321)	(0.0415)
Latvia	0.200	1.221
	(0.125)	(0.153)
Estonia	-0.0272	0.973
	(0.129)	(0.125)
Croatia	-0.697***	0.498***
	(0.157)	(0.0782)
Slovenia	-1.569***	0.208***
	(0.217)	(0.0452)
Macedonia	-2.054***	0.128***
	(0.220)	(0.0282)
Slovakia	-0.712***	0.491***
	(0.150)	(0.0737)
Guatemala	-0.0284	0.972

	(0.117)	(0.113)
Panama	-0.475***	0.622***
	(0.126)	(0.0781)
Ecuador	1.074***	2.928***
	(0.105)	(0.307)
Uruguay	-0.347***	0.707***
	(0.132)	(0.0933)
Kazakhstan	-0.584***	0.558***
	(0.137)	(0.0765)
Puerto Rico	-0.435***	0.647***
	(0.144)	(0.0935)
Taiwan	-0.839***	0.432***
	(0.170)	(0.0733)
Lebanon	0.595***	1.814***
	(0.103)	(0.186)
Israel	-0.197	0.821
	(0.131)	(0.107)
Constant	-12.22***	4.94e-06***
	(0.167)	(8.27e-07)
Observations	170,922	170,922

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Log(p/1-p) = -12.22 + 0.954*FUTSUP + 0.201*DISCENT + 1.431*KNOWEN + 0.706*OPPORT + 3.206*SUSKIL – 0.55*FRFAIL – 0.0165*Age + 0.184*Middle 33%tile + 0.357*Upper 33%tile – 0.25*None – 0.156*Post Secondary – 0.233*Secondary Deg – 0.267*Some Secondary + 0.209*Male – 0.633*Egypt – 1.076*South Africa – 1.11*Greece – 1.004*Netherlands – 0.646*Belgium – 0.777*Spain – 0.707*Hungary – 1.307*Italy – 0.556*Romania – 1.695*Switzerland – 1.175*United Kingdom – 0.982*Sweden – 1.359*Norway – 0.791*Poland – 1.559*Germany + 0.237*Peru + 0.713*Mexico + 0.233*Argentina + 0.386*Brazil + 0.514*Chile + 0.754*Colombia – 3.334*Malaysia – 0.139*Australia – 0.293*Indonesia – 0.141*Philippines – 0.367*Thailand + 0.274*South Korea – 0.739*Vietnam + 0.0943*China – 0.641*India – 0.853*Iran + 0.0129*Canada – 3.38*Morocco – 1.495*Tunisia + 0.554*Senegal + 0.241*Burkina Faso – 0.0118*Cameroon + 0.379*Barbados + 0.821*Botswana – 0.568*Portugal – 0.0151*Luxembourg – 0.468*Ireland – 1.342*Finland – 2.045*Bulgaria + 0.2*Latvia – 0.0272*Estonia – 0.697*Croatia – 1.569*Slovenia – 2.054*Macedonia – 0.712*Slovakia – 0.0284*Guatemala – 0.475*Panama + 1.074*Ecuador – 0.347*Uruguay – 0.584*Kazakhstan – 0.435*Puerto Rico – 0.839*Taiwan + 0.595*Lebanon – 0.197*Israel

FUTSUP - For comparing entrepreneurs with plan of setting up business for the next three years from those without plan, it is expected that there is a 0.954 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 159.6% higher for those with plan of setting up business as compared to those who do not have.

DISCENT - For comparing entrepreneurs who shut down a business for the past 12 months from those who have no experience of shutting down a business, it is expected that there is a 0.201 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 22.2% higher for those with experience of business discontinuance as compared to those who do not have.

KNOWEN - For comparing entrepreneurs who knew someone started a business for the past two (2) years from those who does not no someone, it is expected that there is a 1.431 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 318.3% higher for those who knew someone that start a business for the past two (2) years.

OPPORT - For comparing entrepreneurs who sees a good opportunity for the next six months from those who are not seeing opportunity, it is expected that there is a 0.706 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 102.5% higher for those who sees opportunity for the next six (6) months.

SUSKIL - For comparing entrepreneurs with the required knowledge/skills in setting up a business

from those who does not have required knowledge/skills, it is expected that there is a 3.206 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 2,369% higher for those with the required knowledge/skills in starting a business.

FRFAIL - For comparing entrepreneurs who believes that failure will prevent them to start a business from those who do not believe failure can prevent them, it is expected that there is a 0.55 decrease in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 42.3% lower for those who believes that failure will prevent them from setting up a business.

Age - For every one (1) year increase in the age, it is expected that there is a 0.0165 decrease in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity will increase by 1.6% in every one (1) year of increase in age.

INCOME - For comparing middle- and upper-income earner from low-income earner, it is expected that there is a 0.184 and 0.357 increase in the log odds of the involvement in early stage entrepreneurship activity respectively, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 20.2 and 42.8% higher for those middle- and upper-income earners.

EDUCATION - For comparing non-degree holder, Post-Secondary, Secondary degree, and Some Secondary from with Graduate experience, it is expected that there is a 0.25, 0.156, 0.233, and 0.267 decrease in the log odds of the involvement in early stage entrepreneurship activity respectively, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 22.1%, 14.4%, 20.8%, and 23.4% lower for those none-degree holder, Post-secondary, Secondary degree, and, some Secondary respectively.

GENDER - For comparing male from female, it is expected that there is a 0.209 increase in the log odds of the involvement in early stage entrepreneurship activity, holding other factors constant. The probability of involvement in early stage entrepreneurship activity is 23.2% higher males.

COUNTRY – US country is expected to have an increase in the log odds of the involvement in early stage entrepreneurship compared to other countries except for Peru, Mexico, Argentina, Brazil, Chile, Colombia, South Korea, China, Canada, Senegal, Burkina Faso, Barbados, Botswana, Latvia, Ecuador, and Lebanon. Among all the countries, only Australia, Philippines, China, Canada, Cameroon, Luxembourg, Latvia, Estonia, Guatemala, and Israel do not have a statistically significant difference with the US in contributing to the involvement of early stage entrepreneurship activity.

4.5. Predictive Ability of the Model

Table 5.

Classification	Total Early Stage Entrepreneurship		Total
	Yes	No	
Positive	2,870	2,899	5,769
Negative	10,510	154,643	165,153
Total	13,380	157,542	170,922

The sensitivity indicates that 2,870 out of 13,380 entrepreneurs were involved in early stage entrepreneurship activity. This means that only 21.45% of the true contributors on the early stage entrepreneurship can be detected by the model and 78.55% (false negative) cannot be detected.

The specificity presents that 154,643 out 157,542 entrepreneurs were not involved in early stage entrepreneurship activity. This demonstrates that 98.16% of the true non-contributors of early stage entrepreneurship activity can be detected and 1.84% (false positive) cannot be detected.

The positive predictive value or the precision rate is 49.75% or 2,870/5,769. This practically means that an entrepreneur classified as positive has a 49.75% likelihood of involving in an early stage entrepreneurship activity. This is consistent with the high result of specificity. The negative predictive value indicates that out of 165,163 entrepreneurs without involvement in early stage entrepreneurship activity, 154,643 were classified as negative. This means that there is 93.64% likelihood of not involving in early stage entrepreneurship activity. The high value of NPV indicates that a negative classification can lower the likelihood of not engaging in early stage entrepreneurship activity. However, a very low PPV (only 49.75%) indicates that every second entrepreneurs who had engaged in early stage entrepreneurial activity is classified incorrectly to this survey.

Table 6. Sensitivity and Specificity on Different Prevalence of Early Stage Entrepreneurship Activity

Prevalence (%)	Sensitivity (%)	Specificity (%)	Correctly specified (%)
5	96.31	75.23	76.88
10	91.29	83.39	84.01
15	80.54	87.78	87.22
20	68.85	90.74	89.02
25	58.52	92.83	90.14
30	49.42	94.40	90.88
35	41.29	95.67	91.41
40	34.10	96.69	91.79
45	27.41	97.52	92.03
50	21.45	98.16	92.15
55	16.44	98.70	92.26
60	11.79	99.13	92.29
65	7.91	99.45	92.28
70	4.25	99.73	92.26
75	1.40	99.92	92.21
>75	0.23	99.99	92.18

Table 6 illustrates that as the prevalence of the early stage entrepreneurship activity increases, the PPV will increase and vice versa if decreases. It also shows the relationship between sensitivity and specificity in different prevalence of early stage entrepreneurship in Figure 2. Also, the area under ROC curve (AUC) gives us a very good proportion of the early stage entrepreneurship activity.
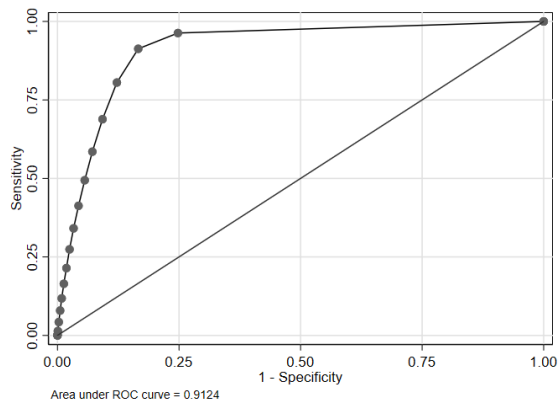

Figure 2. ROC Curve

The practicality of the predictive values is limited because the statistics is determined by sensitivity and specificity of a test, as well as with the prevalence of early stage entrepreneurship activity which can vary. Generally speaking, specificity impacts more the positive predictive value in the case of low early stage entrepreneurship activity prevalence. The reliability of sensitivity and specificity are an important feature of a test when using in similar entrepreneurs, countries, and settings. Predictive values although associated with sensitivity and specificity will change with the prevalence of target early stage entrepreneurship activity. Figure 1 shows the effect of the early stage entrepreneurship activity prevalence on the PPV
and the NPV. Decreasing the early stage entrepreneurship activity prevalence increases the number of false-positive classification, while increasing the early stage entrepreneurship activity prevalence decreases the number of false-negative classifications.
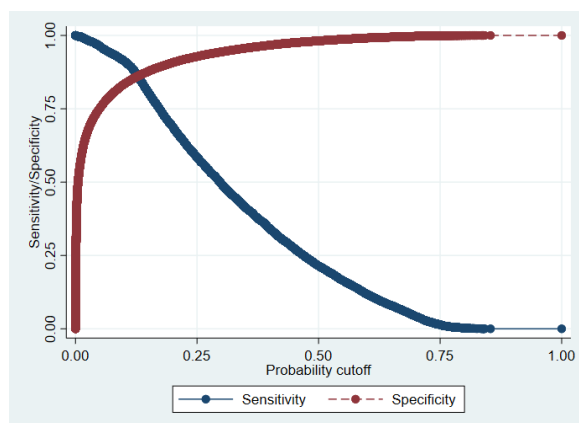
Figure 3. Early stage entrepreneurship activity prevalence and predictive values

5. Conclusion

The result is consistent with GEM framework that the entrepreneurial potential and support can predict the entrepreneurial activity globally. Many studies focus specific geographical locations. However, little is known on a global perspective. This research addresses the gap through examining the role of entrepreneurial potential and support in the involvement on early stage entrepreneurial activity.

The research has some limitations. First, due to the use of a cross-sectional research design, the present study poses restraints in drawing causal inferences about the relationship among entrepreneurs' potential and support and involvement in early stage entrepreneurial activity. Future researchers are recommended to use longitudinal designs to explore the sequential ordering among these explanatory and outcome variables. Second, the study uses demographic as an independent variable. Future researchers can explore the interactions of demographic variables to examine the moderating effects.

With regards to theoretical implications, the present study addresses the research gaps in the entrepreneurship literature through demonstrating how entrepreneurial potential and support and demographic factors ca be directly linked to entrepreneurial activity and having a generalizable conclusion by including country to account the errors in the uniqueness per geographical locations. To date, this is the first study to use entrepreneurial potential and support in globalized settings to generalized predictions on probability of involvement in entrepreneurial activity.

In terms of practical implications, the findings emphasize the significance of cultivating support to deal with daily entrepreneurial hassles. Entrepreneurs, regulators, and the academe are encouraged to offer more opportunities for potential entrepreneurs to realize the importance of effectively coping with the struggles in the entrepreneurial settings. For instance, academe and regulators can conceptualize and develop trainings that aim to boost entrepreneurs' capacity to handle minor entrepreneurial-related problems like addressing the concerns of irate customers where the goodwill is at stake. Results seem to suggest that entrepreneurial potential and support programs may serve as promising approach to promote involvement in entrepreneurial activity.

6. References

Diana Rusu, V., & Roman, A. (2017). Entrepreneurial activity in the EU: An empirical evaluation of its determinants. *Sustainability (Switzerland)*, *9*(10), 1–16. https://doi.org/10.3390/su9101679

Draghici, A., & Albulescu, C. T. (2014). Does the Entrepreneurial Activity Enhance the National Innovative Capacity? *Procedia - Social and Behavioral Sciences*, *124*(1985), 388–396. https://doi.org/10.1016/j.sbspro.2014.02.500

Dvouletý, O., & Orel, M. (2019). Entrepreneurial activity and its determinants: Findings from African developing countries. *Contributions to Management Science*, (January), 9–24. https://doi.org/10.1007/978-3-030-12342-0_2

GEM. (2018). Global Entrepreneurship Monitor 2017/2018. In *Global Entrepreneurship Monitor*. Retrieved from http://www.gemconsortium.org/report/50012

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis*.

Kotzeva, M., Schmiemann, M., & European Commission. Eurostat. (2012). *Entrepreneurship determinants : culture and capabilities.* https://doi.org/10.2785/29545

Morris, M. H., & Lewis, P. S. (1995). The determinants of entrepreneurial activity. *European Journal of Marketing*, *29*(7), 31–48. https://doi.org/10.1108/03090569510094991

Pawęta, E., & Kirillov, Y. (2016). Analysis of determinants of early-stage entrepreneurial activity in Russia. *Comparative Economic Research*, *19*(1), 65–76. https://doi.org/10.1515/cer-2016-0004

Velilla, J. (2018). The entrepreneurial activity using GEM data: evidence for Spain (national and regional) and

for Europe. *MPRA Papers*, *85568*(85568). https://doi.org/10.1111/j.1574-0862.2010.00507.x/abstract

Winiata, S. (n.d.). *The Economic Determinants of Entrepreneurial Activity : Evidence from a Bayesian Approach*.