

# Advanced Education and Entrepreneurship: Mediating Role of Information & Communication and Personal Freedom

Noreen Zahra<sup>1</sup>, Maryam Ahmad<sup>2</sup>

## Abstract

*The debate on entrepreneurship ecosystem is consistently grabbing the attention of scholars. This research study investigates the relationship of access to advanced education, access to information & communication and personal freedom & choice with entrepreneurship. Furthermore, this study explores the impact of access to advanced education, access to information & communication and personal freedom & choice on entrepreneurship using data of Social Progress Index and Entrepreneurship Index for 2016. Serial mediation model was applied on index score of 114 countries' to predict the impact of advanced education on entrepreneurship index, using information and communication as mediator and personal freedom as second mediator. The results of serial mediation confirm that advanced education predicts significant variance in entrepreneurship whereas the mediated path of advanced education through information and communication and personal freedom further boosts the variance. Results also confirm the role of educational institutions in shaping the entrepreneurial attitudes among individuals while ensuring better access to information communication technologies and creating awareness about personal freedom.*

**Keywords:** Access to education, access to information & communication, personal freedom & choice, entrepreneurship index,

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<sup>1</sup> Virtual University of Pakistan. Email: noreenzahra@vu.edu.pk

<sup>2</sup> Virtual University of Pakistan. Email: mariamahmed@vu.edu.pk

## ARTICLE HISTORY

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## 1. Introduction

In the past few decades, government and independent institutions e.g. micro finance institutions and NGOs along with scholars have realized the constructive emergence and importance of entrepreneurship that has altered and accelerated the pace of economic development by converting human capital into a source of wealth creation. Countries around the globe are now transforming to vibrant knowledge based economies with entrepreneurial manifestation. The small and medium enterprises have become the nucleus of job creation and innovation (Ye, Lay, Kanamori, & Koper, 2016). According to the GEM Global Report 2016, Asia Pacific and South Asia like India, Philippines and Vietnam are factor-driven economies whereas China, Indonesia, Malaysia, and Thailand are efficiency-driven economies. Factor-driven economies are characterized by high opportunity and capability perceptions whereas efficiency-driven economies are characterized as advancing an economy with better human resources, government or private research laboratories, and partnerships between multinationals and universities. On the other hand, Japan, South Korea, Singapore and Taiwan are innovation-driven economies where business with the support of public-private partnership competes by manufacturing and distributing new and different products and services while using the most sophisticated production processes and technology (Kelley, Singer, & Herrington, 2016). For measuring the entrepreneurship practices around the globe, Global Entrepreneurship and Development Institute (GEDI) has developed an index for entrepreneurship which is considered as a powerful tool for assessing entrepreneurial activities in 137 countries. The Global Entrepreneurship Index is an annual index that measures the health of the entrepreneurship ecosystems in each of 137 countries. The GEDI index is based on the data collected on the entrepreneurial abilities and aspirations of the local population weighting against the prevailing social and economic infrastructure. As evident by many scholarly investigations, entrepreneurship does not operate in a vacuum and requires supporting infrastructure called, eco-system. GEDI index is thought-provoking data and provides sufficient ground to dig out those predictors that are affecting entrepreneurship index ("Global Entrepreneurship Index Data," 2017). The story of more than 100 countries has the capacity to notify the importance of predictors i.e. access to education, access to information and communication and freedom of choice in determining the entrepreneurship. The prime purpose of this study is to analyze and determine the role of advanced education in providing support for fashioning entrepreneurial attitudes in selected countries while analyzing the role of information & communication and

personal freedom as mediating factors. Entrepreneurship is defined as a mindset and process for creating economic activities while imparting the skills of managing risk taking, creativity and innovation within a new/existing firms (Kuratko, 2016). The literature supports the fact that entrepreneurs can be made and entrepreneurial advanced education has the potential to create, promote and spread the entrepreneurial attitudes.

Presently, educational institutions are playing an important role in promoting the entrepreneurial attitudes to support entrepreneurial ecosystem (Garavan & O'Conneide, 1994; Gorman, Hanlon, & King, 1997; Kirby, 2004; Kuratko, 2005). The entrepreneurial education guarantees to impart required knowledge, skills, competencies, creativity and quest for innovation that can convert factor-driven economies into efficiency-driven and efficiency-driven into innovation-driven economies. Entrepreneurial advanced education is viewed as a process of inculcating and enhancing the competencies to diagnose commercial opportunities, managing risk, resource leveraging and initiation of business ideas (Jones & English, 2004). Interestingly, there is a great debate that individuals are born with certain entrepreneurial genius and such skills cannot be learned whereas some believe that entrepreneurship is a skill that can be learned through advanced education and training and it is similar to leadership theory (Light, 2006; Painter, 1998). Trait theory of leadership states that leaders are born with certain traits whereas behavioral theory states that leadership is a behavior and certain competencies can be learned and mastered to become a good leader (DeRue, Nahrgang, Wellman, & Humphrey, 2011). This approach can be examined in case of entrepreneurial education and attitudes. This is a big research question to investigate before examining the role of education in spreading the culture of entrepreneurship that whether entrepreneurial behaviors/traits can be learned or it is born endowment. It requires scholarly attention and research. According to scholarship, it is debated that it is not a magic or mystery to solve and it has nothing to do with the gene, rather, it is a discipline and discipline can be learned and mastered (Drucker, 1998, 2007). Therefore, advanced education has an imperative and significant role in developing the entrepreneurial attitude among the people. The role of entrepreneurial and advanced education can be viewed in different dimensions as used and identified by Social Progress Index (SPI) (Carvalho, Costa, & Dominginhos, 2010). These dimensions are a (1) number of years spent in school, (2) women's average year spent in school, (3) inequality in the attainment of education, (4) number of globally ranked universities offering education for entrepreneurship and

(5) percentage of students enrolled in these globally ranked universities and educational institutions (Cleyen & Gielen, 2013). These are comprehensive dimensions as identified by Social Progress Index (SPI) for measuring the access to advanced education for developing entrepreneurial attitudes in any country (Hynes, 1996). This study investigates entrepreneurship association with advanced education and positive results may support the argument that entrepreneurship is a skill to master instead of born genius.

It is also assumed that better access to the education improves the access to information and communication which is a second predictor added in underlying study. One of the dynamic skills required for entrepreneurship is ensuring access to required information as information in today's world is also an important resource. Access to the information and communication as defined in Social Progress Index (SPI) is mobile telephone subscription, internet users, and press freedom index. For making informed and strategic decisions, entrepreneurs require better and faster access to information and communication. The world is constantly changing and every day is bringing unique opportunities that need quick and swift exploitation of business opportunities. Thus, it is found worth investigating to introduce this predictor as a first mediator (M1) in defining the relationship between access to advanced education and entrepreneurship index of selected countries.

The third predictor (M2) selected for underlying study is freedom and choice. It is also supported by the scholarly investigations that access to advanced education and access to information and communication significantly impact personal freedom and choice which is also much required in the process of entrepreneurship. The entrepreneurs have to make decisions based on their personal freedom to act for managing their own risk. Access to advanced education is assumed to bring awareness about personal rights, freedom, and choices to act freely as a good citizen. Same is held true for access to information and communication. Today people have faster, better and cheaper access to information and communication through smart phones and internet facilities. The exposure and awareness regarding personal freedom and choice have multiplied many times and same has the potential to influence the entrepreneurship process. SPI index explains freedom and choice as freedom over life choices, freedom of religion, early marriages, satisfied demands of contraception and corruption (SPI Index, 2016). For the specific purpose of this study, the authors have excluded the satisfied demands of contraception score from freedom and choice as it

has no link with selected variables. The significance of this study is manifold as every single added variable contributes considerably in developing an entrepreneurial index of selected countries. Before stepping towards investigating the eco-system of entrepreneurship and the impact of related predictors, it is essential to start the investigation about the impact of access to advanced education, access to information and communication and freedom and choice. Secondary data, i.e. selected indexes provide an opportunity to examine the situation systematically.

Entrepreneurship is viewed as a sustainable option for sustainable economic growth and development, thus, required a thorough investigation for supported eco-system. So far, existing literature covers findings based on primary data collected by scholars and more related to gender aspect, entrepreneurial intentions, human and financial resources constraints and role of educational institutions. Less is explored so far while considering the overall infrastructure and social factors of countries in promoting entrepreneurship. Social Progress Index (SPI) contains and offers abundant data including access to advanced education, access to information & communication and personal freedom & choice as important factors of social progress of a country. Same is held true for Global Entrepreneurship Index. This study aims at investigating the impact of access to advanced education on entrepreneurship mediated by access to information and communication and freedom and choice through serial mediation modeling while using the data of 114 countries as a step towards filling the mentioned gap. The findings of this empirical validation may facilitate the government and non-government institutions along with educational institutions to formulate a sustainable strategy for promoting entrepreneurship.

## **2. Literature Review**

Entrepreneurship is considered and realized as an important factor to boost economic development in the current era. Entrepreneurship creates multiple economic opportunities in the economy through innovation and productivity (Holcombe, 1998). It is transforming the conventional and traditional economies into vibrant economies (Neck & Greene, 2011). It encourages small and medium firms and businesses to mark their value in economic development (Honig, 2004). Entrepreneurship was first identified and explained as fundamental agent for economic growth by Schumpeter. He was an Austrian-American economist who considered Entrepreneurship as an element of change and creativity (Van Stel, Carree, & Thurik, 2005). It has been

established through literature and examples of different economies that Entrepreneurship is significant for economic growth and development (Matlay & Matlay, 2006). But there is another aspect which needs to be explored and this aspect is how entrepreneurial attitude can be inculcated among individuals. The scholarship shows that advanced education in entrepreneurship can play a significant role in this regard (Kuratko, 2005). The higher tertiary level institutions have promoted the advanced education in entrepreneurship through degree programs but the opportunities to access advanced education in entrepreneurship vary in different countries (Kuratko, 2005). Social Progress is imperative for countries for their sustainable development (Stiglitz, Sen, & Fitoussi, 2009). Social Progress Index (SPI) is used for measuring the social and environmental progress of the countries. It is developed and measured by Social Progress Imperative which is a non-profit organization of United States of America (Porter, Stern, & Loria, 2013). SPI measures the social and environmental progress of different countries in terms of basic human needs, foundations of well beings and opportunities ("Social Progress Index 2016 Methodological Report," 2016).

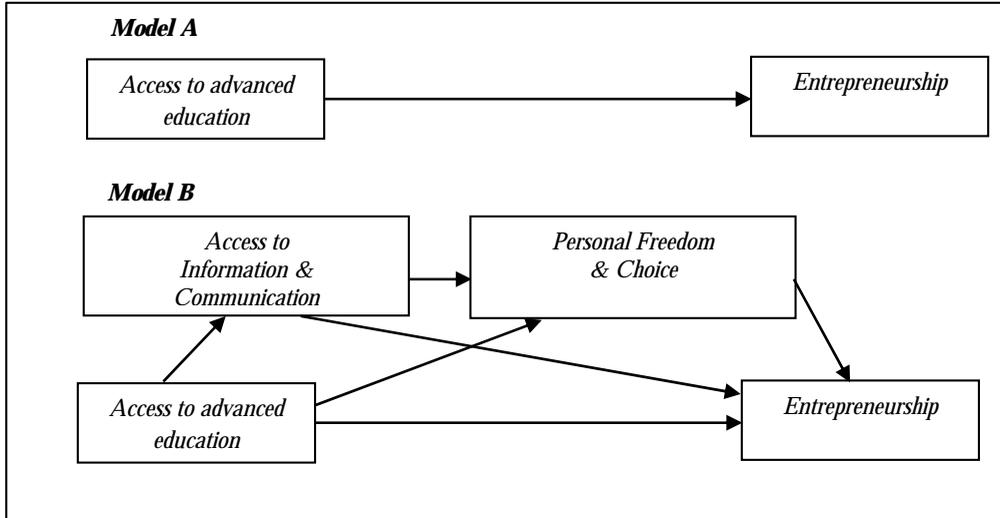
There are multiple indicators which have been used for measuring the above-mentioned variables of Social Progress Index (SPI). These indicators are access to advanced education, access to information and communication and personal freedom and choices. These indicators have been adopted by the authors for measuring their direct and indirect impact on entrepreneurship index in different countries. According to SPI, access to advanced education is operationalized through different determinants like years of tertiary schooling, women's average years in school, inequality in the attainment of education, number of globally ranked universities and percent of tertiary students enrolled in globally ranked institutions. Likewise, access to information and communication and personal freedom are also measured through different components. The components of access to information and communication are mobile telephone subscriptions, internet users, and press freedom index. Personal freedom and choices are explained by freedom over life choices, freedom of religion, early marriages and corruption.

The sustainable economic growth is imperative for the social development of societies (Morrison & Johnston, 2003). It is required to have creative and innovative solutions for swift economic growth in developing countries which leads towards sustainable development. Entrepreneurship can be a solution for the problems of

developing economies but the question is; how it can be promoted among individuals?(Johnson, 1995). Higher Educational Institutions of multiple countries around the globe have started advanced degree programs and training for existing and potential entrepreneurs in the ecosystem (Li, Zhang, & Matlay, 2003). The governments of different countries have taken multiple steps like policy support, financial assistance, and institutional sustenance at the macro level for promoting entrepreneurial advanced education (Kuratko, 2005) but the impact is not noteworthy. Entrepreneurial activities have contributed in different magnitudes in the economic growth and development of various countries (Neck & Greene, 2011). The access to advance entrepreneurial education modifies and develops behaviors among individuals for entrepreneurship (Bird, 1989). Multiple countries have invested huge resources in designing advanced education for promoting entrepreneurship (Kuratko, 2005) but the desired results are not achieved. There could be multiple reasons for this ineffectiveness. The significant underpinning link is entrepreneurship eco-system debating about supporting system.

The definition of the entrepreneurial ecosystem was given by Prahalad (2006); explaining ecosystem as an enabler that stimulates and facilitates the individuals, enterprises, and society at large to syndicate effective effort for generating economic wealth and prosperity through its stakeholders which are driven by dissimilar aims. The entrepreneurial ecosystem has activated significant economic upsurge in many countries leaving many worth following practices for less entrepreneurial countries (Prahalad 2006). The underpinning model adopted for this empirical investigation is proposed by Isenberg (2010). He proposed thirteen factors describing entrepreneurial eco-system i.e. government, infrastructure, economic clusters, support services, leadership, human and financial capital, entrepreneurship supporting organizations, success stories, networks, education, culture, and customers. He studied several countries around the globe to explore the procedures and due role of all stakeholders in building up a supporting eco-system. This study will investigate the factor of education through the variable of access to advanced education index, infrastructure through the variable of access to information and communication index and culture through the variable of personal freedom and choice (Isenberg, 2010). It is required to investigate the direct and indirect impact of access to advanced education on entrepreneurship which is the main area of exploration of this research paper. The other two variables are access to information and communication and personal freedom and choices that explain further variance in the relationship of access to advanced

education and entrepreneurship ecosystem in this research study. The below mentioned theoretical model explicates the relationship of dependent (entrepreneurship) and independent variable (access to advanced education) of the study along with two mediating variables (access to information and communication and personal freedom and choices).



**Figure 1:** Theoretical Model

## 2.1. Hypothesis for serial mediation

For the purpose of serial mediation, the authors have applied Model no. 6 (serial mediation) developed by Andrew Hayes (2013). Model no. 6 covers the indirect effect of the independent variable (X) on the dependent variable (Y) through first mediator variable ( $M_1$ ). It also covers the indirect effect of the independent variable (X) on the dependent variable (Y) through second mediator variable ( $M_2$ ) while also showing the direct impact of the independent variable (X) on the dependent variable (Y). Access to advanced education is taken as an independent (X) variable whereas access to information & communication is taken as a first mediator ( $M_1$ ) and personal freedom & choice is taken as a second mediator ( $M_2$ ) for serial mediation. Entrepreneurship score of 114 countries is taken as dependent (Y) variable in the model. The selection criterion for 114 countries has mentioned in research design

section. For the application of Model 6 as explained above, following hypothesis have been developed for exploring the direct and indirect effect of X, M<sub>1</sub>, and M<sub>2</sub> on Y.

### **Model 6 (Andrew Hayes, 2013)**

X= Access to advanced education (AdE)

M<sub>1</sub>= Access to information & communication (Infocom)

M<sub>2</sub>=Personal freedom & choice (Pfree)

Y= Entrepreneurship (Entre)

H<sub>1</sub>: Access to advanced education (X) predicts entrepreneurship index (Y)

$$\text{Entre} = b_0 + b_1 \text{AdE} + e$$

H<sub>2</sub>: Access to advanced education (X) predicts access to information & communication

$$\text{Infocom} = b_0 + b_1 \text{AdE} + e$$

H<sub>3</sub>: Access to advanced education (X) and access to information & communication predict personal freedom & choice (M<sub>2</sub>)

$$\text{Pfree} = b_0 + b_1 \text{AdE} + b_2 \text{InfroCom} + e$$

H<sub>4</sub>: Access to information & communication and personal freedom & choice mediate the relationship between access to advanced education and entrepreneurship score in sequence.

$$\text{Entre} = b_0 + b_1 \text{AdE} + b_2 \text{Infocom} + b_3 \text{Pfree} + e$$

### **3. Research Design**

It is an explanatory study with positivist stance by using secondary data for statistical modeling. As mentioned in the introduction, four variables are selected for serial mediation i.e. access to advanced education as an independent variable, access to information and communication as a first mediator and personal freedom and choice as a second mediator and entrepreneurship index as the dependent variable. The scores of independent variables were taken from Social Progress Index (SPI) available at the website of *The Social Progress Imperative*. The operationalization of variables is also adopted from the same index report ("Social Progress Index 2016 Methodological Report," 2016). The data set is for the year 2016. Entrepreneurship is added as the dependent variable and the global score of entrepreneurship 2016 is taken from the website of *The Global Entrepreneurship and Development Institute* ("Global Entrepreneurship Index Data," 2017). The SPI index is available for 134 countries

whereas the Global Entrepreneurship index is available for 138 countries. The inclusion criterion for selection of countries is marked at the availability of data in all indexes. The authors found the availability of all four selected indexes of 114 countries, thus the sample size was determined as 114 countries. The number of countries, i.e. 114 is also found satisfactory while using the rule 20 cases for each variable as a minimum sample size in regression analysis ("Assumptions of Linear Regression," 2016). In this study, the numbers of variables are four (4) thus the minimum requirement was 80 cases whereas the selected cases are 114. For the purpose of serial mediation, process macros developed by Andrew Hayes is adopted while using SPSS V.20. Model no.06 found best suited for serial mediation. (Darlington & Hayes, 2016; Hayes, 2013)

#### 4. Data Analysis

Before developing serial mediation model (Model B), descriptive statistics of underlying variables were figured out for a better understanding of the strength of the relationship and its statistical significance.

**Table 1:** Descriptive and Correlation Matrix among Variables

	<i>M</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>
Access to advanced education	44.8525	22.74183			
Access to information & communication	72.5138	14.38110	.818**		
Personal freedom & choice	63.6057	14.98255	.740**	.721**	
Entrepreneurship	33.4412	19.01058	.826**	.872**	.818**

Note: \*\*. Correlation is significant at the 0.01 level, N=114

Means and standard deviation of four variables including independent, mediators and dependent are given in Table 1. Table 1 illustrates that there is a strong positive correlation between the access to advanced education (X) and access to information & communication ( $M_1$ ),  $r = .818^{**}$ ,  $n = 114$ ,  $p < .001$ . It is inferred that better access to advanced education can bring betterment in access to information & communication. A strong positive relationship is also observed between access to advanced education (X) and personal freedom and choice ( $M_2$ ),  $r = .740^{**}$ ,  $n = 114$ ,  $p < .001$ . Same has been observed between access to advanced education (X) and entrepreneurship score (Y),  $r = .826^{**}$ ,  $n = 114$ ,  $p < .001$ . An empirical investigation

of correlation analysis has exhibited that advanced education, information and communication, personal freedom and entrepreneurship are related with each other in all selected countries, thus, this aspect must not be overlooked while forecasting the entrepreneurial activities. This Table also illustrates a strong positive relationship between access to information and communication ( $M_1$ ) with personal freedom and choice ( $M_2$ ) as  $r = .721^{**}$ ,  $n=114$ ,  $p<.001$  and with entrepreneurship score ( $Y$ ) as  $r = .872^{**}$ ,  $n=114$ ,  $p<.001$ . It is evident that countries in which people have better access to information & communication, they have a decent understanding of their personal freedom and better at entrepreneurial activities. Same inference can be affirmed with strong positive relationship observed between personal freedom and choice ( $M_2$ ) and entrepreneurship score ( $Y$ ),  $r = .818^{**}$ ,  $n=114$ ,  $p<.001$ . Table 2 contains all the information regarding regression coefficient, standard error, and model summary for Model A i.e. access to advanced education as IV and entrepreneurial score as DV including regression assumptions. Zero-order relationships among the selected variables are observed which is required for mediation (Baron & Kenny, 1986).

**Table 2:** Regression Coefficient, Standard Error, and Model A Summary for Access to Advanced education and Entrepreneurial Index

Predictor	<i>B</i>	SE ( <i>B</i> )	$\beta$	<i>t</i>	Sig ( <i>p</i> )
Access to advanced education	.690	.045	.826	15.483	<.001

Note: Adjusted  $R = .679$ ,  $R^2 = .682$ ,  $F(1, 112) = 239.732$ ,  $p < .001$ , Dependent Variable: Entrepreneurship index

Simple linear regression was applied to test Model A and related regression assumptions. It is tested in Model A that access to advanced education significantly predicts the entrepreneurial score of 114 countries. The results of the regression have exhibited that the predictor explained 68% of the variance ( $F(1, 112) = 239.732$ ,  $p < .001$ ). It is observed that one unit increase in the predictor variable can improve the entrepreneurship index by 0.69 units, which is statistically significant. It also confirms the linear relationship among variables as  $R^2$  value is greater than 0.30. The issue of collinearity is not expected as only one predictor was added in the Model A, however, Model B with all three predictors are tested to ensure the absence of multi-collinearity and statistics of tolerance and VIF values were found within acceptable range. Same is applied for autocorrelation as the probability of autocorrelation in cross-sectional data for different countries is negligible. Another assumption of normally distributed errors

is tested with Shapiro-Wilk test that confirms the assumption between the model and the observed data as  $p > .05$  (Field, 2013).

**Table 3:** Tests of Normality

	<i>Kolmogorov-Smirnov<sup>a</sup></i>			<i>Shapiro-Wilk</i>		
	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>
Unstandardized Residual	.067	114	.200*	.990	114	.569

Note:  $N=114$

Table 3 contains the information extracted while applying Model 6 of serial mediation with the help of process macros. Hayes (2013) has mentioned the least application of serial mediation as compared to parallel mediation for certain reason.

**Table 4:** Regression Coefficient, Standard Error and Model B Summary for Serial Multiple Mediator Models

<b>Predictors</b>	<b>M<sub>1</sub> (Infocom)</b>			<b>M<sub>2</sub> (Pfree)</b>			<b>Y (Entre)</b>		
	<i>Coeff</i>	<i>SE</i>	<i>P</i>	<i>Coeff</i>	<i>Se</i>	<i>P</i>	<i>Coeff</i>	<i>Se</i>	<i>P</i>
X(AdE)	.5172	.0344	<.001	.2990	.0698	<.001	.3137	.0692	<.001
M <sub>1</sub> (Infocom)				.3641	.1104	.0013	.2341	.1062	.0296
M <sub>2</sub> (Pfree)							.5239	.0871	<.001
Constant	54.08 69	4.500 9	<.001	23.794 8	5.805 8	<.001	-30.928	5.5718	<.001
$R^2 = .6691$			$R^2 = .5876$			$R^2 = .7861$			
$F(1, 112), p < .001$			$F(2, 111), p < .001$			$F(3, 110), p < .001$			

Note:  $N=114$

X=Access to Advanced education

M<sub>1</sub>=Access to Information and Communication

M<sub>2</sub>=Personal Freedom & Choice

Y=Entrepreneurship

The results of Model 6 by Andrew Hayes (2013) are given in Table 4 including coefficient values, *SE*, statistical significance, and  $R^2$  values. It also confirms the hypothesis developed for the study. It predicts the impact of access to advanced education on the first mediator, i.e. access to information and communication covering hypothesis no.02 in Model 1 summary. It shows that access to advanced education explained 67% of the variance ( $F(1,112)$ ,  $p < .001$ ) in access to information & communication and positive  $\beta$  indicates that one unit increase in access to advanced

education can bring .5172 unit increase in access to information & communication and it is statistically significant, thus,  $H_2$  is not rejected. Model 2 statistic summary checks the impact of access to advanced education and access to information & communication on freedom & choice covering  $H_3$ . The statistics have showed 59% of the variance in the outcome variable ( $F(2,111)$ ,  $p < .001$ ) due to predictors. Positive  $\beta$  indicates that one unit increase in access to advanced education can bring .2990 increase whereas one unit increase in access to information & communication can bring .3641 unit increase in outcome variable, thus,  $H_3$  is not rejected. Model 3 summary exhibits the results of  $H_4$ . The model statistics indicates 79% of the variance ( $F(3,110)$ ,  $p < .001$ ) in outcome variable i.e entrepreneurship index of 114 countries due to predictor variables i.e. access to advanced education, access to information and communication and personal freedom and choice. Positive  $\beta$  indicates that one unit increase in advanced education can bring .3137 unit increase in entrepreneurship score. Similarly, one unit increase in access to information & communication can bring .2341 unit increase along with .5239 unit increase due to personal freedom & choice and all  $\beta$  values are positively significant.  $\Delta R^2$  observed in Model A and Model B is 0.1041 means 10% more variance is caused due to additional predictors. Though, it confirms that  $H_4$  still has the total direct and indirect effect which is more critical to test the Model B.

**Table 5:** Direct and Indirect Effect of Serial Multiple Mediator Model

	<i>Effect</i>	<i>SE</i>	<i>T</i>	<i>p</i>
<i>Total effect</i>	.6901	.7784	15.4833	.0000
<i>Direct effect</i>	.3137	.0692	4.5355	.0000
<i>Indirect effect</i>	<i>Effect</i>	<i>Boot (SE)</i>	<i>Boot LCCI</i>	<i>Boot ULCI</i>
Ind1	.1211	.0445	.0299	.2048
Ind2	.0987	.0403	.0315	.1949
Ind3	.1566	.0432	.0843	.2576
Ind1: AdE→Infocom→ Entre				
Ind2: AdE→Infocom→Pfree→ Entre				
Ind3: AdE→Pfree→ Entre				

*Note:*  $N=114$

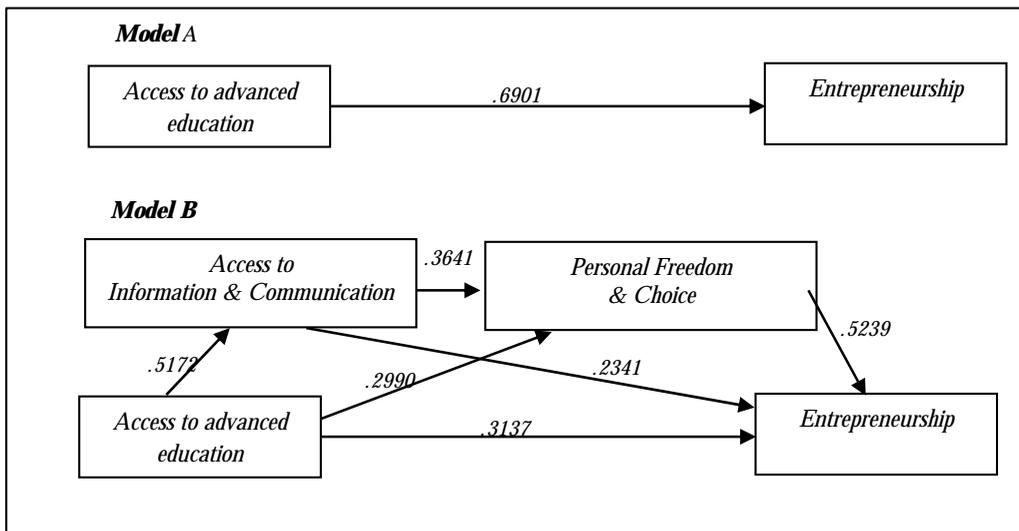
AdE→ Access to Advanced education

Infocom→ Access to Information and Communication

Pfree→ Personal Freedom & Choice

Entre→ Entrepreneurship

Total effect in Table 5 confirms the findings of Table 2 regarding H<sub>1</sub> (Model A) where the access to advanced education brings .6901 unit change in entrepreneurship index and it is statistically significant. Direct effect confirms the finding of Model B which is also predicted in Table 4 that confirms .3137 unit increase in entrepreneurship index due to serial mediation. Ind1 has exhibited the mediated relationship of access to information & communication with access to advanced education and entrepreneurship index (i.e. AdE→Infocom→ Entre) with effect size .1211 and this indirect effect is significantly positive because bootstrap confidence lower and upper limit is above zero (.0299 to .2048). Same is observed for Model B which is main model of this study. Ind2 exhibits mediated relationship of access to information & communication and personal freedom & choice with the outcome variable and predictor (AdE→Infocom→Pfree→ Entre) with effect size .0987 which is actually the  $\Delta R^2$  mentioned above and this indirect effect is significantly positive because bootstrap confidence is above zero (.0315 to .1949) confirming H<sub>4</sub>. Ind3 predicts mediated relationship of personal freedom & choice (AdE→Pfree→ Entre) and the effect size is .1566 which is statistical significant as bootstrap confidence is above zero (.0843 to .2576) (Hayes, 2013). The data analysis reaffirms the fact that entrepreneurship index is influenced by access to advanced education and supplemented by access to information & communication and personal freedom & choice (Figure 2), the detailed inferences are given in discussion session.



**Figure 2:** Model A and Model B Results:  $\Delta R^2=.0987$

## 5. Discussion

The results of serial mediation applied on the data of 114 countries have affirmed the significance of advanced education, the role of information & communication and personal freedom & choice in determining the entrepreneurship process. As Table 1 contains the correlation among selected variables, all are found strong and significantly correlated. The results are associated with the literature and reveal that in various countries universities are initiating incubation centers, business plan competitions and seminars for providing a platform for startups. It is also mentioned in the introduction section that entrepreneurship or in other words new enterprise creation functions is considered as a nucleus of job creation. The core responsibility of higher education institutions is not only limited to creation of knowledge, research and development (R&D) and preparing skilled individuals for the labor market, but also as a nursery where job creators are cultivated and trained. The presence of the number of reputed international universities in entrepreneurship index is self-evident that role of institutions and access to advanced education is essential to foster entrepreneurial process. The advanced education unlocks the psychological and intellectual abilities among individuals that later demonstrate the characteristics of entrepreneurs. The countries which have highest number of internationally recognized higher educational institutions exhibit high index score on entrepreneurship. These universities possess advanced R & D, strong ties with industry and well-equipped incubation centers for creative and unique entrepreneurial minds. Certain characteristics among potential entrepreneurs can be taught and polished in higher educational institutions. The characteristics like creative thinking, managing people, creates social and supportive networks, meeting and listening inspirational speeches of entrepreneurs for expert exposure boost the opportunity seeking confidence. The countries with low index score on entrepreneurship need to learn the lessons that cosmetic solutions for boosting entrepreneurship without investing in improving the access of potential entrepreneurs to advanced education are temporary and have less potential for long-term economic growth. It is not obligatory for a potential entrepreneur to earn an advance degree, but access to the library, participation in seminars and group learning and discussion with senior professors can crack the under-explored business potential. Similarly, R& D with sophisticated lab facilities can pave the path for startups.

The access to information & communication also shows a strong and statistically significant relationship with entrepreneurship. Nowadays, information & communication is a strategic tool in initiating and sustaining a business startup. The relationship strength shows that the countries in which individuals have better access to information & communication technologies exhibit better score on entrepreneurship index. Information Communication Technology (ICT) wave has triggered many unique business ideas e.g. companies websites, online shopping, online consultation, social media and digital marketing. It has been observed that most of the fastest business start-ups were triggered due to the intervention of ICT. Access to information & communication has also shown a strong and statistically significant relationship with access to education as well. It is not surprising that higher educational institutions are extensively using ICT in delivering education. Many universities around the globe are using their online Learning Management System (LMS) to interact with their students. Similarly, they have started many distance learning programs and courses for students and professionals. Universities are also using video conferencing facility for workshop and seminars to overcome the problem of physical availability of senior professors, industrialist, and innovators. ICT has dissolved the geographical boundaries for academicians and learners. The countries where the access to information & communication structure is yet to be developed, the entrepreneurial venture ideas are restricted and the process of exploiting the forthcoming opportunities is sluggish. The world is changing at a fast pace and every day is offering a new opportunity to explore and exploit. The countries which require to boost their job creation process are needed to develop state of the art ICT infrastructure. It will also expand the outreach of entrepreneurs and higher educational intuitions.

The third variable of the study i.e personal freedom & choice shows a strong and statistically significant relationship with entrepreneurship as expected. Entrepreneurship is all about personal freedom and making a self-led choice. One of the characteristics and the primary motivation for choosing entrepreneurship career is seeking personal freedom. Individuals who start their own business usually make unrestricted decisions and same is reaffirmed with the data analysis as well. The results show and confirm that personal freedom & choice and entrepreneurship have a positive relationship, thus, can be inferred that in countries where individuals exhibit

more personal freedom have more inclination towards entrepreneurship. Personal freedom & choice has also depicted strong and statistically significant relationship with access to advanced education and access to information & communication. Yet again, the role of higher education in creating awareness among individuals regarding their personal freedom is established. It is inferred that if individuals have better access to higher educational institutions, they exhibit more personal freedom and making unrestricted and undirected choices. Sideways, accessibility to better ICT infrastructure also facilitates in creating awareness about personal freedom. The entrepreneurial process requires the support of all selected variables. As discussed in many research articles, entrepreneurship does not materialize in a vacuum. It requires an ecosystem to nurture the process. Higher educational institutions and policies pave the way for individuals to access to such institutions and ensure better access to information & communication that arouse the awareness of personal freedom required for swift entrepreneurship process. The data analysis of 114 countries supply sufficient evidence that unique and creative ideas with financial resources are not adequate for the entrepreneurial process but the accessibility of advanced education and information & communication also play its due role in schooling individuals for their personal rights.

Model A has revealed the impact of access to advanced education on entrepreneurship and resulting variance is counted as 68% thus provides food for action to higher educational institutions and education policymakers. Model B has revealed the impact of access to advanced education affecting the access to information & communication that later affect the personal freedom & choice in determining the entrepreneurship index and the counted effect size is .3137 which is also statistically significant. The reported  $\Delta R^2$  in Model B is around 10% (.0987). Thus, it is inferred that if the access to advanced education is incapable to improve the access to information & communication or making individuals concessions about personal freedom & choice, the entrepreneurial process cannot be boosted up. For providing a booster, the path where access to advanced education is affecting entrepreneurship through access to information & communication (AdE→Infocom→ Entre), or where the advanced education is affecting entrepreneurship through personal freedom & choice (AdE→Pfree→Entre) is significant. The proposed path in Model B to measures the indirect impact of three predictor variables with entrepreneurship (AdE→Infocom→Pfree→Entre) provides ample empirical support for originated debate. This path brings 78%

variance in entrepreneurship score (10% booster). The results of serial mediation confirm the underpinning theory of entrepreneurship ecosystem that states that external factors are also responsible for entrepreneurial success. No hesitation is made for making the empirical conjecture that ecosystem around the entrepreneurs facilitates and boosts the entrepreneurship.

Understanding and observing the characteristics of successful entrepreneurs are not sufficient with a myopic heroic version of entrepreneurs. The external environment factors that facilitate the process of start-ups also need scholarly attention. Underpinning viewpoint regarding a successful entrepreneur is metaphorically described as the tallest oak in the forest. It is tallest not only because of its acorn but also because of the soil and short or distant trees that never caused sunlight blockage. So far, many developing countries are focusing more on providing IT and financial support to potential entrepreneurs but pay less attention towards the development and expansion of ecosystem. Such practices can bring a short-term local uplift but international competition demands for an amplified support system. Education opens up the entrepreneurial eyes, ICT has reinvented and reimagined all the business and personal freedom has broken the shewel for new opportunities. Developing countries with low entrepreneurial index scores need to cognize the significance of ecosystem for fostering economic growth and job creation process.

With reference to studies already conducted in the similar area, the role of existing knowledge about individuals who navigate their resources for entrepreneurial activity remains limited with reference to their education and personal autonomy. Studies in many countries support the role of education for superior entrepreneurial intentions and spirits (Davidsson & Honig, 2003; Liñán, Cohard & Cantuche, 2011; Pugalis, Round, Blackwood & Hatt, 2015) and the underlying study empirically validates the previous studies. Thus, the higher educational institutions must realize their role in teaching and promote entrepreneurship with futuristic insights. The findings of this study also validate the previous findings that a new approach to higher education is required specifically in universities of technology (Dejager, Mthembu, Ngowi, & Chipunza, 2017). However, the role of higher educational institutions in creating awareness for personal autonomy is still an unexplored area that needs serious scholarly attention.

## **6. Recommendations**

The results of this empirical study imply that HEIs should inculcate the freedom of thoughts, choices, and autonomy is inescapable, thus, in all business education programs must add special courses for developing and improving soft skills, critical thinking, and social intelligence. Teaching only managerial, financial, legal and technical skills are not sufficient. Government concerned authorities must plan to work in close collaboration with HEIs to reach all areas of the country for spreading awareness and developing related skills and education while using its communication infrastructure. The current communication infrastructure is adequate for initial startup for designing online material, courses and programs related to social and critical thinking skill. The HEIs along with concerned governmental and non-governmental authorities need to take more responsibility for promoting entrepreneurial intentions for career fighting breed.

## **7. Conclusion**

Literature review, empirical results, and discussion in this paper lead us to conclude that access to advanced education, access to information & communication and personal freedom & choice play a crucial role in determining the entrepreneurial activity. The role of advanced education is usually unappreciated in entrepreneurship and it is viewed as an additional qualification. It is concluded that advanced education is not only an additional qualification but a weighty strategic tool that aids the entrepreneurial process. Higher educational institutions in developing countries must design their programs and curriculum to inculcate the required business skills. The educational policies must be designed according to the contemporary needs not only for locals but also for international business competition. ICT has turned the table for all firms either small or large, thus, potential entrepreneurs must equip themselves with the required skillset and also demand more developed infrastructure. The cyber policies and internet connection for far areas of the countries can excite unexplored potential e.g. underprivileged groups. Personal freedom & choice is part of the culture and usually less observed in many developing countries. For unrestricted thoughts and ideas, the awareness of personal freedom & choice is inevitable. It can be done through education either basic or advanced education. The ecosystem contains many stakeholders that play their due rule in pushing and expanding the boundaries of entrepreneurship process. The entrepreneur's skillset and personal genius require a conducive supporting

environment for start and grow. The countries that need to foster their institutional and individual entrepreneurial process must involve all stakeholders for a better ecosystem design.

The authors have added only three variables in the model from Isenberg (2010) ecosystem model whereas future studies can add the rest of the five variables from the above mentioned model.

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