

# Fostering Entrepreneurship: an Empirical study of Entrepreneurial mind set of Engineering and Technology students in Pakistan

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## **1- Background**

Pakistan is facing the problem of unemployment among youth like other developing countries. Unemployment is a global problem and entrepreneurship act as a catalyst of socio-economic development of a nation by creating job opportunities. The 21<sup>st</sup> century is a knowledge based epoch thus the economic growth depends both upon advance technology and entrepreneurship. The interface between technical disciplines and entrepreneurship is growing rapidly because these disciplines can produce vital entrepreneurs with innovative ideas. It is also a solution in response to global competition and the practice of corporate downsizing that perhaps has contributed to the problem of unemployment, especially among engineering and technical education graduates (Smith 2005). Entrepreneurship is a state of mind that initiates the process of innovation through investment, risk taking and return. Business schools are working on the development of curricula for the discipline of technology education to incorporate entrepreneurship with engineering and technology education. According to Cunningham (1991) if educational process is a function of knowledge, skills and values then business schools have concentrated only on knowledge neglecting the skills and values are either ignored or their existence is presumed. On the contrary, engineering and technology institutes are producing graduates with problem solving mind set needed to provide a comprehensive solution for any problem. Engineers already possess the qualities required to succeed in business. By enhancing those qualities with entrepreneurial knowledge and strong communication skills engineers and technology graduates can return optimal benefits to their companies and to themselves by creating opportunities with innovation.

Given the vital role of entrepreneurship as an engine of socio-economic development, there is a focus of policy makers and educationists in stimulating social and economic development through entrepreneurship as well as entrepreneurial education (Gorman et al. 1997). As a consequence, many higher education institutes (HEI) at international level are presently offering entrepreneurship as an academic subject (Kolvereid and Moen 1997). For instance, in the United States, there are more than 400 colleges and HEI's those are offering courses in entrepreneurship education and the number of students taking entrepreneurial courses is on the growing trend

(Kuratko and Hodgetts 2007). In adding up, these subjects are not only offered by business schools at the undergraduate and graduate levels, but they are also offered by other faculties, such as engineering and information technology (Garavan and O'Conneide 1994). The rapid expansion of entrepreneurship education is a proof that those who participate in entrepreneurship education have a greater intention towards new business formation (Galloway and Brown 2002). Likewise, formal entrepreneurial education is likely to impact the attitudes of engineering and technology students towards entrepreneurship in career selection (Hansemark 1998).

In 1947 there was only one university in Pakistan. University of the Punjab was established in 1880s. A number of universities were established after independence of the country. University of Engineering and Technology Lahore and Agriculture University of Faisalabad were established on the recommendation of Sharif Commission 1959. Lahore University of Management Sciences and Aga Khan University was established in 1980s as private higher education institutes in Pakistan. According to data given by Higher Education Commission (HEC), presently Pakistan has one hundred and ten institutions of higher education, out of which eighty-three are universities and twenty-seven are degree-awarding institutes out of which thirteen are engineering and technology universities (HEC, 2006-07). These engineering institutes have started business programs and entrepreneurship education courses in their degree programs by realizing the importance of entrepreneurship education. Higher Education Institutes are giving importance to entrepreneurship courses in their business programs but the move towards entrepreneurship education is not satisfactory according to Sajjad Ahmaed Khan.

*“The analysis indicates that a number of priority action areas arise to build upon. Of major importance is setting up a process by which clear agreement on the concept of entrepreneurship education is reached and its relevance to the planning of future entrepreneurial education at the National Universities for Pakistan explored. More specifically, a sound structure for faculty development, incentives and reward systems has been provided by HEC. This all reflects the devotion of the HEC towards entrepreneurship education in Pakistan; however,*

*there are certain challenges that need to be considered in introducing it in the current educational system of Pakistan.”*

## **2- Purpose of the Study**

The purpose of this research is to study the impact of entrepreneurship education on Pakistani engineering and technology students' intention towards entrepreneurship. In dealing with this, the research concentrates on the major problem of graduate joblessness in Pakistan. In Pakistan there is a need to pose about the capacity of higher education institutes in producing students for selecting entrepreneurship as career opportunity. To concentrate on the need, this study explores the influence of entrepreneurship education by concentrating on the role of Engineering and Technology higher education institutes for enhancing entrepreneurship, entrepreneurial pedagogical skills, entrepreneurial pedagogy, and entrepreneurial co-curricular activities, and internship programs.

## **3- Objectives of the study**

The main objective of this study is to explore the impact of entrepreneurship education on Pakistani Engineering and Technology HEI's students' intention towards entrepreneurship. Mainly, this study endeavors to explore the relationship between entrepreneurship education and Engineering and Technology HEI's students' intentions towards entrepreneurship. The specific objectives of this research are to:

- i) Impact of students' attitude on decision to choose entrepreneurship as a career;
- ii) Determine the entrepreneurship education variables that significantly impacts Engineering and Technology HEI's students' intention towards entrepreneurship;

## **4- Research question**

Based on the research objectives of this study, the following principle research question is posed:

*Are the learners' entrepreneurial intentions determined by his or her personality, or can entrepreneurship education effect this decision?*

## **5- Problem Statement**

In the view of minimizing engineering and technology graduates' joblessness problem as well as developing future entrepreneurs, it is appropriate to carry out this research to develop a greater understanding of the impact of entrepreneurship education on Engineering and Technology HEI's students' intentions towards -entrepreneurship. Hence, the problem to be examined in this research is:

*“Given that entrepreneurship is associated with job producing, is entrepreneurship education capable of minimizing the number of unemployed graduates and at the same time increasing Pakistani engineering and technology students' interest in entrepreneurship”?*

## **6- Operational Definitions**

Different researchers use different definitions of concepts in their studies. The following provides a brief discussion of terms used in the study.

*Entrepreneurship*: The process of creating and running a new business activity (Edwards and Muir 2006a). It can be categorized in a range of forms: “new or established businesses of all sizes (micro, small, medium and large) or as self employment” (Matlay 2005b, p. 629).

*Entrepreneur*: Someone who is involved in entrepreneurial activity such as establishing a new firm or entering into self-employment.

*Entrepreneurship education*: „A range of skills and attributes that are not innate and can be developed through educational programmes” (Kanyi 1999, p. 40). In this study, it is bounded by four variables: the role of engineering and technology institutes in promoting entrepreneurship, the entrepreneurial curriculum and content, the pedagogical issues and entrepreneurial internship programmes.

*Intention towards entrepreneurship*: An individual's mind set to become an entrepreneur.

*Engineering and technology students:* In this study, engineering and technology students are academic students study in engineering institutes, commerce and technology colleges at the bachelors and masters level in the semester three, four, five and six.

## **7- Theoretical framework**

The study will be based upon Theory of Planned Behaviour. “Psychologists have proven that intentions are the best predictors of any *planned behavior*, particularly when the behaviour is rare, hard to observe, or involves unpredictable time lags” (Krueger et al., 2000, p.411). Entrepreneurship can be seen as a planned behavior since it consumes time to initiate and implement a plan. The TPB (Theory of Planned Behavior) of Ajzen (1991) focuses on the individual’s intention to perform a specific behavior. Therefore, a motive lies in the middle. The stronger the intention, the more probability of it is being implemented.

According to (Ajzen, 1991) entrepreneurial intentions are formed with personal attitudes, subjective norms and perceived behavioral controls. All the three factors are backed up with the demographical and other human capital factors which strengthen an individual’s behavior towards entrepreneurial venture. Studying cultures in this domain is of imperative nature.

One another sound model in entrepreneurial intentions is based on Ajzen’s theory of planned behavior (Ajzen, 1991). According to the theory, intentions are elucidated by:

1. An individual’s attitude towards the behavior
2. The subjective norms
3. And the individual’s perception towards behavioral control

Intentions are conjured up as instantaneous antecedents of actual behavior (Ajzen, 1991). Also, building an attitude towards a certain thing which drives a specific behavior must accompany by a conviction; that it will result in definite outcomes (Fishbein and Ajzen, 1975; Boyd and Vozikis, 1994). An Individual’s attitude towards the behavior is of mere importance. It is an entrepreneur’s attitude towards the venture which will define the boundaries of his success.

Social factors from the external environment have also been given much weight by Ajzen. He included ‘subjective norms’ another factor which drives intentions of an individual towards entrepreneurship. These are the perceived social values which creates a social force to engage or restrict oneself in a behavior. Social forces also influence an individual’s tendency to act entrepreneurially. These social pressures also play an important part in motivating or demotivating an individual to entrepreneurship, hence constructing or destructing the intention. On the other hand, an individual’s perception towards behavioral control also demarcates the boundaries of intentions. Behavioral control is a function of an individual’s attitude towards a behavior and the subjective norms towards that behavior, which is the center of attention in expecting the actual behavior.

Ajzen’s model has been given wide scale acceptance by research scholars due to its wide scale applicability in determining entrepreneurial intentions. It gives holistic, contemporary and relevant circumstantial insights in knowing the right factors which influence entrepreneurial intentions. It accounts for socio-economic factors which can influence entrepreneurial activity. As discussed by Ajzen, Behavioral beliefs tie the behavior of curiosity to predictable results. It is also the subjective likelihood that the behavior will result in a convinced outcome. It was assumed that subjected values of such outcomes determine an attitude towards a behavior; which is the level to which presentation of a behavior is positively or negatively valued.

Next comes the ‘Normative Beliefs’, which are the perceived behavioral anticipations of closely related family members or groups (e.g. spouse, friends, doctor, colleagues etc); which builds a social pressure called as ‘Subjective Norms’.

Control beliefs are related with the apparent presence of factors that may make easy or obstruct act of a behavior. According to Ajzen, control beliefs if combined with the perceived power of each control factor conclude the established perceived behavioral control.

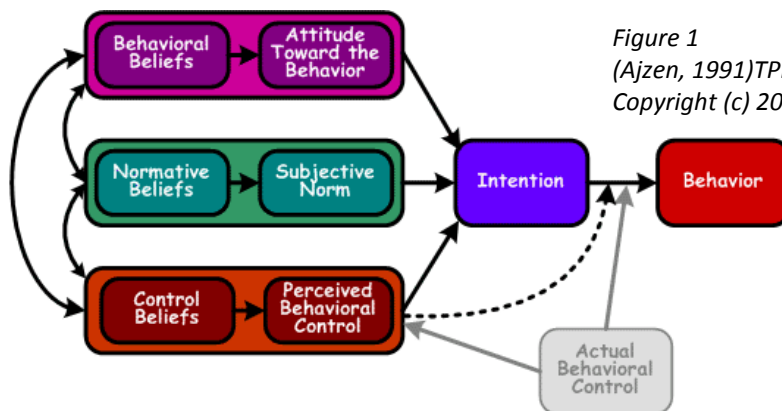


Figure 1  
(Ajzen, 1991) TPB Diagram  
Copyright (c) 2006 Icek Ajzen

All of the above factors play their individual role in forming up an individual's intentions which certainly transforms into entrepreneurial behavior.

In the modern global economy, entrepreneurship has become a central issue for business studies as well as in other disciplines like sciences and engineering. Many scholars ask, either implicitly or explicitly, why anyone should study entrepreneurship (Shane and Venkataraman, 2000). It is thought most researchers are attracted to this area of study due to the perceived ability to make a constructive difference to individual, social and national development (e.g., Fayolle and Degeorge 2006).

Table1: Study on the impact of entrepreneurship education by researchers

Author(s)	Finding regarding impact of Entrepreneurship education
Fayolle <i>et al</i> , 2006; 2007	There are significant differences between students who have taken entrepreneurship courses and those who have not
Noel, 2001	Entrepreneurship graduates were more likely to launch businesses and had greater intentions to become entrepreneurs
Mescon (1987)	147 programme participants reported that 34 percent of the graduates started a business after taking an entrepreneurship course and 52 percent planned to go into business within six months of the survey.
Galloway & Brown (2002)	Attendance of entrepreneurship courses has increased the number of business start-ups as various responses had been given pertaining to the intention to launch a venture upon graduation.
Lee et al. (2005)	The results of the study showed that Korean students who had taken entrepreneurship education had significant higher intention to start up ventures compared to their American counterparts.

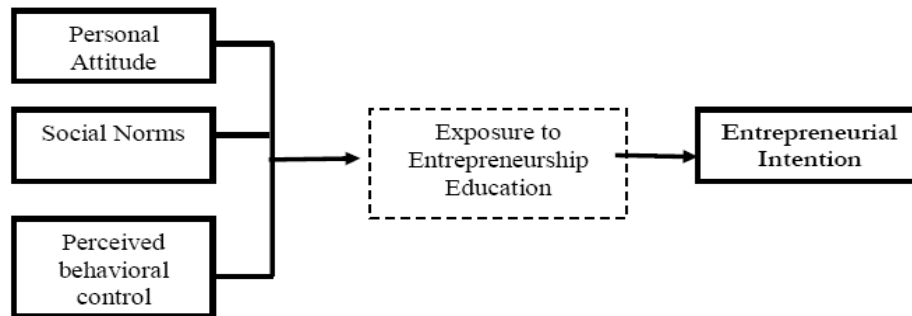


Charney & Libecap (2003)	Entrepreneurship graduates were found to be three times more likely to initiate a new venture and become self-employed compared to no entrepreneurship graduates.
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Source: Developed for research

By observing the impact of entrepreneurship education on students' intentions to decide entrepreneurship as their career selection, entrepreneurship education variable has been included in research for developing conceptual frame work of the study.

Figure; 2 Conceptual Frame work



*Developed by Otman aneizi,*

## 8- Scope of Study

In scaling the study to a correct extent, focus has been given to entrepreneurship education participants in business and economics discipline after the completion of engineering degree, while another focus has been given to non participants of entrepreneurship education program students who are enrolled in the engineering and technical degree programs such as engineering, computer science and information technology education etc. survey sample will be selected from engineering and technology institutes in Pakistan. The study will be focused upon entrepreneurship education participants in business and economics programs after the completion of engineering or technical degree program and non participants will be taken from engineering

and technology programs from institutes of Pakistan. The groups that are specifically targeted for the survey will comprised of only at the bachelors and masters level in the semester three, four, five and six.

### **9- Significance of the Study**

Notwithstanding that many countries are recognizing the importance of entrepreneurship to national economic growth (Lee 2007), there is a paucity of research linking education to growth in entrepreneurship in regard to the creation of entrepreneurs among university students (Peterman and Kennedy 2003). The present research extends previous studies (Fayolle et al. 2006) by examining in depth the effect of entrepreneurship education on university students 'desire to choose entrepreneurship ventures as career alternatives. In particular, based on studies by Fayolle and Gailly (2005) and Fayolle et al. (2006), this study investigates the relationship between entrepreneurship education variables such as the role of Engineering and Technology Institutes in promoting entrepreneurship, educators' and friends' roles, entrepreneurial curriculum and content, and entrepreneurial internship programs, and Engineering and technology students' inclination towards entrepreneurship.

Furthermore, the relationship between entrepreneurship education and entrepreneurial inclination, which may be moderated by personal and family business background, will also be investigated in this study. Knowledge about the variables associated with entrepreneurship education that affects Pakistani Engineering and technology students' entrepreneurial inclination is still sketchy.

This study is an attempt to fill this knowledge gap. It is also the aim of this research to contribute to the extant theoretical framework by identifying the variables of entrepreneurship education that could influence students' inclination towards entrepreneurship, especially in the context of Pakistan.

The study makes a third contribution as a source of future reference for further research.

It also hopes to increase understanding of entrepreneurship education and entrepreneurial inclination among engineering and technology students in Pakistan as a whole. Most importantly,

the results of the study could provide useful insights into the state of entrepreneurship education for policy makers and engineering and technology institutions in Pakistan in order to overcome the graduate unemployment problem.

In conclusion, the trend in most universities is to develop or expand entrepreneurship programmes and to design unique and challenging curricula specifically for entrepreneurship students (Kuratko, 2005). In other words, the importance of entrepreneurship education is that it may promote the founding of new businesses by graduates or enhance their employment prospects and the success of graduates in the job market, promote technology transfer from the university to the market through the development of technology-based business plans and forge links between the business and academic communities (Charney and Libercap, 2000).

Finally, as this study examines engineering and technology students' inclination towards entrepreneurship, it may provide useful practical information to educational policy makers in making more informed decisions on entrepreneurship programmes in order to increase students' participation in business in the future. The education stakeholders such as government and universities will also have a better understanding of the factors that influence students' propensity towards starting up entrepreneurial ventures. The outcomes from this research are expected to have policy implications for the future development of entrepreneurship programmes for young people, especially students in engineering and technology institutes.

*Entrepreneurial curriculum and content:* The courses and methods of teaching and assessment of entrepreneurship that are part of the entrepreneurship education in engineering and technology institutes.

*Demographic variables:* An individual's gender, ethnicity, age, religion, educational background, working experience and family business background.

*Personality traits:* An individual's personal characteristics that impacts the decision to become an entrepreneur for example risk taking, proactive propensity and personal attitude towards entrepreneurship.

## **10- Research methodology**

Population of the study comprises of Engineering and Technology students in Pakistan from Engineering and Technology Institutes. Random sampling technique will be used in the study for selecting the sample size that will comprise of 300 students of Engineering and Technology Institutes. A comparison will be made between students participated in entrepreneurship education and non participants. Questionnaire will be translated into Urdu and its reliability will be measured by pilot testing. In this study, engineering and technology students are academic students study in engineering institutes, commerce and technology colleges at the bachelors and masters level in the semester three, four, five and six.

Quantitative research approach will be utilized by conducting a questionnaire survey that will be based upon Entrepreneurial Intentions Questionnaire. The questionnaire will be adapted from previously existing entrepreneurial intentions questionnaires (EIQ). The questionnaires were already tested by their authors previously in their research study. Their research can provide information about the validation of the questionnaire (Lüthje & Franke, 2003; Autio et al. 2001; Linan, 2002)

Correlation, t-test and regression analysis will be used to analyze the data. Factor analysis and Structural Equation Model will also be considered for quantitative data analysis. SPSS, AMOS software will be use for quantitative data analysis.

***Data Analysis, Discussion and Conclusion;***

The sample includes 150 entrepreneurship participants and 150 Non-participants from engineering and technology institutes.

**Table 1**  
**Descriptive Statistics**

<b>Demographics</b>	
Ent. Edu. Participants	150
Non Ent. Edu. Participants	150

**Reliability Analysis**

Entrepreneurial Intention Questionnaire was pilot tested than survey was conducted questionnaire the reliability of the questionnaire was 0.84.

**Table 2**  
**Reliability Statistics**

Cronbach's Alpha	N of Items
.84	20

## Correlations Analysis

Correlation analysis was run to explore the significant relationship between the variables that are given in the Table 3

		SUMPA	SUMSN	SUMPBC	SUMEI
SUMPA	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	300			
SUMSN	Pearson Correlation	.356*	1		
	Sig. (2-tailed)	.000			
	N	300	300		
SUMPBC	Pearson Correlation	.234**	.330	1	
	Sig. (2-tailed)	.004	.078		
	N	300	300	300	
SUMEI	Pearson Correlation	.437**	.536**	.332**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	300	300	300	300

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*Correlation is significant at the 0.01 level (2-tailed).

The relationship between entrepreneurial intentions and personal attitude is .437 at significant level 0.01 that shows there is a strong relationship between personal attitude and entrepreneurial intentions. Likeness for entrepreneurship increases the entrepreneurial intention level of individuals and it was same observed among eng. Students. People having more likeness for entrepreneurship they will have more intentions towards starting up their own business. The

relationship between subjective norms and entrepreneurial intentions is also positive as the correlation value is .536 at significant level of 0.01. It shows that subjective norms those include the supporting behavior of friends, family and relatives are directly related to a person's behavior to run his own business. The more it will be supporting behavior by friends, family and relatives the more it will be high entrepreneurial intention to start a business. The relation between perceived behavioral control and entrepreneurial intentions is also positive as it is shown by correlation value .332 at significant level of 0.01. Perceived behavioral control is related to the self efficacy level of person's decision to run a business.

**Independent t-test for Entrepreneurship Education Participants and Non participants Entrepreneurial Intentions**

H<sub>0</sub>; There is no significant difference between entrepreneurial intention of male and female engineering students.

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**Table 4.0**  
**Group Statistics**

Gender	N	Mean	Std. Deviation
SUMEI Male	150	23.83	2.08
Femal	150	20.86	2.16

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**Table 4.1**

**Independent Samples Test**

		<b>Levene's Test for Equality of Variances</b>				
		F	Sig.	T	df	Sig. (2-tailed)
SUMEI	Equal variances assumed	.118	.733	-.023	58	.974
	Equal variances not assumed			-.043	21.056	.974

Independent t-test was run to find out the significant difference of the male and female intentions. Leven’s test for equality of variance shows significance of .043. So equal variance was assumed and it was observed that there was a significant difference in the scores for participants (M=23.82, SD=2.07) and non participants (M=20.85, SD=2.15) conditions; t (57)=-0.23, p = .043. These results suggest that there is no significant difference between Male and female student’s entrepreneurial intentions and this rejects the null hypothesis. This means that male and female have different level of intentions to start a business because males have more self efficacy than female so male have more intention to start new venture.

**Table 5  
Group Statistics**

	ENT. EDU.	N	Mean	Std. Deviation
SUMEI	PARTICIPA NT	150	23.6	3.05
	NON PARTICIPA TN	150	21.26	3.19



**Table 5.1**

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
SUMEI	Equal variances assumed	.003	.960	-.5.14	58	.015
	Equal variances not assumed			-.631	23.079	.035

An independent-samples t-test was conducted to compare entrepreneurial intentions of entrepreneurship education participants and non participants engineering students. There was a significant difference in the scores for participants (M=23.6, SD=3.04) and non participants (M=21.26, SD=3.19) conditions;  $t(21.04) = -5.14$ ,  $p = .035$ . These results suggest that there is significant difference between entrepreneurship education participants and non participants entrepreneurial intentions and this rejects the null hypothesis. And it shows participants of entrepreneurship education have more intentions than non participants.

## Regression Analysis

*H<sub>0</sub>: Personal Attitude, Subjective Norms and Perceived Behavioral Controls have insignificant impact on Entrepreneurial Intentions on students*

**Table 6: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.905 <sup>a</sup>	.818	.819	1.86

a. Predictors: (Constant), SUMPBC, SUMSN, Sumpa

**Table 6.1  
Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.50	1.48		-.231	.609
	Sumpa	.66	.19	.521	6.005	.001
	SUMSN	.34	.20	.261	2.160	.000
	SUMPBC	.21	.01	.149	2.622	.073

a. Dependent Variable: SUMEI

Regression Equation Suggests:

$$EI = -0.5 + 0.66*PA + 0.34*PBC + 0.21*SN$$

The regression equation shows that all the components of Ajzen's model, that are Personal Attitude, Subjective Norms and Perceived Behavioral Controls have positive relation towards Entrepreneurial Intention among students. In other words, from the statistical model, the researchers get direct proportionality of all the components of Ajzen's model with entrepreneurial intentions of the students

The above statistical model shows that EIQ based on Ajzen's model shows promising results in determining Entrepreneurial intentions in engineering. Questions were asked on three broad aspects, which are Personal Attitudes, Perceived Behavioral Controls and Subjective Norms. On the whole, the model shows that all of the said variables show strong correlation with Entrepreneurial intentions among engineering students with 99 percentage confidence interval.

### **Conclusion and Suggestions**

Research on engineering and technology students has shown that students have positive attitude towards entrepreneurship to run their own business after graduating from institutes. Students participation in entrepreneurship education have also shown positive impact on students intentions towards entrepreneurship than those students who did not participate in entrepreneurship education. Therefore policy makers and curriculum developers should formulate policies and develop curriculum for enhancement of entrepreneurship among students especially in engineering students. Male students have shown more intention towards entrepreneurship than female students because our society is patriarchal that give more confidence to male. Education system should formulate policies and train teachers for proper education of female for enhancing their self efficacy

level and entrepreneurial intentions to run their own business after graduating from institutes.

Future research can be carried out on characteristics of successful entrepreneurs in Pakistan and the impact of family back ground towards intention to run a person's own business.

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