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ENTREPRENEURIAL INTENTIONS AMONG CHEMISTRY EDUCATION STUDENTS IN KANO STATE

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Abstract

Chemistry is everything and everywhere, as a result, chemistry offers wide varieties of business opportunities for small and medium enterprises development like any other discipline. From the perspective of students, starting a new firm is a complicated decision due to high uncertainty and perceived risk. There are many factors that can support or hinder the students' decision to start their own business. Therefore, entrepreneurial intention of chemistry education students in tertiary educational institutions in Kano state were surveyed with structured questionnaire. Research questions were raised and hypotheses tested using descriptive and inferential statistical tools. Motivation to go into private business included quest to gain more money, influence from family and the urge to be an independent person. Barriers such as lack of initial capital outlay (seed capital) and lack of guidance proved to be highly significant hindrances. Based on the findings, it was recommended among others, that all stakeholders should create and strengthen entrepreneurial education specifically for tertiary educational institutions in Nigeria.

Introduction

Chemistry entrepreneurship is a subset of academic entrepreneurship, which is in turn a subset of what is referred to as knowledge economy. Academic entrepreneurship has the sole objective of commercialization of innovations developed by academic scientists in colleges and research institutes via patenting, licensing, start-up creation, and academic/university-industry partnerships Siengel, Veugelers and Wright, 2007; Rothaermel, Agung and Jiang, 2007). Chemistry entrepreneurship therefore, involves the process of converting innovations on Chemistry into marketable products for commercial gain. With increasing awareness in Chemistry entrepreneurship, there is a paradigm shift from conducting basic research whose results end up only in academic journals but today, Chemists and scientists in general are thinking of taking their work beyond publications by patenting and commercializing them for economic gains. Therefore, achieving transformation of novel science into successful business ventures is key to long term profitability of the world's chemical and related industries. However, this goal requires scientists who possess a critical combination of both technical and entrepreneurial skills The concept of academic entrepreneurship became prominent in the US especially in the days of decreasing funding of universities during the Reagan Administration (Grimaldi, Kenney, Siegel and Wright, 2011). Endorsing entrepreneurship has become a major topic of public policy across the developed and developing countries. In the developed countries, for instance, policy discourse centres on the issue of how to support the creation of new firms which are spin offs from the universities or the research centres. On the other hand, endorsing academic entrepreneurship has recently started as a subject of discussion for policy makers in the developing country such as Nigeria. Various steps have been taken to stimulate the growth of entrepreneurship, particularly in the tertiary level of education. However, there are many obstacles in the way of supporting the academic

entrepreneurship. Many academic institutions in Nigeria lack research activities and documented outcomes. Most tertiary educational institutions focus on teaching and preparing their students to be workers in the industrial or managerial world. Moreover, there is a lack of comprehensive policy in supporting the academic entrepreneurship. Apart from tertiary educational institutions, other actors such as government or the existing industries pay very little attention and thus give little support to the issue of academic entrepreneurship (Onifade, 2010).

Although the Nigerian government (local, state and federal) have put in place some measures to encourage self-employment in the country, the most important infrastructure such as electricity, a good transportation system, potable water, security of lives and provision of funds and researches are not adequate. Nonetheless, small and medium enterprise sectors have emerged as an engine of economic growth and the attainment of the much talked about Millennium Development Goal (MDGs). The small-scale sector which forms a part of total industrial sector has direct impact on the growth of national economy. Active and enthusiastic entrepreneurs can fully exploit the potentialities of a country's available resources like labour, technology and capital.

From the perspective of students, starting a new firm is a complicated decision due to high uncertainty and perceived risk. Entrepreneurial intention could be influenced from two sources, internal and external. Internal factors include a strong motivation and personal characteristics of students while external factors cover the external environment that may support or hinder entrepreneurial intention. For instance, the uncertainty in the political and economic situations such as in Nigeria may affect the entrepreneurial intention among students. Therefore, to design a good policy, it is important to know what factors support or prevent the intention of students in starting their own firm after graduating and this is the focus of this study.

Problem statement

While there are have been significant researches on the causes of entrepreneurial propensity, few studies track the career paths of chemistry entrepreneurial graduates and few still, examine the entrepreneurial plans of students who have been exposed to courses in entrepreneurship. In the view of Winden (1989, the opinions choice toward the need for investigating potential entrepreneurs in order to gain a comprehensive picture of the process of entrepreneurship. In Kano state, studies on how entrepreneurial motivation, gender and perception of entre barriers, among others, affect entrepreneurial plans of chemistry entrepreneurial students have not been empirically established. This study follows a less trodden path, in examining the prevalence and correlates of entrepreneurial plans of chemistry entrepreneurial students in tertiary educational institutions in Kano state.

Objective of the Study

The general objective of the study was to evaluate the possible differences in entrepreneurial intentions of chemistry education students along the bases of internal and external factors and gender. The following are the specific objectives:

(i) To evaluate the extent of entrepreneurial motivation being received by chemistry education students.

(ii) To examine the relationship between internality of locus of control and entrepreneurial plans of chemistry education students.

(iii) To assess the differences in entrepreneurial plans of male and female students of chemistry education.

Research Questions and Hypotheses

The following questions and hypotheses were raised/formulated to guide the study:

RQ1: Is entrepreneurial motivation more likely to turn graduating students into entrepreneurs?

RQ2: To what extent would internality of the locus of control be associated with entrepreneurial plans of students who have been exposed to a course in entrepreneurship development?

RQ3: To what extent are male students more likely to become entrepreneurs after graduating from school than female students?

RQ4: What are the limiting factors in entry into entrepreneurship?

HO_1: Students who are first born children are more likely to become entrepreneurs after graduating from school.

HO_2: Students with a low perceived barrier are more likely to become entrepreneurs after graduating from school compared to students with a high perceived barrier.

Review of Related literature

Entrepreneurship has been linked with new venture, i.e. start-up, and the concept has been defined as the "creation of new enterprise" (Mazzarol, et al, 1999). This definition reflects a growing awareness that entrepreneurship is not a event, but a process which may take many years to evolve and come to fruition.

In business environment, there are confirmed/established and potential entrepreneurs. A confirmed entrepreneur is the person who actually commences a business while a potential entrepreneur is the person who has the intention of starting-up a business. Succinctly put, an intention is a decision to act in a given way (Davidson, 1989), or state of mind that focuses a person's attention, experience and behaviour toward a specific object or method of behaving. Intention directs critical strategic thinking and decision, operating as a perceptual screen for viewing relationship, resources and exchanges (Mazzarol, et al, 1999). Therefore, intending entrepreneurs are those who have given serious consideration to establishing a small business training programme, or in that they have demonstrated a strong desire to establish a business.

It has been proposed that entrepreneurial intention is the best predictor of venture creation (Audet, 2000). This proposition is anchored upon the theory of planned behaviour earlier proposed by Ajzen and Madden (1986) and Ajzen (1991) as cited in Cromie (1998). This theory posits that actions are best predicted by intentions, which in turn are determined by a person's perception of social pressures, and the degree of perceived behaviour control.

One of the earlier mainstreams of entrepreneurial research that focused on the characteristics of entrepreneurs is called the trait approach. This approach was introduced by McClelland (1965), who tried to relate entrepreneurship to psychology. In the trait approach or personal characteristics-oriented approach as it is sometimes called, there is an implicit assumption that an entrepreneur is the key action. He is an individual who identifies opportunities, develops strategies, assembles resources and takes an action. His study found that most of the laid-off workers stayed at home for a while before finding a better job or started

their own business and came out with the theory of the need of achievement. He discovered that the need of achievement was a crucial factor for personal career decision. Accordingly, competitiveness was found to be the most important variable in Lynn's (1991) study of the determinant factors of entrepreneurial intention among university students which confirmed relationship between national culture and economic growth while a high valuation of money was the second most important variable. Although the prospect of making money typically ranked low in entrepreneurs' stated motivation (Bamberger, 1986; Hamilton, 1988 and Cromie, 1998). On the contrary, the need to be one's own boss or to have independence is the most significant factor (Storey, 1994).

Over the years, the trait approach has been challenged by the environmental approach. The environmental approach studies the most influential factors outside the entrepreneurs which contribute to the entrepreneurs' success. A number of hypotheses have also been proposed about the influence of entrepreneurs' families on their willingness to start their own business. Katz (1992) observed that the eldest children tended to have more entrepreneurial initiatives than their younger siblings. According to him, this phenomenon happened because eldest children had to bear the responsibility at an early age.

Besides, there are still numerous external factors that are believed to influence the entrepreneurs' characteristics. These factors can constitute a positive or negative force in the stimulation of entrepreneurial desires. Social environments, such as family, relatives, colleagues and friends, economic conditions, as well as unemployment are among the factors that are most widely studied**.** Political situations to some degree may stimulate the decision to start up**.**

With regards to gender, there is a substantial over representation of males among business founders in most countries. Reynolds (1991 and 1995) found that nascent entrepreneurs among males are more than twice as many as those among females in the US. Mathews and Moser (1995) also reported a higher interest in business ownership among males than females. Women are wrongly presumed to be less likely to possess entrepreneurial traits, to be more risk-averse than men, more likely to avoid uncertainty, and less likely to have male values (masculinity) often associated with entrepreneurship such as assertiveness, risk taking, perseverance and decisiveness (Verheul and Thurik, 2003).

Research Methodology

The plan adopted for this study was the descriptive survey design. The researcher was interested in determining the entrepreneurial plans of Chemistry education students in the three tertiary educational institutions in Kano state that offer the programme. Thus, a descriptive survey was found to be the most suitable design.

Kano state has three (3) tertiary educational institutions that run Chemistry education programme either at NCE or degree level. Federal College of Education (Technical) Bichi and Sa'adatu Rimi College of Education, Kumbotso run the programme at NCE level while Federal College of Education Kano, runs the programme both at NCE and degree levels. In this study, students in NCE II, III and all levels of the degree programme made up the population of this study. Specifically, the population comprised 1,938 students who belong to the category specified above (see table 1 below). This category of students was sampled because they have been taught and exposed to entrepreneurship education courses. It was equally believed that these students are more matured, and most likely to have made some tentative decisions as to what

their future career choice would be. A sample of 200 was randomly selected from the population of the study. Specifically, sample of 50 was selected from NCE II and III in each of the three institutions while 50 was selected from the degree students in Federal College of Education, Kano.

Table 1: Population of students in the selected colleges

College	NCE 2	NCE 3	B.Ed. 100	B.Ed. 200	B.Ed. 300	B.Ed. 400
Federal College of Education (Technical) Bichi	345	298	21	122	103	95
Federal College of Education, Kano	145	134				
Sa'adatu Rimi College of Education, Kumbotso	367	308				
Total						**1,938**

Source: Academic records for 2009/2010 session

Structured questionnaire was the only instrument used to collect data and issues such as entrepreneurial intentions, perceived feasibility of starting a business, demographic characteristics and effect of entrepreneurship education were addressed. Response options included 5-point Likert type rating scale, appropriate categorical and dichotomous scales were also used. The instrument was pilot tested among the B.Ed. 400 level students in Federal College of Education, Kano.

The data collected was analysed with the aid of a statistical package – SPSS. Both descriptive (frequency, mean, SD and Z-score) and inferential statistics (student t-test) statistical tools were used.

Results and Discussion

Only 180 copies of the administered instrument were returned and found usable for the purpose of this analysis. It was interesting to learn what motivations lay behind the students who want to start their own company.

Table 2: Motivation of students

Motive	Mean	SD	Z-score
To make a lot of money	4.102	0.809	5.6221
Receive endorsement from family	3.911	1.078	4.6428
Presence of role model from family entrepreneur	3.794	1.096	4.0430
To be a decision maker	3.713	0.868	3.6269
To be an independent person	3.676	0.893	3.4372
See an example from successful entrepreneur	2.639	1.051	-1.8785
To have more satisfaction in work	2.235	1.389	-3.9497
To use own creative skills	2.183	1.306	-4.2163
To exploit market opportunities	1.926	1.099	-5.5339
Population mean and SD	**3.0054**	**0.1951**	

n = 180: **Source:** Field survey, 2010

Table 2 showed the motives related to gaining more money (z-score = 5.6221). It seems logical that in developing countries, people want to achieve prosperity as their first priority. Another factor is the influence from family, including parents' approval of their children's quest to go into entrepreneurship (z-score = 4.6428. Family influence is also dominant as most of the students said that they have a living example of entrepreneur in their family (z-score = 4.0430). Becoming a decision maker and to be an independent person (z-score = 3.6269) appeared to be another motive for students to go into private business. Other listed motives appeared to be less important motives for students to go into private business after graduation.

Analysis of the locus control scores revealed a population mean score of 12.9 with a mean score of 14.0 for the males and a mean score of 12.7 for the females. This indicates that for some Chemistry Education students, there is a general perception that events in their life is not quite within their control and are therefore less likely to go into private business. The other side of the analysis revealed that male students have higher locus of control than female students indicating higher level of internality among males than females. In a masculine society as exists in Nigeria, and with the prevailing institutional and socio-cultural barriers to female entrepreneurship, it would not be surprising that females who have not become entrepreneurs may tend to have external locus of control beliefs.

Another concern of this study was to perform a confirmatory analysis of the difference in motivation variables of first-born children and those that are not first-borns. The mean scores of these two groups were computed and t-test was carried out shown in table 3.

Table 3: Difference in motivation between groups of students

Motive	mean (first-born)	mean (not first-born)	t-test
Money related motivation	3.352	4.226	3.071**
Receive endorsement from family	3.514	3.987	0.892*
Presence of role model from family entrepreneur	3.632	3.991	0.789
To be a decision maker	3.137	3.942	3.950
To be an independent person	3.270	3.995	2.785*
See example from successful entrepreneurs	2.397	2.073	0.678
To have more satisfaction in work	2.676	2.677	3.877**
To use own creative skills	3.926	3.823	0.548
Market related motivation	2.102	1.750	1.092
Population mean	**3.1112**	**3.3849**	

Note: **p < 0.01; *p < 0.05

n = 180: **Source:** Field survey, 2010

Generally, and judging from the sample means and the population means, students who are the first born in their family have higher entrepreneurial intentions than those that are not first born in the family. Thus, the result of the t-test analysis showed significant difference in some motivation variables of these groups of students (see table 3). Motive of having a lot money and more satisfaction at work revealed highly

significant difference (at $p < 0.10$) while family endorsement and the urge to be independent person showed a significant difference at $p < 0.050$). Other variables do not show any significant difference. In a way, those students who are first-born desire to go into private business for the sake of making more money. The reason for this is not far-fetched as the first- borns are expected to relieve their parents in nurturing other siblings especially in a polygamous setting which is prevalent in African cultures.

The study was also interested to know the barriers students think can change their decision to be entrepreneurs. Table 4 showed the perceived barriers of students in starting their own firm.

Table 4: Perceived barriers to starting a new venture

Perceived barriers	Mean	SD	Z-score
Lack of initial capital outlay (seed capital)	3.897	1.090	6.5876
Uncertainty in the market/tight competition	3.617	1.192	3.7158
Lack of guidance on starting new venture	3.573	1.000	3.2646
Lack of self-confidence	3.514	1.093	2.6595
Settled promises/offers by companies	3.360	1.262	1.0800
Uncertainty in political and economic environments	3.279	1.326	0,2492
Government bureaucracy	3.220	1.178	-0.3558
Lack of family support	3.139	1.090	-1.1857
Personal reason (e.g. pursuit of higher education, marriage, disability, etc)	2.507	1.235	-7.6687
Lack of institutional support	2.441	1.193	-8.3456
Population mean and SD	**3.2547**	**0.097 5**	

n = 180: **Source:** Field survey, 2010

A lack of initial investment outlay (seed capital) is perceived as the main barrier to start own business (z-score = 6.5876). Next to it is the uncertainty in the market (z-score = 3.7158). Another barrier is a lack of guidance in starting a new venture (z-score = 3.2646). Lack of self-confidence (z-score = 2.6595) is another potent factor that can change students' minds in setting up a new venture as entrepreneur. Another factor that is capable of changing students' minds is promising positions from big companies. Working in big firms could give some benefits, such as more stable career, low risk and no investment to make. Interestingly, students appeared not to be deterred with uncertainty in political and economic growth, government bureaucracy, lack of family support, personal reasons and lack of institutional supports when going into private businesses.

Table 5: Differences in the perceived barriers between groups of students

Perceived barriers	Mean (1^{st} group)	Mean (2^{nd} group)	t-test
Lack of initial capital outlay (seed capital)	3.485	3.073	0.7810
Uncertainty in the market/tight competition	3.044	3.397	0.7806
Lack of guidance on starting new venture	3.676	3.470	0.6318
Lack of self-confidence	2.632	2.382	0.6394
Settled promises/offers by companies	3.338	3.382	0.8395
Uncertainty in political and economic environments	3.909	3.985	0.3473
Government bureaucracy	3.161	3.117	0.8303
Lack of family support	2.500	2.382	0.5326
Personal reason (e.g. pursuit of higher education, marriage, disability, etc)	3.632	3.397	0.2514
Lack of institutional support	3.514	3.720	0.1767
Population mean	**3.2891**	**3.2305**	
Note: **p < 0.01; *p < 0.05			

n = 180L **Source:** Field survey, 2010

Lastly, table 5 showed the difference in the perceived barriers between two groups of students (low perceived barrier and high perceived barrier). Compared to the previous measurement about motivation, perception about barrier has no significant difference on the students in the first and second groups. It seems that the students have perceived barriers even before following the entrepreneurial programme. Therefore, low or high perceived barrier does not affect a student's decision to go into private business.

Conclusions and Recommendations

Students' entrepreneurial plan is affected by several factors. Prominent factors identified in this study are the motivation to gain more money, influence from family (including parents' approval of their children's quest to go into entrepreneurship) and the urge to be an independent person.

Students who are the first-borns in their family have higher entrepreneurial intentions than those who are not first-borns in the family. In Nigeria, older children are expected to relieve the parents in nurturing other siblings especially in a polygamous setting. Male students have higher locus of control than female students indicating higher level of internality among males than females. In other words, female students tend to belief that circumstances around them are outside their control.

Some barriers are significant in increasing or decreasing entrepreneurial intention. Lack of initial capital outlay (seed capital), lack of guidance, uncertainty in the market place and lack of self-confidence were found highly significant in relation to entrepreneurial intention. Offers from big companies may turn student careers from being entrepreneurs to being managers. Blueprints of entrepreneurship education are not available for policies that enhance entrepreneurial intention.

Sequel to the above, there is the growing need for all stakeholders to create and strengthen entrepreneurial education specifically for tertiary educational institutions in Nigeria. Currently, the focus and process of

education is too mechanistic and does not promote and encourage entrepreneurial behaviour. Therefore, tertiary educational institutions in the country should brace up with the challenges to mount programmes which can prepare students for starting a new company directly after graduation. Programmes that build students' capacity such as practical issues on starting a new business are very important. These programmes can give hands-on experience and knowledge that are necessary to start new businesses. Hence, this study has created a challenge for the universities to endorse entrepreneurship as part of their education.

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