



THE INFLUENCE OF SCIENCE EXPOS ON ENTREPRENEURIAL INTENTION OF LEARNERS IN SOUTH AFRICA

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ABSTRACT

The purpose of this paper is to investigate the influence of science expos on entrepreneurial intention of learners in South Africa. Also to explain the Theory of Planned Behaviour as a cognition-intention model for entrepreneurship. The interest of the study was to offer empirical support of the influence of science expos on entrepreneurial intentions. Science expo finalists were randomly selected and requested to complete a structured questionnaire. The participants (N=125) who completed the questionnaires were from all 9 provinces. The results indicate that most learners have the intention of starting their own business ventures and become self-employed. Gender has no significant role in entrepreneurial intentions. It emerged that no significant entrepreneurial education was given to learners. The correlation analysis indicated that the learners' entrepreneurial intentions are positively correlated to their personality traits and family background. The results strengthen the idea that family background, entrepreneurial education, status, poverty, fear, acquired scientific skills and unemployment influence entrepreneurial intentions. The paper offers important evidence that science expo also creates entrepreneurial intentions among learners. Therefore, it is important to incite and create the desire among learners to participate in science expos in order to promote entrepreneurial intentions.

Keywords: Entrepreneurial intention, entrepreneurship, scientific project, Curriculum and Assessment Policy Statement(CAPS).

INTRODUCTION

South Africa is one of the countries in the world with the highest unemployment rate which stands at 24.1% (Stassa, 2014; South Africa, 2014). Unemployment could lead to poverty, crime and drug abuse. Entrepreneurship and innovation could offer a potential solution to the problem of unemployment. A research has established that the development of small, medium and micro-enterprises (SMMEs) contributes 42% to employment creation (Chiloane-Tsoka & Rasivhetshele, 2014). South Africa's entrepreneurial activity is 9.1% according to the Global Entrepreneurial Monitor (GEM) of 2011. This entrepreneurial performance is way far below the average of other countries (Simrie, Herrington, Kew, & Turton, 2012). There is therefore a need for entrepreneurship education (Sanchez-Garcia, 2013).

This study is based on the theoretical model framework (see appendix A) which indicates the interrelationships between entrepreneurship predictors and science expo finalists' (adapted to suit current study) entrepreneurship intentions (Mudondo, 2014) and strongly rooted in the theory of planned behaviour (Ajzen, Theory of planned behaviour., 1991). The study differs from other studies in that it explores the level of entrepreneurial intention among learners from all provinces who participated in the International Science Fair (ISF) in South Africa from the 7th- 8th of October 2014. Furthermore the study evaluates the impact of the Non-Profit Organization Eskom Expo for Young Scientists with regards to entrepreneurial intentions of the learners who participate in science fairs. One of the main objectives of the ISF is to equip science learners with necessary skills such as technological innovative skills, process skills and creativity. The Eskom Expo for Young Scientists is an intervention that offers science fairs to school learners, where participants have an opportunity to

showcase their research projects. The learners who participate in the EE activities get exposed to scientific content knowledge, research methods, skills and techniques. Some projects are so good that they can be developed to produce products and give rise to a business enterprise. A significant number of learners in South Africa have indicated their interest in starting businesses or to be entrepreneurs (Steenekamp, Van der Merwe, & Athayde, 2011:67-68). However no substantive research has been done to find out if Eskom Expo has any contribution to the establishment of SMMEs in South Africa. According to Bybee, Powell and Trowbridge (2014 updated) students that make use of instruments as in projects acquire skills such as; research, organizational, creative, manipulative and communicative skills.

The department of education of South Africa in its Curriculum and Assessment Policy Statement (CAPS) also emphasize that learners should be able to collect, analyse, organise and critically evaluate information (CAPS, 2011); which they do in science projects. In grades 10 and 11 a science project is done per year and they also gain the scientific process skills from science expo as well. Learners have to master these process skills for them to submit an acceptable science project. These skills may be used to generate ideas which are convertible to profitable ventures. According to Malebana (2014) learners need skills to perform entrepreneurial tasks. The study also examined the impact of internal factors (desire to be business owner, independent, prosperous, power, social status) and external factors (unemployment, poverty, fear, family background) on the entrepreneurial intentions of the learners.

This study seeks to find out whether the Eskom Expo for Young Scientists is in any way offering these 'higher order mental and manual dexterity' skills (Bybee, 2014) and thereby stimulating the starting up of SMMEs in the communities. However it has been established that aspiring entrepreneurs in South Africa lack high levels of self-assurance, business skills and experience (Urban, 2012). It will be of interest to stakeholders if EE is offering learners such skills and self-esteem.

The paper culminates with recommendations on how to enhance the entrepreneurial culture among the South African learners. The success of learners in developing their science projects into projects that create employment shows the relevance of the science expos to the curriculum and the South African society.

ENTREPRENEURSHIP AND BEHAVIOUR

Small Medium and Micro Enterprises (SMME) sector is globally considered as the driving force in economic growth and job creation (Lunsche & Baron, 2000). According to Orford (2003) education and training have been identified as South Africa's main weakness with regard to an enabling environment for entrepreneurship. Therefore interventions like Eskom Expo (EE) through science projects could offer students with the necessary platforms for innovations and possible creation of new designs as bases for patents and job creation. According to Johnson (2001) entrepreneurship is defined as a process of getting new ideas and innovatively converting them into useful products or valuable services. A study has considered entrepreneurship as an intentionally planned behaviour (Linan, Nabi & Krueger, 2013). Therefore entrepreneurial intentions pave the way for business ventures (Douglas, 2013). This happens when the desire for self-employment is much greater than the desire to work for other people (Segal, Borgia, & Schoenfeld, 2005). Very few studies have actually focused on entrepreneurial intentions among learners (Lüthje, 2003). The learners' attitudes and personality are considered to have a positive effect on the learner intentions to start a business venture. According to Gase and Tremblay (2011) people's attitudes and perceptions are controlled by their environmental observations. Learners from families who already own businesses have a higher chance of engaging in business ventures as well (Van Auken, Fry, & Stephens, 2006). However the intention is also influenced by other factors such as the environment, traits, social and local pressures (Linan, Rodriguez-Cohard, & Rueda-Cantuche, 2011). Furthermore there is need to understand the contexts of entrepreneurship such as when, how and why people become entrepreneurs (Welter, 2011). A study has also revealed that some students may not be decided on

whether to enter into business ventures or to seek employment (Franco, Haase, & Lautenschlager, 2010).

Studies mentioned above have indicated that entrepreneurship is a planned behaviour it is imperative that this paper looks into the Theory of Planned Behaviour (TPB). A study was conducted on entrepreneurial intentions of students in Gauteng and Western Cape (Muofhe & du Toit, 2011). This paper uses the TPB to predict entrepreneurial intentions of learners some finalists who participated in science expo from all the provinces of South Africa.

THEORY OF PLANNED BEHAVIOUR (TPB)

There is a psychological explanation for entrepreneurial intentions given that intentions are predictors of any planned behaviour (Krueger, Reilly, & Casrud, 2000). In entrepreneurship the first action towards establishing a business venture is entrepreneurial intention (Bird, 1988). Different research designs have been developed to investigate the phenomenon of entrepreneurial intention (Siu & Lo, 2011). In an effort to understand the behaviour of people Ajzen advanced the TPB which helps in understanding how the behaviour of people can be changed and that intentions motivate certain behaviours (Ajzen, Theory of Planned Behaviour, 1991). Researchers agree with Ajzen in that people are most likely to intend to commence a business when they have relationships with people who are already entrepreneurs (Lapista, Breugst, Hebllich, & Patzelt, 2012). This theory or model explicates that entrepreneurial behaviour is a result of entrepreneurial intent.

According to Ajzen (1991) there are three important factors which influence the changing in intention and the actual behaviour of an individual (see figure 2):

- The belief and attitude a person has toward behaviour. A learner might desire to be an entrepreneur because a family member is already an entrepreneur, need for independence, willing to take risks etc.
- Social factor or subjective norm. This entails social pressure from the environment on the learner (individual) to start or not to start a business venture.
- Perceived behavioural control influence intention. This means that the actual behaviour cannot solely depend on intention to perform certain behaviour or on the motivation, but on the perceived difficulty of performing the behaviour.

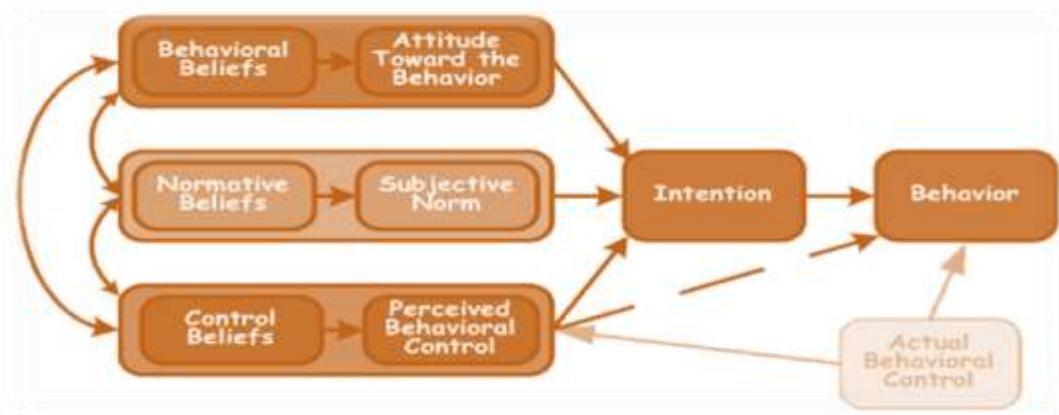


Figure 2: Ajzen's (1991) theory of planned behaviour.

MODEL OF ENTREPRENEURIAL EVENT

Another model was developed by Shapero (1975) which is the model of 'Entrepreneurial event'. This model explains that the intention to start a business depends on trustworthiness or credibility of alternative behaviours and the propensity to act upon opportunities. The behaviour should be desirable and feasible for it to be 'credible'. After testing Shapero's ideas Krueger (1993) developed his model (see figure 3). His study concluded that; desirability, feasibility and propensity to act only

explain half of the differences in intentions toward entrepreneurship. The best predictor according to Krueger (1993) is the perceived feasibility.

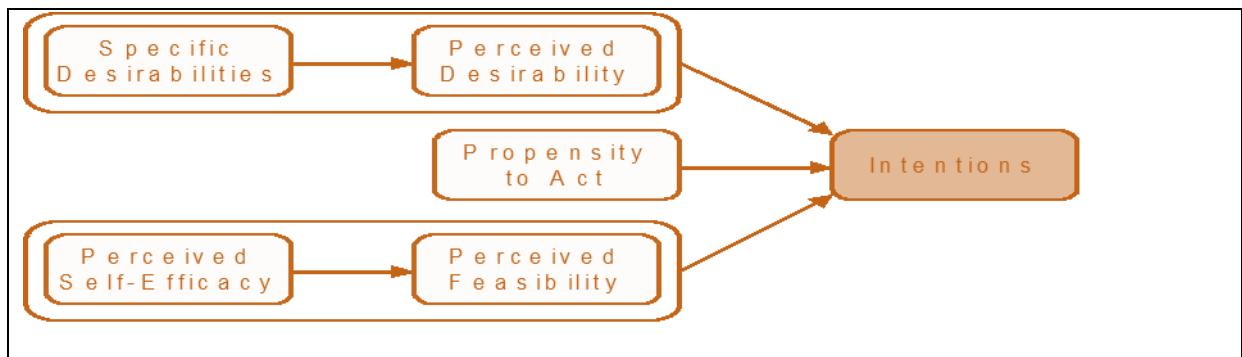


Figure 3: The Shapero-Krueger model from Krueger et al. (2000, p.418).

Krueger et al (2000) points out the significance of understanding the theory of self-efficacy with regards to entrepreneurial behaviour. Self-efficacy theory clarifies what individuals' beliefs concerning their competences to produce results are. An individual possessing a strong sense of self-efficacy is capable of accomplishing many things (Bandura, 1997). However a study has also elucidated those behavioural beliefs will either produce a positive or negative attitude towards the behaviour according to the combined model (Stols & Kriek, 2011).

PURPOSE OF STUDY

The aim of the study was to investigate the influence of science expos on entrepreneurial intention of learners in South Africa.

METHODOLOGY

Participants: The sample consisted of 125 learners who were randomly selected from the science expo finalists coming from all the 9 provinces of South Africa. The population size was 600 learners the sample size was therefore quite adequate.

Research design: A cross-sectional survey was used to carry out the study to obtain primary data from the chosen sample. Surveys are efficient in collecting huge amounts of data and are usually used in studies that use people as units of analysis (Babbie and Mouton, 2004). The primary data was obtained through structured questionnaires which were quantitative and qualitative in nature in order to gain an understanding in the influence of science expos on entrepreneurial intentions of learners. Analysis to the questionnaire responses was done and evaluation was done using techniques such as statistical graphs, tabulation, correlation and Cronbach's alpha method.

Instruments: the researcher used a questionnaire to collect data from the learners about their entrepreneurial intentions. The questionnaire had 40 questions which were divided into the following: general questions, entrepreneurial intentions, attitude, personality, risk taking, subjective norm and perceived behavioural control. Previous researches (Autio, et al, 2003; Kickul & Gundry, 2002 and Lüthje & Franke, 2003) were used to develop the questionnaire which was adapted to suit the study context of science expos. The questionnaire data was triangulated with information from focused group discussions (FGD).

Reliability test: The following questions were asked to obtain data on entrepreneurial intentions of learners:

- Have you ever seriously considered having your own company/business?
- Would you want to upgrade your science project into a business venture?

- Starting my own business sounds attractive to me.
- I personally consider entrepreneurship to be a highly desirable career.

Cronbach's alpha method was used to test the reliability of the instrument. The instrument is considered reliable when *Cronbach's alpha* ranges from 0 and 1 (Liew, 2010).

Table 1: Summary of Cronbach's alpha tested

Variables	Cronbach's alpha
Entrepreneurial intentions	0,696
Attitude towards entrepreneurship	0,840
Participation in entrepreneurship education	0,658
Proactive personality	0,753

The reliability of the results the questionnaire was also pre-tested on 10 students at regional level to ensure the reliability of the instrument.

Data collection: The data were collected using the structured questionnaires distributed during the 7-11 October 2014 International Science Fair (ISF). The participants were requested voluntarily to complete the questionnaires and were assured that the data collected would be treated confidentially (Babbie, 2007). The response rate from the respondents was ensured by physically distributing and collecting the questionnaires.

Data analysis: The analysis of the data was done according to Cooper and Schindler (2011). The raw data had to be converted to variables suitable for analysis and coding. The researcher used the Statistical Package for the Social Sciences (SPSS) for Windows to analyse the collected data (IBM, 2013) to generate inferential and descriptive statistics for the frequencies of the sample.

RESULTS AND DISCUSSION

Descriptive statistics

The study involved 125 science expo finalists coming from the 9 provinces of South Africa. A significant number of the learners (79, 2%) have seriously considered started their own business. The positive impact of Eskom expo projects is further seen by the significant number (40%) of learners willing to upgrade their science projects to business ventures. There were 43.2% males and 56.8% females and 26.4% were in the age category of 10-15years, 70.4% in 16-20 years and 3.2% in 21-23 years category (see appendix B). Entrepreneurial background has an effect on the entrepreneurial intentions of learners. Results have revealed that 79.2% of the learners have considered having their own business and that 53.6% of the parents are self-employed. This supports earlier research that has revealed that entrepreneurial family background increased the likelihood of entrepreneurial intentions and possibly becoming one (Douglas & Fitzsimmons, 2013; Dohse & Walter, 2012). A positive correlation was found between the entrepreneurial intentions, subjective norm and perceived behavioural control and this is in line with earlier researches (Gerba 2012; Gird & Bagraim, 2008). The results prove that the more confidence learners have to start their own business ventures and the support they feel might come from friends and relatives; the more they are inclined to commence a business venture or the more the intention. The results indicate that gender has no significant effect on entrepreneurial intentions and this is supported by an earlier study (Haus, Steinmetz, & Isidor, 2013). In summary, the above evidence clearly shows that science expo has influence on the entrepreneurial skills of learners in South Africa.

LIMITATIONS OF THE STUDY

Data was captured on one occasion, therefore is therefore impossible to infer causal relationships and the actual behaviour. In addition, the study was carried out at one centre or place and the learners had a high chance of discussing their opinions.

- a) The study cannot totally attribute the commencement of business venture to science expo as there are many factors in play in the learners' environment.

- b) Future studies to be conducted at a larger scale, since this study only comprises 125 participants.
- c) The study was voluntary and it's possible that the learners who did not participate could have provided different perspectives to those who completed the questionnaires.

CONCLUSIONS

The study design and quantitative statistical applications tested the central foundation of this study, the influence of science expo on entrepreneurial intention. Entrepreneurship has more benefits on the economy; therefore school curriculum should provide effective entrepreneurship education and programmes to help learners in South Africa to be more entrepreneurial and competitive. In addition the study has provided valuable information to policy makers in the South African Department of Education, Department of Trade and Industry and Department of Science and Technology. The information can be used as a base to align the school curriculum that enhances entrepreneurial attitudes and other departmental policies so as to encourage and instilling the desire in learners to start up their own business ventures. The results of the study can also assist policy makers to gain an understanding affecting the learner's perceptions on considering entrepreneurship as a career choice. There is need for a more effective curriculum which develops skills, innovation and technology to tap the potential of the learners.

RECOMMENDATIONS

Notwithstanding the limitations of the study; the study has some important recommendations which are directed to all stakeholders:

- a) The study recommends the introduction and running of the science expo in all district of South Africa.
- b) Entrepreneurship need to be promoted in the country due to the high unemployment rate.
- c) The TPB can be a useful tool to evaluate the science expo's impact on learners' intention to start up business ventures.
- d) Government departments should support the science fairs as they can change the mind-sets, attitudes and intentions of those learners who have negative thoughts about entrepreneurship.
- e) School curriculum should include entrepreneurial education. The education system needs to fight poverty, unemployment and dependency (Hegarty, 1990). Education and training develops and improve some facets of entrepreneurship (Henry, Hill, & Leitch, 2003).

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Appendix A

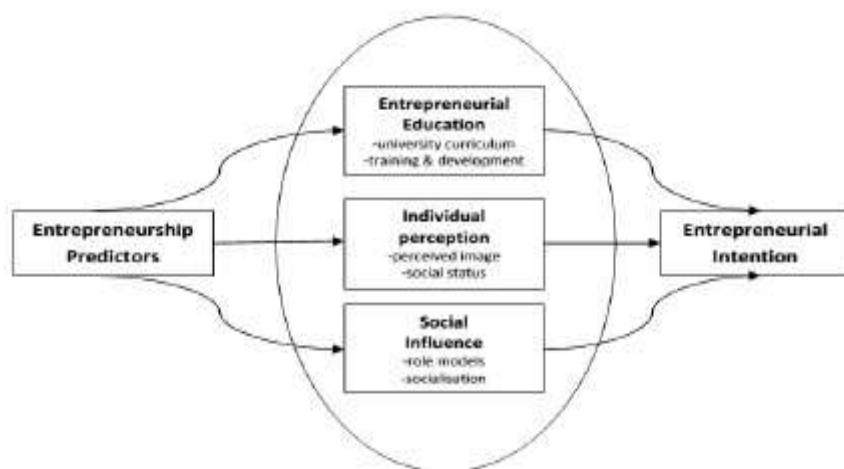


Figure 1: Theoretical Model Framework