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## PREDICTING ENTREPRENEURIAL BARRIERS AND INTENTIONS: THE ROLE OF UNIVERSITY ENVIRONMENT, ENTREPRENEURIAL CULTURE AND PUBLIC INFRASTRUCTURE

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### Abstract

This study investigated four questions: whether a non-entrepreneurship-oriented university environment predicts entrepreneurship barriers, whether an entrepreneurial-oriented university environment predicted entrepreneurship intentions among learners, whether public infrastructure mediated the relationship between the non-entrepreneurship-oriented university environment and entrepreneurship barriers and, whether public infrastructure mediates the relationship between the entrepreneurship-oriented university environment and entrepreneurship intentions. An explanatory research design was pursued and the study was quantitative in nature. A sample of university learners was randomly approached for primary data collection. A self-administered questionnaire was used as a research instrument. Simple linear regression and hierarchical regression analyses were performed to make meaning of the data. The study found that a non-entrepreneurship-oriented university environment predicts entrepreneurship barriers, and an entrepreneurial-oriented university environment predicts entrepreneurship intentions among learners. Hierarchical regression analysis results revealed that public infrastructure does not mediate the relationship between the non-entrepreneurship-oriented university environment and entrepreneurship barriers. The results further reveal that public infrastructure does not mediate the relationship between an entrepreneurial university environment and entrepreneurship intentions. The study concluded that to enhance entrepreneurship behavior among university learners, widespread entrepreneurship education must be adopted.

**Keywords:** University Environment, Culture, Entrepreneurship, Barriers, Intentions

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### 1. Introduction

Across the globe, there is a strong belief that entrepreneurship is an attitude and, therefore, it can be learned. In that regard, institutions of higher learning, that is, universities and vocational colleges allocate a significant budget to create a conducive environment for students to learn critical skills towards becoming an entrepreneur (Guerrero and Urbano, 2012; Wright *et al.* 2017). As institutions of higher learning continue to invest in creating a better environment for would be entrepreneurs, learners have become an attractive sample for research focusing on entrepreneurial intentions (Sesen and Pruett, 2014).

Unlike old universities models which prepared the learner for the labor market (formal employment), the current university environment is made up of classroom and outside classroom activities which are designed to empower learners with multiple employability options. These include, running their own entrepreneurial ventures or seeking formal employment (Audretsch, 2014; Guerrero *et al.* 2015; Guerrero and Urbano, 2019). This could be viewed as a response to the increased problem of graduate unemployment in South Africa (Tshishonga, 2022) and globally (Sidique *et al.* 2022). However, for such noble efforts to yield the desired results, the university must have relevant resources, capabilities, support mechanisms and educational programs to create a university environment or an entrepreneurial university ecosystem, that will stimulate and enhance the entrepreneurial behavior among learners (Wissema, 2009). In the context of this study, the term university environment refers to activities that support the demonstration of entrepreneurial behavior by learners. These include entrepreneurship courses, university incubators, community engagement activities that are entrepreneurship-oriented, entrepreneurship coaches and mentors in the form of alumni, science parks and entrepreneurial competitions on campus and beyond.

Universities differ in terms of their focus, operations, research quality, history, culture, location, networks, alumni and resources. The mentioned factors influence capabilities of universities (Leiva *et al.* 2022). What each university can and cannot do has an impact on how it approaches entrepreneurial education (Clarysse *et al.* 2005). Further, this has a spill over effect towards learner entrepreneurship barriers and intentions (Leiva *et al.* 2022). For example, research argues that universities with competitive and established computer science, medical, engineering, agriculture and commerce faculties are able to influence different types of entrepreneurial initiatives from their learners as opposed to those whose emphasis is on arts and humanities (Wright *et al.* 2017). It is therefore the goal of this study among others to investigate whether university environment predicts student entrepreneurial barriers and intentions. Empirical evidence on this subject is scarce from an emerging economy perspective and this study seeks to fill this void.

Scholars further observe that the rate at which individuals participate in entrepreneurial activities is different by country, making the concept of culture more critical in an attempt to understand individual entrepreneurial behavior (Giacomin *et al.* 2011). This raises the question, “does culture predict entrepreneurial barriers and intentions among university learners?” To advance theory, there is a need for answers from emerging economies, for example, South Africa and this study seeks to contribute to this debate focusing on three approaches, namely, the aggregate psychological traits, the social legitimation and the dissatisfaction approach.

Iakovleva *et al.* (2011) found that learners from emerging economies were more likely to exhibit entrepreneurial intentions better than learners from prosperous economies. In contrast, evidence from 59 countries provided by the Global Entrepreneurship Monitor reveals that the rate at which individuals participate in entrepreneurship is high in developing countries as opposed to developed countries (Bosma *et al.* 2012). Wennekers *et al.* (2005) pointed out that the level of entrepreneurship contribution to a given economy vary owing to the size of the economy. Economy size in turn determines the level of public infrastructure available to be exploited by individuals who intend to pursue entrepreneurship as a career. Public infrastructure in this study refers to mechanisms meant to stimulate and enhance entrepreneurial behavior among citizens, for example, private incubators, government owned incubators, grants from private players, and grants from government agencies. Given this background, this study further sought to answer the question, “does public infrastructure mediate the relationship between university environment, culture and entrepreneurial barriers and intentions among university learners?” Leading universities across the globe are in the forefront of product commercialization, and registration of new patents (Guerrero *et al.* 2020). There is a need to understand the role of the university environment, culture and public infrastructure towards entrepreneurship barriers and intent among learners if South Africa is to produce entrepreneurial graduates who will take a leading role in improving the gross domestic product of the country. Results of this research seek to contribute to this gap and further provide a platform for further research on this topic.

This paper is structured as follows: literature review where theories anchoring this research are discussed and empirical evidence is reviewed leading to hypotheses development

in Section 2. Thereafter, the methodology is presented in Section 3 followed by the results in Section 4. Findings are discussed in details in Section 5 and finally, Section 6 concludes the paper.

## **2. Literature review: Theory and hypotheses development**

### **2.1. University environment and barriers to entrepreneurship**

To better explain the concept of entrepreneurial barriers, research adopts an approach where the concept of entrepreneurial motives is explained first. Literature focusing on entrepreneurial motives and barriers categorizes them into two distinct groups, that is, intrinsic and extrinsic (see Finnerty and Krzystofik, 1985; Volery *et al.* 1997; Choo and Wong, 2006; Birdthistle, 2008; Sandhu *et al.* 2011; Smith and Beasley, 2011; Giacomini *et al.* 2011). The studies mentioned above, on the one hand, point out that intrinsic motives towards starting an entrepreneurial venture range from creativity, autonomy, intrinsic rewards, control, risk taking, personal development and professional dissatisfaction. On the other hand, extrinsic motivators towards starting an entrepreneurial venture are listed as pursuit of profit or financial gain, social status, safety orientation, market opportunity, and course content among others. As explained earlier, entrepreneurial barriers are also categorized into intrinsic and extrinsic barriers. This section focuses on entrepreneurial barriers directly or indirectly related to the university environment.

One of the key mandates of universities is to develop student entrepreneurial competencies. In other words, activities within and outside the classroom must be designed to develop and nurture the learner's entrepreneurial competencies, categorized by Giacomini *et al.* (2011), as an extrinsic barrier towards entrepreneurship, that is, if not fully developed. Similarly, the classroom activities and those beyond the classroom should be designed in such a way that they provide key answers to issues pertaining to lack of resources (Volery *et al.* 1997), viable business ideas, equity, customers, and social networking (Birdthistle, 2008). Smith and Beasley (2011) concurred and added that other issues that require immediate attention are lack of specific-sector coaches or mentors. Such key factors must be theoretically and practically addressed by an effectively designed entrepreneurship curriculum. However, if the entrepreneurship curriculum is weak in any of these extrinsic factors, learners are more likely to have higher perceptions on entrepreneurial barriers owing to the university environment that is less entrepreneurial oriented.

The university environment is expected to positively develop learners on various intrinsic issues. For example, learners must have courage (Birdthistle, 2008), must be able to deal with stress, must be hard workers, risk oriented, and they should not fear failure (Sandhu *et al.* 2011). Smith and Beasley (2011) argued that the university environment must further provide opportunities for entrepreneurial experience where learners will gain critical general business knowledge. In addition, activities within and outside of the classroom must prepare learners to assume managerial responsibilities and other key business responsibilities which will increase the probability of success for the new venture. An entrepreneurship curriculum that is not theoretically and practically sound may not provide answers to the mentioned intrinsic and extrinsic factors, which could lead to learners having higher perceptions of entrepreneurial barriers owing to the subsequent university environment that is less entrepreneurship oriented. In light of the above discussion, the study hypothesizes that:

*H<sub>1</sub>: University environment that is not entrepreneurship oriented predicts entrepreneurship barriers among learners.*

### **2.2. University environment and entrepreneurship intentions**

Entrepreneurial education is one of the top benefits for enrolling in institutions of higher learning. Other additional benefits do accrue to learners as a result of the institutions' reputation in terms of research, community engagement, and teaching and learning effectiveness. More importantly, community engagement allows institutions of higher learning to partake in activities beyond the classroom setting. These enable learners to take initiatives, which involve experiential learning

where they gain the needed personal experience to set-up an entrepreneurial venture (Wright *et al.* 2017).

South Africa's institutions of higher learning can be categorized into resourceful universities and the under resourced universities (Jawitz, 2012). This divide is blamed on the pre-democratic era where some institutions were strictly whites only, while others were designed to accommodate Black learners and other racially discriminated groups (Crain *et al.* 2008). After democracy, very little has changed as a handful of wealthy blacks and other previously discriminated groups can afford exorbitant fees charged by these institutions. In cases where young black learners are accepted by formerly whites only institutions, education standards are lowered (reverse racism) as they are perceived as undeserving, and people who lack the attributes to perform well in life (Daniels and Damons, 2011; Kessi and Cornell, 2016).

The South African government has been criticized for doing very little to change the resources disparity and transformation in institutions of higher learning (Govinder *et al.* 2013). Surely, this has a significant bearing in terms of research, community engagement and teaching and learning quality. These factors are critical towards creating a university environment with the capacity to develop, drive and sustain a positive entrepreneurial culture. Under normal circumstances, institutions of higher learning must be an environment where learners, regardless of race and economic status, must freely demonstrate their entrepreneurial intent and capabilities. South African universities are still battling to create such a conducive environment. The Student in Free Enterprise Organization (SIFE), now known as Enactus is one student organization committed to entrepreneurial action. Its success is attributed to commitment from its members and support from academic and business leaders. The existence of such organizations in institutions of higher learning creates an entrepreneurial ecosystem that arguably enhances entrepreneurial intentions among learners. Research indicates that given an entrepreneurship oriented university environment, entrepreneurs will emerge because their environments promote and reward entrepreneurship behavior (Audretsch and Belitski, 2016; Carayannis *et al.* 2016).

Institutions that are ranked high in terms of research, teaching and learning as well as community engagement, their learners are likely to find it easier to identify and exploit entrepreneurial opportunities owing to the existence of established networks compared to institutions who are unknown. In that regard, entrepreneurial intentions are likely to be high owing to the institutions' participation in education and beyond. Methods being employed by institutions of higher learning to create an environment that further stimulate entrepreneurial intentions among learners include conferences, provision of seed money for student projects and entrepreneurial competitions. In addition, to ensure that resources such as seed funds are put to greater use, institutions of higher learning make initiatives to bring on campus a variety of entrepreneurs, support actors and investors. Such efforts need to be improved and maintained to create a university environment that is conducive to demonstrate entrepreneurial intentions by learners. Given this discussion, the study hypothesizes that:

*H<sub>2</sub>: The university environment that is entrepreneurship oriented predicts entrepreneurship intentions among learners.*

### **2.3. Culture and entrepreneurial behavior**

In simple terms, entrepreneurship is the willingness to start a new enterprise with the goal of making profits. In the process of creating an enterprise, an individual takes several risks which when minimized; the returns are more likely to be high and satisfying leading to the success of the venture and the entrepreneur. Across the globe, there is variation in entrepreneurship behavior among individuals. In some countries, the number of individuals who pursue entrepreneurship as a career is higher compared to other countries (Thurik and Dejardin, 2011). There are many factors, which contribute to these variations. This study seeks to explain these variations from a cultural context making use of the aggregate psychological traits approach, the social legitimation or moral approval approach and the dissatisfaction approach.

#### **2.4. The aggregate psychological traits approach and entrepreneurial behavior**

Research shows that a link does exist between an individual's values and beliefs on the one hand and an individual's behavior on the other (Mueller and Thomas, 2000). Based on this notion, it is relatively correct to state that to a larger extent, an individual's belief and values also influences a person's career choice such as being self-employed. In other words, culture, which is a sum of values and beliefs, therefore predicts entrepreneurship barriers and intent. The aggregate psychological traits approach points out entrepreneurship behavior of a given society is determined by the number of individuals within a society that exhibits entrepreneurial values. Thus, the larger the number of individuals who exhibits entrepreneurial values, the higher the number of individuals who are more likely to demonstrate entrepreneurial behavior (Davidsson, 1995; Shane, 1993). Therefore, in societies that have very few individuals exhibiting entrepreneurial values and beliefs, based on the aggregate psychological traits approach, culture could be perceived as a barrier to entrepreneurship.

#### **2.5. The social legitimation or moral approval approach and entrepreneurial behavior**

Entrepreneurship rewards individuals in many ways and the biggest reward according to social legitimation approach is status. In communities where entrepreneurs are perceived to be very important individuals and are treated by the entire community as such, as evident in education systems, support structures earmarked to support entrepreneurs and other incentive schemes, for example, an accommodating taxation scheme, these activities contribute significantly to a high number of individuals demonstrating entrepreneurial behavior in that community (Etzioni, 1987). It, therefore, follows that in societies that shy away from recognizing individual entrepreneurial efforts, by not providing the needed support and incentives for entrepreneurs to flourish, such a culture would be perceived to be a barrier to entrepreneurship.

#### **2.6. The dissatisfaction approach and entrepreneurial behavior**

This approach focuses at entrepreneurship behavior at macro level and assumes that the differences between the population's values and beliefs lead to variations at which people would demonstrate entrepreneurial behavior. In other words, whenever it happens that values and beliefs of people who do not value nor practice entrepreneurship and those who value and believe in entrepreneurship collide, this could lead individuals who value and believe in entrepreneurship to highly exhibit entrepreneurial behavior (Baum *et al.* 1993).

The above scenario is better explained by focusing on push factors as opposed to pull factors of entrepreneurship. Some individuals are pulled or attracted by profits or rewards that exist when a person succeeds as an entrepreneur (Stephan and Uhlaner, 2010). However, the dissatisfaction approach views entrepreneurial behavior as a clash of the person's current state and the person's desired state. Noorderhaven *et al.* (2004) also reached a similar conclusion pointing out that higher dissatisfaction levels with life in a society leads to a large number of people demonstrating entrepreneurial behavior while higher levels of satisfaction with life leads to low participation in entrepreneurship.

In South Africa, majority of learners face challenges such as academic and financial exclusion. It is the general belief that for a person to succeed in life, a tertiary education qualification plays a role similar to that of a key, which a person requires to unlock several closed doors. Assuming that learners are threatened by academic and financial exclusion, this study argues that chances are high that they may demonstrate entrepreneurial activities such that if they fail to attain their degrees, they may have something to show for in the form of an entrepreneurial venture. Based on the above discussion, the study hypothesizes that:

*H<sub>3</sub>: Non-entrepreneurial culture predicts entrepreneurial barriers among learners.*

*H<sub>4</sub>: Entrepreneurial culture predicts entrepreneurial intentions among learners.*

## 2.7. Public infrastructure, university environment, culture and entrepreneurial behavior

The availability of public infrastructure somehow makes the entrepreneurial journey much easier to those willing to pursue entrepreneurship as a career. In essence, public infrastructure provides a supporting arm. Public infrastructure is diverse and can be in the form of public and private incubators, mentor programs, industry-specific training programs, entrepreneurial seminars and workshops, and corporate engagement activities tailor made for start-ups. In South Africa, incubators seem to be the most preferred support mechanisms and readily accessible to individuals willing to demonstrate their entrepreneurial activities. EY (2013) found that there is a strong belief among South African entrepreneurs that business incubators are important and play a role second to none towards strengthening the future of entrepreneurship in the country.

According to the Entrepreneur South Africa (2021), at least 58 incubators exist in South Africa and are controlled by private entities, municipalities, government agencies, colleges and universities. In this study, to measure public infrastructure, incubators owned by universities are excluded as the author assumes that such incubators contribute to the overall university environment. Entrepreneurially oriented universities are taking a giant step by establishing entrepreneurial incubation centers to promote entrepreneurship education in theory and in practice. Ogutu and Kihonge (2016) found that the number of incubators positively impact gross domestic growth of a country. Incubators provide various means and make the creation and growth of young enterprises an almost hurdle free process. Such means can be in the form of finance, managerial and technical expertise. Given this belief, it is relatively correct to assume that the availability of public infrastructure, for example, government and private owned incubators (excluding university owned), grants and other networks, may positively change people's values and beliefs towards demonstrating entrepreneurial activities. In other words, the very existence of public infrastructure plus a conducive university environment may downplay perceptions on entrepreneurial barriers that the learners or the general population may have leading to increased entrepreneurial intentions. Based on the above discussion, this study hypothesizes that:

*H<sub>5</sub>: The availability of public infrastructure mediates the relationship between the university environment that is entrepreneurship oriented and entrepreneurial barriers among learners.*

*H<sub>6</sub>: The availability of public infrastructure does not mediate the relationship between the university environment that is entrepreneurship oriented and entrepreneurial intentions among learners.*

## 3. Data and methodology

This study is quantitative and adopted a positivist paradigm. Data was collected only once, thereby making this study a cross sectional research. An explanatory research design was pursued. Through explanatory research, the researcher is able to identify the influence or impact of independent variables on the dependent variables. The study has two independent variables, that is, the university environment and culture. Similarly, there are two dependent variables namely, entrepreneurial barriers and intentions. The study also sought to investigate the impact of a mediating variable (public infrastructure) on the relationship between the independent and the dependent variables.

### 3.1. Data collection and sampling

A self-administered questionnaire was designed for data collection purposes. Questionnaires were issued to 400 learners from three South African universities in the Eastern Cape Province. These were chosen because of geographical proximity. Further, resources available to undertake this study could only cater for a study of that scale. The questionnaire was designed to extensively capture biographic data of the respondents such as age, gender, academic level, the faculty and the qualification, which the learner was pursuing. Since the study's objectives focused on learners at South African universities, convenience sampling was undertaken. Field workers stationed in

campus premises approached learners, asked for consent to participate in the study and it was granted. Although 400 questionnaires were issued, 123 were returned with usable information. Therefore, a response rate of 30.75% was obtained. Lockdown regulations passed during the Covid-19 pandemic prevented field workers from making extensive follow ups to gather more data. Other key ethical issues were observed such as protecting respondents from harm (social, physical, economical and emotional). The respondents' right to privacy and the right to withdraw were explained in writing on the questionnaire cover page.

### 3.2. Data analysis

Data analyses was carried out in three phases. First, exploratory factor analysis (EFA) was undertaken with the goal of identifying the relationship between the study's variables including the latent factors that explain the covariation between the study's variables. More importantly, the EFA procedure also gave the researcher the means to determine the validity of the constructs incorporated in the research instrument. The second phase of data analysis was performed through simple linear regression and the final phase was performed through hierarchical regression.

### 3.3. Measures

The university environment scale was made up of three constructs, that is, support availability, entrepreneurial activities and university governance. The support availability, entrepreneurial activity and the university governance sub-scales were each made up of six items respectively. The mentioned constructs were adopted and modified from Novela *et al.* (2021) Entrepreneurial University Model. Novela *et al.* (2021) developed an Entrepreneurial University Model from extensive literature review, and in-depth interviews. However, this model has not undergone any validation and its reliability is unknown. Through Exploratory Factor Analysis (EFA), this study will undertake the task of validating the adopted and modified constructs from Novela *et al.*'s (2021) proposed model. Respondents were asked to rate the sub-scale items on a five point Likert scale from 1 = completely false to 5 = completely true. The same scale was further manipulated to measure university environment that is entrepreneurship oriented and the university environment that is not entrepreneurship oriented.

Stephan's (2009) culture of entrepreneurship scale was adopted to measure entrepreneurial culture. The scale is made up of five dimensions, namely, seeking opportunities, valuing entrepreneurial traits, and entrepreneurial motivation each having five sub-scale items. The capability beliefs and the taking responsibility sub-scales had six and four sub-scale items respectively. An example of a sub-scale item for seeking opportunity reads, "Most people like to find various solutions to a problem". An example for the valuing entrepreneurship traits sub-scale item reads, "Most people place a high value on independence and autonomy". The entrepreneurship motivation sub-scale items read, "Most people start their own business to be better off financially". Examples for the capability beliefs and taking responsibility sub-scale read, "Most people are able to solve difficult and complex problems", and "Most people feel it is their responsibility to do high-quality work", respectively. These were rated on a five point Likert scale from 1= completely false to 5 = very true. The public infrastructure scale had four scale items and was measured on a five point Likert scale from 1 = strongly disagree to 5 = strongly agree. Similarly, the entrepreneurial culture scale items were also manipulated to provide for two key variables, that is, non-entrepreneurial culture and entrepreneurial culture.

The entrepreneurship barrier scale was made up of two dimensions namely the extrinsic and intrinsic barriers sub-scales originally designed by Giacomini *et al.* (2011). The extrinsic sub-scale had two items and the intrinsic scale had three items. An example of the extrinsic sub-scale item reads, "There is lack of support structures and fiscal or administrative costs". An example of the intrinsic sub-scale reads, "I lack self-confidence". Respondents rated these on a five point Likert scale from 1 = strongly disagree to 5 = strongly agree. Thompson's (2009) entrepreneurship intent scale was adopted and modified. Originally, Thompson's scale has 10 items with four distracter items and three reverse coded items. In this study, the distracter items were ignored

and the reverse coded items modified to a positive wording format. An example of the entrepreneurial scale reads, "I am saving money to start a business". Respondents rated these statements on a six point Likert scale from 1 = very untrue to 6 = very true.

#### 4. Results

The results reveal that 55% of the participants were male and 44% were female. One percent of the participants chose the rather not say option as far as the gender question was concerned. With regard to race, 92.7% of the participants were African, 5.6% were Indian and 1.6% were Colored. With respect to age, 51.6% of the participants were aged between 21 and 25, followed by 20 and below age category represented by 34.7% and the minority category was that of 26-30 represented by 13.7%. The study largely targeted undergraduate learners and the results reveal that second year learners dominated the study represented by 58.9%, followed by third years represented by 26.6%, first years were represented by 13.7% and fourth years were the least represented with 0.8%. The study also sought to establish whether entrepreneurship education was part of the curriculum in different qualifications, which these learners were registered in. If the answer was yes, the study also sought to establish whether entrepreneurship education was studied as a module from first year to the final year of the program. The results reveal that 66% of the respondents indicated that entrepreneurship education was part of their curriculum. However, 83% indicated that they do not study entrepreneurship from first year to the final year of the program. The results also revealed that 34% of the learners did not study entrepreneurship, as it was not part of their curriculum. This is an indication that entrepreneurship education is not widely offered across disciplines in South African universities. Among those who mentioned that they did study entrepreneurship, only 15% indicated that they had entrepreneurship as a standalone module from first to the final year of their programs. The majority of learners revealed that entrepreneurship was a standalone module at third year level of their programs represented by 54%, while 31% mentioned that they studied entrepreneurship only as a chapter from a business related module. Table 1 reveals the distribution of participants across programs, which they were registered for.

**Table 1. Qualifications pursued by respondents**

Name of Qualification	National Qualification Framework level	Percentage
Business Management	7	26.6
Human Resources Management	7	17.7
Public Management	7	8.9
Internal Auditing	6	10.5
Tourism Management	6	4.8
ICT	7	6.5
Office Management	6	5.6
Mechanical Engineering	6	1.6
Accounting	7	4.8
Civil Engineering	7	2.4
Fine Art	7	0.8
Financial Information Systems	6	0.8
Education	7	6.5
Electrical Engineering	7	0.8
Building technology	6	1.6

Source: Author

Results in Table 1 reveal that the majority of the participants were registered for a Bachelor's Degree in Business Management represented by 26.6% followed by Bachelor's Degree in Human Resources Management represented by 17.7%, Diploma in Internal Auditing



(10.5%), Bachelor's degree in Public Management (8.9%), Bachelor's degree in Information and Communication Technology (ICT) and Education represented by 6.5% respectively.

Exploratory Factor Analysis (EFA) was undertaken to serve three purposes, that is, to understand the structure of a set of variables. Second, given that the author adopted all of the scales from empirical research, EFA was undertaken to identify and confirm the relevant questionnaire items. Lastly, EFA was undertaken to reduce the data set to a more manageable size while retaining the most relevant information and eliminate challenges related to multicollinearity in the data set. A principal axis factor analysis was undertaken on the 58 items with oblique rotation (direct oblim). First, the sampling adequacy was investigated making use of Kaiser-Meyer-Olkin's (KMO) measure and KMO = 0.724 considered a middling value and above the threshold of 0.5 was obtained (Field, 2013; Hutchenson and Sofroniou, 1999). This outcome indicated to the researcher that exploratory factor analysis can be performed with the probability of yielding accurate results as the sample size was adequate. An analysis was performed further to determine eigenvalues for each factor in the data. The outcome revealed that 17 factors had eigenvalues over Kaiser's criterion of 1 and in total they explained 69.18% of the variance. The scree plot was ambiguous and showed inflexions that would justify retaining either 10 or 12 factors. Ten factors were retained and among the retained factors, 9 factors were usable in the data analysis as they had reasonable reliability scores as measured by the Cronbach Alpha coefficient as indicated in Table 2.

**Table 2. Factors, scale items, constructs and reliability scores**

Factor	Emerged scale items	Eigenvalues	Cronbach Alpha	Construct/factor name	Scale used
1	EM4, EA2, EA3, SA1	11.404	0.706	Entrepreneurial activities	✓
2	UG5, UG1, EA6, EA5, UG3	2.609	0.702	University governance	✓
3	PI2, PI4, PA3, PA1	2.433	0.734	Public infrastructure	✓
4	CB3, TR1, SO5, TR5, TR4	2.138	0.725	Taking responsibility	✓
5	SA4, SA6	1.912	0.698	Support availability	✓
6	VET3, CB6, CB2, SO1, CB4	1.818	0.708	Capability beliefs	✓
7	EIS1, EIS2, EIS3, EIS4, EIS5, EIS6	1.71	0.724	Entrepreneurship intent	✓
8	EB1, EB2	1.601	0.696	Extrinsic barriers	✓
9	IB3, CB1, IB3, IB2	1.56	0.713	Intrinsic barriers	✓
10	VET1, VET2, SO2	1.47	0.480	Value entrepreneurial traits	✗

**Note:** The accepted scales are represented by a ✓ symbol in Table 2 and the rejected scale because of poor reliability score is marked with a symbol ✗.

**Source:** Author

Simple linear regression analysis was performed with respect to hypotheses 1 stating that the university environment that is not entrepreneurship oriented predicts entrepreneurship barriers among learners. Results are shown in Table 3.

**Table 3. Simple linear regression model fit and summary for entrepreneurship non-oriented university environment on entrepreneurship barriers**

Source	Regression	Residual	Total
df	1	122	123
Sum of squares	7840	56.329	64.169
Mean of squares	7840	0.462	
F Value	16.980		
Pr>F	0.000*		
<b>Model summary</b>			
R	0.350		
R2	0.122		
Adjusted R2	0.115		
Est. standard error	0.67949		

**Note:** \*Significant fit at  $p < 0.05$ . Predictors: university environment (not entrepreneurship oriented). Outcome Variable: Entrepreneurship barriers

**Source:** Author

Results displayed in Table 3 reveal a low positive correlation between a university environment that is not entrepreneurship oriented and entrepreneurship barriers,  $r = 0.350$ . University environment that is not entrepreneurship oriented explained 12.2% of the variance in entrepreneurship barriers,  $R^2 = 0.122$ . Based on these values, Cohen's  $f^2$  was derived making use of the formula  $R^2/(1-R^2)$ . Cohen's  $f^2$  measures the effect size of the IV on the DV and on this model, an effect size of 0.139 was derived which according to Cohen (1988) guidelines points to a medium effect. An  $F$ -ratio = 16.980 and significant at  $p = 0.000$  reveals that the proposed model can be relied on in predicting entrepreneurial barriers among learners.

Table 4 shows the parameter estimates for non-entrepreneurial oriented university environment on entrepreneurship barriers. The results reveal model estimates as  $b_0 = 2.242$ , and  $b_1 = 0.102$  revealing a significant positive effect at  $p = 0.001$ . This finding indicates that failure by universities to transform their environments to become responsive to entrepreneurship engagements will continue to be a significant barrier towards demonstration of entrepreneurial activities by learners,  $b_1 = 0.102$ ,  $p = 0.000$ . Given this finding, the study fails to reject the hypothesis stating that the university environment that is not entrepreneurship oriented predicts entrepreneurship barriers among learners.

**Table 4. Parameter estimates for university environment that is not entrepreneurship oriented on entrepreneurship barriers**

Parameter	B	Std error	Sig. (2-tailed)	BCa 95% LB & UB
Constant	2.242	0.249	0.001*	[1.726 – 2.698]
University environment	0.102	0.021	0.001*	[0.061 – 0.157]

**Note:** \*Significant fit at  $p < 0.05$ . Predictor: University environment (not entrepreneurship oriented). Outcome Variable: Entrepreneurship barriers. LB = lower bound; UB = Upper bound.

**Source:** Author

Simple linear regression analysis was performed and bootstrapped confidence intervals were requested as they do not rely on assumption of normality and homoscedasticity to assess  $H_2$  stating that a university environment that is entrepreneurship oriented predicts entrepreneurship intentions among learners. University environment, which is entrepreneurship oriented was the independent variable and entrepreneurial intent was the dependent variable. Results are shown in Tables 5 and 6. Table 5 indicates there is a low positive correlation between university environment that is entrepreneurship oriented and entrepreneurial intentions,  $r = 0.414$ . In addition, the results reveal that an entrepreneurship oriented university environment explained 17.1% of the variance in entrepreneurial intentions among learners. University environment that is entrepreneurship oriented has a medium effect on entrepreneurial intentions, Cohen's  $f^2 =$

0.206. An  $F$ -ratio = 25.205, that is significant at  $p = 0.000$  reveals that the model can be relied upon when predicting entrepreneurial intentions among learners.

**Table 5. Simple linear regression model fit and summary for university environment that is entrepreneurship oriented on entrepreneurship intent**

Source	Regression	Residual	Total
Df	1	122	123
Sum of squares	20.451	98.990	119.441
Mean of squares	20.451	0.811	
F Value	25.205		
Pr>F	0.000*		
<b>Model summary</b>			
R	0.414		
R2	0.171		
Adjusted R2	0.164		
Est. standard error	0.90077		

**Note:** \*Significant fit at  $p < 0.05$ . Predictors: University environment (entrepreneurship oriented). Outcome Variable: Entrepreneurship intentions.

**Source:** Author

Table 6 provides parameter estimates of the model where  $b_0 = 2.054$ , and  $b_1 = 0.164$  and  $p = 0.000$ . This result reveals that efforts towards improving the university environment to be more responsive to entrepreneurial activities will result in a positive and significant increase in entrepreneurship intentions among learners,  $b_1 = 0.164$  and  $p = 0.000$ . Given this outcome, the study fails to reject the hypothesis stating that the university environment that is entrepreneurship oriented predicts entrepreneurship intentions among learners.

**Table 6. Parameter estimates for university environment that is entrepreneurship oriented on entrepreneurship intentions**

Parameter	B	Std error	Sig. (2-tailed)	BCa 95% LB & UB
Constant	2.054	0.409	0.001*	[1.291 – 2.728]
University environment	0.164	0.032	0.001*	[0.101 – 0.241]

**Note:** \*Significant fit at  $p < 0.05$ . Predictor: University environment (entrepreneurship oriented). Outcome Variable: Entrepreneurship intent. LB = lower bound; UB = Upper bound.

**Source:** Author

With respect to  $H_3$  stating that non-entrepreneurial culture predicts entrepreneurship barriers, simple linear regression analysis was performed and bootstrapped confidence intervals were requested. In the regression analysis, non-entrepreneurship culture was entered as the independent variable and entrepreneurial barriers was the dependent variable. Results are shown in Tables 7 and 8. In Table 7, we learn that a low positive correlation exists between non-entrepreneurial culture and entrepreneurship barriers,  $r = 0.447$ . Further, non-entrepreneurship culture explained 20% of the variance in entrepreneurship barriers among learners,  $R^2 = 0.200$ . Non-entrepreneurship culture has a medium effect on entrepreneurial barriers, Cohen's  $f^2 = 0.25$ . The results also reveal the model achieved fitness given an  $F$ -ratio = 30.508 that is significant at  $p = 0.000$ . In other words, this model can be relied upon when predicting entrepreneurial barriers among learners.

**Table 7. Simple linear regression model fit and summary for non-entrepreneurship culture on entrepreneurship barriers**

Source	Regression	Residual	Total
Df	1	122	123
Sum of squares	12.836	51.332	64.169
Mean of squares	12.836	0.421	
F Value	30.508		
Pr>F	0.000*		
<b>Model summary</b>			
R	0.447		
R <sup>2</sup>	0.200		
Adjusted R <sup>2</sup>	0.193		
Est. standard error	0.64866		

**Note:** \*Significant fit at  $p < 0.05$ . Predictors: Non-entrepreneurship culture. Outcome Variable: Entrepreneurship barriers.

**Source:** Author

Results in Table 8 provide the parameter estimates of the model where  $b_0 = 2.001$  and  $b_1 = 0.214$ . The results further reveal that in the absence of meaningful efforts to change the entrepreneurial culture in the society that is currently characterized by high unemployment among university graduates, barriers to entrepreneurship at university level can only increase among learners given evidence in Table 8 where,  $b_1 = 0.214$ , and significant at  $p = 0.000$ . Given this outcome, the study fails to reject the hypothesis stating that non-entrepreneurial culture predicts entrepreneurship barriers among learners.

**Table 8. Parameter estimates for non-entrepreneurship culture on entrepreneurship barriers**

Parameter	B	Std error	Sig. (2-tailed)	BCa 95% LB & UB
Constant	2.001	0.295	0.001*	[1.368 – 2.521]
University environment	0.214	0.043	0.001*	[0.129 – 0.313]

**Note:** \*Significant fit at  $p < 0.05$ . Predictor: Non-entrepreneurship culture. Outcome Variable: Entrepreneurship barriers. LB = Lower bound; UB = Upper bound.

**Source:** Author

Hypothesis 4 stating that entrepreneurship culture predicts entrepreneurial intent was examined through simple linear regression analysis where bootstrapped confidence intervals were requested. Results are shown in Tables 9 and 10. The results reveal a low positive correlation between entrepreneurship culture and entrepreneurial intentions,  $r = 0.450$ . Furthermore, the results indicate that entrepreneurial culture explains, 20.3% of the variance in entrepreneurial intentions among learners,  $R^2 = 0.203$ . Entrepreneurial culture has a medium effect on entrepreneurial intentions as measured by Cohen's  $f^2$  derived as 0.255. The results also reveal that the model can be used to predict entrepreneurial intentions with success given an  $F$ -ratio = 31.022, and significant given  $p = 0.000$ .

**Table 9. Simple linear regression model fit and summary for entrepreneurship culture on entrepreneurship intentions**

Source	Regression	Residual	Total
df	1	122	123
Sum of squares	24.214	95.227	119.441
Mean of squares	24.214	0.781	
F Value	31.022		
Pr>F	0.000*		
<b>Model summary</b>			
R	0.450		
R <sup>2</sup>	0.203		
Adjusted R <sup>2</sup>	0.196		
Est. standard error	0.88349		

**Note:** \*Significant fit at  $p < 0.05$ . Predictors: Entrepreneurship culture. Outcome Variable: Entrepreneurship intent.

**Source:** Author

Results in Table 10 reveal parameter estimates of the model where  $b_0 = 2.038$  and  $b_1 = 0.293$ . The results further reveal that for every unit increase in entrepreneurial culture, there is a corresponding positive and significant increase in entrepreneurial intentions among learners equal to 0.293. Given this outcome, the study fails to reject the hypothesis stating that entrepreneurial culture predicts entrepreneurial intentions among learners.

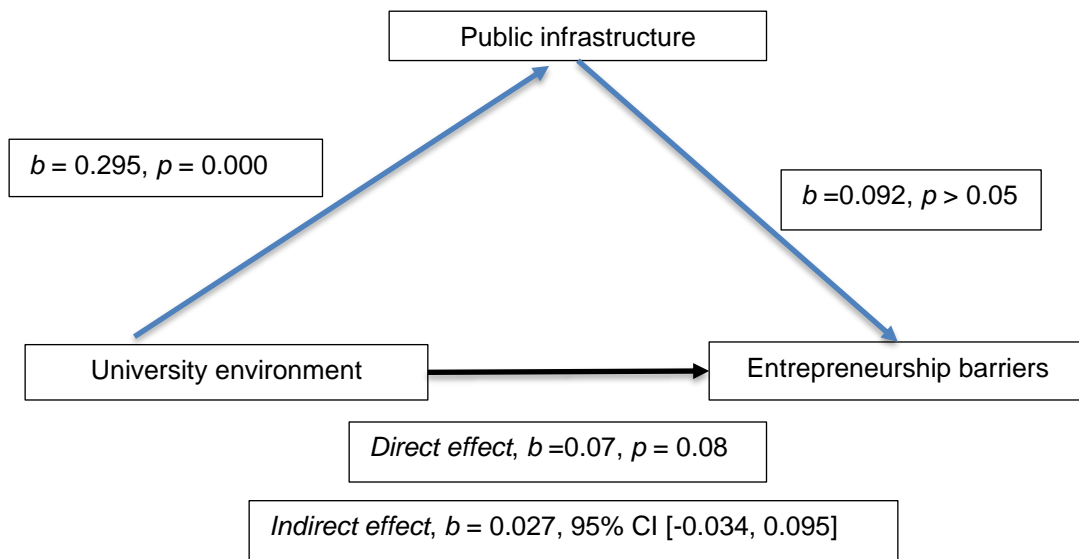
**Table 10. Parameter estimates for university environment on entrepreneurship intentions**

Parameter	B	Std error	Sig. (2-tailed)	BCa 95%
				LB & UB
Constant	2.038	0.521	0.001*	[1.012 – 2.950]
Entrepreneurship culture	0.293	0.069	0.001*	[0.164 – 0.434]

**Note:** \*Significant fit at  $p < 0.05$ . Predictor: Entrepreneurship culture. Outcome Variable: Entrepreneurship intent. LB = Lower bound; UB = Upper bound.

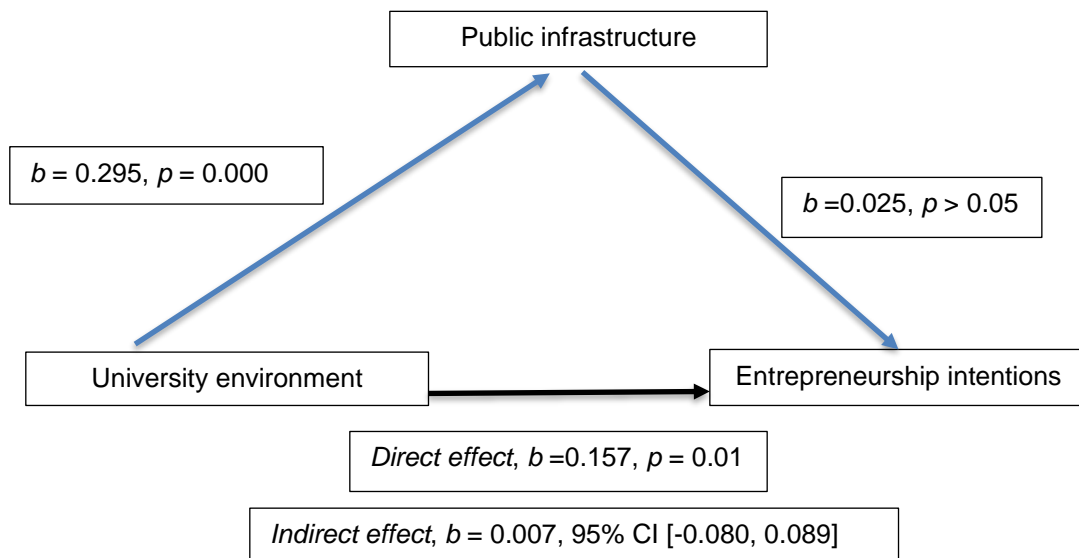
**Source:** Author

Hierarchical regression analysis was performed with respect to hypothesis 5 stating that the availability of public infrastructure mediates the relationship between the university environment that is not entrepreneurship oriented and entrepreneurial barriers among learners. Non-entrepreneurship oriented university environment was the predictor variable, while public infrastructure was the mediating variable and entrepreneurship barriers was the outcome variable. The results summarized in Figure 1 reveal that non entrepreneurship oriented university environment does not predict entrepreneurship barriers with public infrastructure in the model,  $b = 0.027$ , BCa CI [-0.034, 0.095]. Given this finding, we reject the hypothesis stating that the availability of public infrastructure mediates the relationship between the non-entrepreneurship oriented university environment and entrepreneurial barriers among learners.



**Figure 1. Model showing that public infrastructure does not mediate the relationship between university environment and entrepreneurship barriers among learners**  
Source: Author

The study further investigated whether the availability of public infrastructure mediates the relationship between an entrepreneurship oriented university environment and entrepreneurial intentions among learners. Hierarchical regression analysis was performed and the results are summed up in Figure 2. Results in Figure 2 reveal that there is a non-significant indirect effect of entrepreneurship oriented university environment on entrepreneurship intentions through public infrastructure,  $b = 0.007, \text{BCa CI } [-0.080, 0.089]$ . Given this finding, the study rejects the hypothesis stating that availing public infrastructure will result in an entrepreneurship oriented university environment having non-significant impact on entrepreneurship intentions among learners.



**Figure 2. Model showing that public infrastructure does not mediate the relationship between university environment and entrepreneurship intentions among learners**  
Source: Author

## 5. Discussion

Descriptive results revealed that entrepreneurship education is discipline based across the universities surveyed. Some disciplines are yet to offer entrepreneurship education as shown by 34% of the respondents, who indicated that entrepreneurship education was not part of their curriculum. Only 15% of the respondents revealed that they have entrepreneurship as a standalone module from first to third year level, while 54% indicated that they study entrepreneurship at third year making one of the exit modules. In some disciplines, entrepreneurship is studied as a chapter in a broader module as indicated by 31% of the respondents. Given that the goal of the Department of Higher Education and Training is wide entrepreneurship education, thus, the teaching of entrepreneurship across all disciplines, the study's results reveal a very big gap between the present and the desired future state. This gap calls for a different approach in curriculum design, research and teaching and learning if the goal of wide entrepreneurship education is to be achieved at all. Three key aspects have been identified by the research that could play a significant role revising the aforementioned with the goal of promoting entrepreneurship in the society namely, the university environment, culture, and public infrastructure.

The study looked at the impact of a university environment that is not entrepreneurship oriented on barriers to entrepreneurship and it was found that a university environment that is not entrepreneurship oriented explained 12.2% of the variance in entrepreneurship barriers among learners,  $R^2 = 0.122$ . More importantly, the measure of effect size revealed a medium effect, Cohen's  $f^2 = 0.139$ . Further, the study investigated the impact of an entrepreneurship university environment on entrepreneurship intentions. The findings revealed that an entrepreneurship oriented university environment explained 17.1% of the variance in entrepreneurship intentions among learners ( $R^2 = 0.171$ ), with a medium effect size as measured by Cohen's  $f^2 = 0.206$ . These results stress the importance of having a university environment that is conducive for the development of an entrepreneurship mindset among learners. This research provides evidence that a university environment that is not entrepreneurship oriented leads to learners highly perceiving entrepreneurial barriers but an entrepreneurial oriented university environment promotes entrepreneurship intentions among learners. Research also concurs to these findings, and points out that in an ecosystem that supports entrepreneurial activities, entrepreneurs will emerge given that the environment they find themselves in supports their actions (Audretsch and Belitski 2016; Carayannis *et al.* 2016).

The study also investigated the impact of non-entrepreneurial culture on university barriers and the impact of entrepreneurial on entrepreneurship intentions among learners. Literature pointed out that a person's values and beliefs play a significant role towards individual behavior. This study provides evidence that an individual who exhibits non-entrepreneurship culture perceived entrepreneurial barriers given  $R^2 = 0.20$ , meaning that non-entrepreneurship culture explained 20% of the variance in entrepreneurship barriers among learners. Further, the effect of non-entrepreneurship culture on entrepreneurial barriers was found to be medium, Cohen's  $f^2 = 0.25$ . The study also provided evidence that individuals who exhibit entrepreneurship culture are willing to set up their entrepreneurial ventures in the near future,  $R^2 = .203$ . This means that entrepreneurship culture explained 20.3% of the variance in entrepreneurship intentions of the learners. Entrepreneurship culture has a medium effect on entrepreneurship intentions given Cohen's  $f^2 = 0.255$ . Adekiye and Ibrahim (2016) found similar results pointing out that culture has a positive significant impact on entrepreneurship intentions among learners. The results of this study to a larger degree concur with theory. The aggregate psychological approach indicates that in a given society, the demonstration of entrepreneurship is determined by the number of individuals already exhibiting this behavior. Thus, the higher the number of entrepreneurs, the higher is the probability of a large cohort to follow a similar career path. The study's finding also concur with the dissatisfaction theory which point out that individuals who are not satisfied with their lives are more likely to perceive entrepreneurship as a viable career opportunity with the hope for a better future. The moral approval approach points out that individuals pursue entrepreneurship with the hope that when they succeed in this career path, they will be rewarded with status. The study's results, to a larger extent, support this notion. Individuals who exhibit

entrepreneurial intent are driven by many factors including rewards they are likely to enjoy when the venture succeed and status is one of such rewards.

The study provided evidence to reveal that non-entrepreneurship university environment insignificantly predicts entrepreneurial barriers when public infrastructure is factored in the model. This finding indicates that adequate access to public infrastructure has insignificant impact in an attempt to change individual perceptions towards entrepreneurial barriers if they are in university environment that is not supportive of entrepreneurial behavior. Thus, if we are to lower individual perceptions on entrepreneurial barriers, interventions mechanisms must target the university environment and make it more entrepreneurship friendly.

The study also revealed that public infrastructure does not mediate the relationship between an entrepreneurship oriented university environment and entrepreneurship intentions. In other words, increased access to public infrastructure predicts entrepreneurial intentions and adequate access to public infrastructure does not diminish the impact of an entrepreneurship-oriented university on the entrepreneurship intentions of learners. Given this finding, it is therefore correct to say, if entrepreneurial intentions of learners are to be enhanced, access to public infrastructure must be improved and the university environment must be pro entrepreneurial.

The major finding brought to light by this study is the gap that still exist as far as widespread entrepreneurial education is concerned across South African universities. In South Africa, if the goal of wide spread entrepreneurship education is to be achieved, there is a need to confront the resources gap between institutions of higher learning. As highlighted earlier, South African universities fall into two categories, that is, the well-resourced and poorly resourced universities as a result of the apartheid legacy. Although the government is battling to resolve this imbalance, its efforts have yielded little success (Govinder *et al.* 2013). The answer to this present challenge lies in collaboration and cooperation between the well-resourced and poorly resourced universities. According to Moore (1993), in a competitive world, organizations can increase their chances of success by co-evolving, developing skills and being innovative. The well-resourced South African institutions and their global partners are adopting an approach where they are no longer educating learners to understand or about entrepreneurship but to become entrepreneurs. In the process, their entrepreneurial ecosystem is getting better by the day while the poorly resourced universities continue to lag behind as they offer entrepreneurship education that is predominantly theoretical, with little benefits to the learner after graduation. By co-evolving, developing skills and through innovation, poorly resourced universities can overcome two major obstacles, that is, the unavailability of entrepreneurship educators and entrepreneurship friendly infrastructure. These are the key ingredients needed to transform the university environment to become more entrepreneurial oriented and positive in terms of entrepreneurial culture. In addition, when the mentioned approach is taken on board, there is a possibility of reaching strategic long lasting partnerships with private entities and government agencies that possess the needed infrastructure to nature and develop entrepreneurship skills in learners.

## 6. Conclusion

This study investigated four objectives, first of which is whether non-entrepreneurship oriented university environment predicts entrepreneurship barriers. The simple linear regression analysis results with respect to this objective revealed that this model was positive and significant. The second objective investigated whether entrepreneurship oriented university environment predict entrepreneurship intentions among learners. The simple linear regression analysis results revealed that the model was positive and significant. The third objective sought to determine whether public infrastructure mediated the relationship between non-entrepreneurship oriented university environment and entrepreneurship barriers. Hierarchical regression analysis results revealed that public infrastructure does not mediate the relationship between non-entrepreneurship oriented university environment and entrepreneurship barriers. Last, the study investigated whether public infrastructure mediated the relationship between entrepreneurship oriented university environment and the results revealed public infrastructure does not mediate the relationship. Given the study's finding, the study therefore concludes that to enhance entrepreneurship behavior among university learners, widespread entrepreneurship education



must be adopted. However, to ensure that widespread entrepreneurship is a success in South African universities, the resource gap should be addressed through co-evolving, development of skills and through innovation. Further, to enhance entrepreneurial behavior among learners, intervention mechanism must target the university environment, entrepreneurial culture, and access to public infrastructure.

Future research can focus on investigating the moderating role of public infrastructure on the relationship between entrepreneurially oriented university environment and entrepreneurship intentions as well as on the relationship between entrepreneurship culture and entrepreneurship intentions. That will answer questions such as what levels of public infrastructure will render the relationship between entrepreneurial oriented university environment and entrepreneurship intentions, and entrepreneurship culture and entrepreneurship intentions significant. The study's main limitation is that data was not collected from all South African universities. In addition, among the universities surveyed, the response rate was low.

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