



Going Down Memory Lane in the Application of Ajzen's Theory of Planned Behaviour Model to Measure Entrepreneurial Intention: An Sem-Pls Approach

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ABSTRACT

Undoubtedly, technical education is the backbone of every nation's growth and development. Understanding and predicting business creation initiatives demand empirical studies using theory-oriented models that appropriately mirror the multi-faceted perception-based processes underlying entrepreneurial intention and behaviour. Drawing on a model adapted from a study by Linan and Chen (2009), and based on the Theory of Planned Behaviour (TPB) by Ajzen, this article empirically investigates the influence of Perceived Behavioural Control, Subjective Norm and Attitude towards Entrepreneurship, on Entrepreneurial Intention using Structural Equation Modelling (SEM) – Smart Partial Least Square (PLS) approach. In addition, several hypotheses (demographic-oriented variables) in relation to TPB are investigated. Data were collected on 574 students from a public technical university in Ghana. The findings suggest that TPB is an important tool for predicting entrepreneurial intentions. Thus, the findings support the TPB for EI in Ghana. Two motivational factors (Attitude towards Entrepreneurship and Perceived Behavioural Control) related to EI, but SN showed a non-significant association with EI. This study also found SN positively affecting attitude toward entrepreneurship and perceived behavioural control. However, only one (PSE-SN relationship) of the demographic-based hypotheses was significant. This study, however, cautions against the generalizability of the findings as the sample size comprises of students from a single institution. One of the theoretical implications of our study relates to evidence of the consistency of the theory of planned behavior in explaining entrepreneurial intention in the Ghanaian context. Future studies could replicate this research by sampling more technical universities in Ghana and other settings.

Keywords: Entrepreneurial Intentions, Partial Least Square, Theory of Planned Behaviour

JEL Classification: MO

1. INTRODUCTION

Education is arguably an indispensable component in the knowledge-driven society (Schleicher, 2003). Quality education is also quintessential for technological advancement, creativity and innovation to the economic growth and development of any country. Ghana has reached a stage in its development where creativity and innovation have become imperative in propelling its industrialisation agenda for accelerated economic turnaround. For instance, target 4 of the Sustainable Development Goal (SDG)

4 seeks to substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship. Technical universities are expected to play an important role in the support of knowledge creation and knowledge transfer via science and technology, which is critical for the development and wellbeing of any country. This is particularly exemplified by the conversion of public polytechnics into technical universities in Ghana. These technical universities are expected to provide high-level technical skills training in the area of Technical and Vocational

Education and Training (TVET) as well as provide opportunities for technical and vocational students from the second cycle institutions. According to Lewin (1997) there are five justifications for governments' fixation and investment in TVET, which include; increasing the importance of schooling by imparting individuals with skills and knowledge required for making the individual an integral member of the community; curtailing the level of unemployment as a result of provision of employable skills to the youth and those who cannot excel academically; increasing economic development because it enhances the quality and skill level of the working population; reducing poverty by virtue of accessibility to higher-income occupations, and changing the attitude of individuals to opt for occupations that have prospects for the future.

TVET, as an integral part of the technical university concept, would provide employment avenues for the teeming youth who are seeking for non-existent white-collar jobs in the country after graduation. In the quest to address the challenge of unemployment, industrialisation, and labour utilisation, policy makers in Ghana perceive technical education as the policy instrument to promote social progress using entrepreneurship education. Furthermore, technical universities in Ghana are mandated to excel at both basic and applied research by positioning themselves strategically in the delivery of services like professional training, marketing of new knowledge, consultancy, career guidance and counselling, etc. An important theme that runs through the vision and mission of the technical universities in Ghana is entrepreneurship. The immense contribution of entrepreneurship to the fortune of global economies in the area of employment creation opportunities and economic development has necessitated the promotion of entrepreneurship as a topmost agenda for most nations across continents, especially Ghana.

However, there seem to be limited studies on the promotion of entrepreneurship in developing countries, since the attention of previous research on the promotion of entrepreneurship has been on developed countries (Bruton et al., 2008). According to Nabi and Linan (2013) little is known about the factors affecting entrepreneurial intention in developing countries. The knowledge and information about entrepreneurship in the advanced countries may not necessarily be applicable in developing countries due to perhaps diversity in cultural tendencies and other dynamics. This paper seeks to unravel the factors affecting the entrepreneurial intentions of students and offer some valuable insight into aspects of the technical education curriculum that empower students to be entrepreneurially-oriented. Over the years, policy makers and researchers have explored the factors affecting entrepreneurial intentions, given its immense socio-economic importance (Carree and Thurik, 2006). The tremendous significance of entrepreneurship in any nation's development probably accounts for the reason why the proponents of the technical education concept to situate entrepreneurial education as a focal point in the curriculum. Despite the interest in entrepreneurial intentions, there is scant evidence about entrepreneurial intentions in different entrepreneurship contexts, especially in developing countries like Ghana. Individuals with the intention to pursue a business are highly likely to carry it out (Ajzen 1991; Fishbein and Ajzen,

1975) and it is worth emphasising that examining entrepreneurial intention is an important strategy towards studying actual entrepreneurial behaviour. The most prevalently used theoretical framework in the area of entrepreneurial intention research is the Theory of Planned Behaviour (TPB), which conceptualises that the strength of intentions as an immediate antecedent of behaviour (Ajzen, 1991; 2002; 2019). Entrepreneurship education may nurture a student's attitudes and intentions, as well as the establishment of a new firm (Linan, 2008). According to the Global Entrepreneurship Monitor (2016), people that study entrepreneurship in school are more likely to be entrepreneurs compared to those without entrepreneurial knowledge.

The data obtained from 574 respondents is applied to test the robustness of Ajzen's (1991) TPB, using structural equation techniques to ascertain the existence of structural relationships. Prior studies on entrepreneurial intentions have used linear regression models (Chandler and Lyon, 2001) despite the limitation of biased results. Thus, this study will contribute to the illumination of a specific pattern of relationships among the intention antecedents in a developing country like Ghana where there seems to be a paucity of research on the theory of planned behavior. To our knowledge, this is the first study in which the robustness of the TPB is being tested using a technical university sample in the Ghanaian context. The main objective of this paper is to test and apply the TPB (Ajzen, 1991) to examine the entrepreneurial intention among Sunyani Technical University students. This will contextualize the contribution of the TPB and its applicability to the technical university system. Furthermore, an application of the TPB will help in a comparison with prior studies, of which the majority has taken place in developed countries. The findings of this study will go a long in evaluating the technical university concept and its implications for Ghana's educational system.

The structure of this article is as follows. After this introduction, we present a research model and hypotheses. Then we present the research methodology, data analysis and results, followed by the discussion and conclusions. We conclude with limitations of the study, theoretical and practical implications and directions for future research.

1.1. Sunyani Technical University in Context

Following Perez-Esparrells and Orduna-Malea (2018) we consider Technical Universities as all those universities that contain the words "technical," "technology" or "polytechnic" in their official institutional names. In the Ghanaian context, such institutions include those that focus on vocational training, engineering, business and other related courses.

Sunyani Technical University (STU) was established by the Technical Universities Act, 2016 Act 922. The history of the technical university dates back to the Sunyani Technical Institute in 1967 as a non-tertiary institution under the Ghana Education Service. It was subsequently upgraded to a Polytechnic in January 1997, following the passage of the Polytechnics Law of 1992 (P.N.D.C. L. 321) by the Government of Ghana as a Tertiary Institution of Education. This gave the institution the mandate to run the Higher National Diploma program as certified by the

National Board for Professional and Technician Examinations (NAPTEX) and accredited by the National Accreditation Board (NAB). The Technical Universities Act mandates the University to award certificates, diplomas, degrees and others subject to the approval of the Council. Sunyani Technical University as of 2015/2016 academic year offered six (6) Bachelor of Technology (B. Tech) programmes and fourteen (14) HND programmes and a total student population of 4992.

The mission of Sunyani Technical University is, "a public institution of higher learning that is committed to the provision of career-focused education in engineering, science and technology, technical and vocational, applied arts and related disciplines with hands-on experience and *entrepreneurial development* to meet the higher and middle-level manpower needs of the country" (Sunyani Technical University 5-year Strategic Plan).

The vision of STU is, "to become a top-notch Technical University for the provision of career-focused, practically-oriented and *entrepreneurially-inclined* higher and middle level manpower training for the socio-economic development of the Brong Ahafo region and Ghana as a whole."

The vision and mission statements of the university show the relevance of entrepreneurship as the focal point of the institution. In fact, Act 922 requires all Technical universities in Ghana to integrate the entrepreneurship curriculum.

2. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

Ajzen (2019) defines intentions as "a person's readiness to perform a given behavior." Entrepreneurial intention can be defined as conscious awareness and conviction by an individual to establish a new business venture and plan to do so in the future (e.g. Bird, 1988; Thompson, 2009). The route to starting a new firm may be regarded as voluntary with conscious intentionality. Arguably, intention has been perceived as the single most powerful predictor of entrepreneurial behavior (Autio et al., 2001; Krueger et al., 2000), and also an important dependent variable in its own right (Thompson, 2009).

According to the TPB, entrepreneurial intention indicates the effort that the person will make to discharge that entrepreneurial behavior. The TPB depicts the three motivational factors influencing behavior (Ajzen, 1991; Linan, 2004):

- Attitude toward start-up (personal attitude) refers to the extent to which one holds a positive or negative personal valuation about being an entrepreneur (Ajzen, 2001; Autio et al., 2001; Kolvereid, 1996b). Generally, the more favorable the attitude towards a behavior, the greater the intention to actualize that behavior
- Subjective norms (SNs) refer to the perceived social pressure to carry out or not to carry out entrepreneurial behaviours. Thus, the perception that "reference people" would approve of the decision to become an entrepreneur or not (Ajzen, 2001). SNs examine the sum of individuals' perceptions about how important people in their lives think about their engagement in

a particular behavior (e.g. starting an entrepreneurial venture). It has been found to be the weakest link of entrepreneurial intention in some studies (Almobaireek and Manolova, 2012; Krueger et al., 2000). However, a couple of other studies have professed that subjective norms influenced entrepreneurial intention (Iakovleva et al., 2011; Kautonen et al., 2013; Siu and Lo, 2011). Other empirical studies have found support for SN positively affecting antecedents of entrepreneurship intentions: attitude toward entrepreneurial behavior and perceived behavioural (Linan and Santos, 2007; Linan et al., 2011a; 2011b; Santos et al., 2014). Consistent with studies by Linan (2004), Linan and Chen (2009) and Linan et al. (2011), a probability of indirect effects of subjective norms on entrepreneurial intention is analysed in this paper, considering the controversy on the relationship. In this sense, there may be reasons to consider the relation SN has on both PA and PBC. Figure 1 exemplifies this notion

- Perceived behavioral control (PBC) is defined as the perception of the ease or difficulty of becoming an entrepreneur. In conceptual terms, there is no difference between perceived behavioural control and self-efficacy but operationally, PBC and SE are normally assessed differently. Both refer to people's beliefs that they are capable of performing a given behavior (Ajzen, 2019).

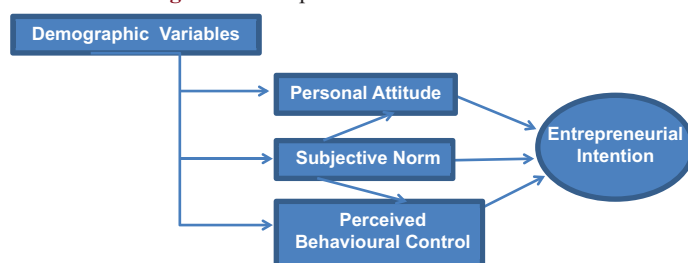
Prior studies have empirically applied the TPB to student's Entrepreneurial Intentions and confirmed that Attitude Towards Entrepreneurship, Subjective Norm and Perceived Behavioural all play significant roles (Iakovleva et al., 2011; Karimi et al., 2014; Krueger et al., 2000; Linan and Chen, 2009).

Of the three motivational antecedents in entrepreneurial intentions in the model (Figure 1), ATE and PBC have been shown to relate most strongly to not only EI (e.g. Karimi et al., 2014; Linan and Chen, 2009) but also on both personality factor (Fini et al., 2012; Nabi and Linan, 2013; Obschonka et al., 2010; Zhao et al., 2005) and contextual factors (Fini et al., 2012; Goethner et al., 2012). Previous studies on entrepreneurship (Fini et al., 2012; Goethner et al., 2012; Nabi and Linan, 2013) perceive subjective norms as less relevant than ATE and PBC for entrepreneurial intention because entrepreneurs can be generally characterized as more inward as opposed to outward and directed and thus less oriented towards social norms than non-entrepreneurs (Goethner et al., 2012).

2.1. Demographic Factors and Entrepreneurial Intentions

A plethora of studies have established the direct link between demographic variables and entrepreneurial intention (Boyd and

Figure 1: Entrepreneurial Intention Model



Vozikis, 1994; Gird and Bagaim, 2008; Lee and Wong, 2004; Malebana, 2014). Others have incorporated in the original theoretical TPB framework some demographic variables which are likely to have a given effect on intention, such as family background (e.g. parents), gender, past business, entrepreneurship and social and social experiences, entrepreneurship training and education (Davisson, 1995; Fayolle and Gailly, 2015; Guerrero et al., 2008; Kolvereid, 1996b; Krueger et al., 2000; Ozyilmaz, 2011; Tkachev and Kolvereid, 1999). These variables were found to indirectly affect intentions through their effect on ATB, SN and PBC (Kolvereid, 1996b; Solesvik, 2013; Tkachev and Kolvereid, 1999). ATB, SN, and PBC serve as mediating variables, hence information on them could be used to better assess the impact of demographic characteristics on entrepreneurial intention (Gird and Bagaim, 2008; Krueger et al., 2000; Tkachev and Kolvereid, 1999). Figure 1, depicts the model we will be using in our study which is similar to the TPB by Ajzen (2019) and applied by Autio et al. (2001), Linan and Chen (2009), Fayolle et al. (2006b), Kolvereid and Isaksen (2006), and Veciana et al. (2005). By virtue of past researches' inability to show a consistent impact of social norms on intentions, and for consistency with respect to our hypotheses we expect that social norms will mediate the effects of demographic factors on entrepreneurial intentions. For instance studies by Carsrud and Brannaback, (2011), Kolvereid and Isaksen (2006) and Conner and Armitage (1998) have all produced mixed results about social norms.

2.2. Entrepreneurship Education (EE) and Entrepreneurial Antecedents (EA)

Entrepreneurship education consists of "any pedagogical or process of education for entrepreneurial attitudes and skills" (Fayolle et al., 2006b. p.702).

According to Ajzen (2002), a greater knowledge of differential entrepreneurial aspects will definitely contribute to more realistic perceptions about entrepreneurial activity, thus indirectly influencing intentions. The role of entrepreneurship education in the generation of entrepreneurial behavior is gaining popularity in academic circles (Bae et al., 2014; Entrialgo and Iglesias, 2016; Fayolle and Gailly, 2015). In Ghana, the products of technical universities are expected to display a positive entrepreneurial propensity and disposition because of their exposure to entrepreneurial education. However, studies on EE and entrepreneurial antecedents have produced inconsistent results. For instance, Rauch and Hulsink (2015) and Souitaris et al. (2007) found a direct correlation between EE and attitudes and PBC, while studies conducted by Auken Van (2013) reported a negative association and Diaz-Casero et al. (2012) and do Paço et al. (2015) did not find any significant link.

The foregoing observations are the base of the following core and demographic hypothesis of the paper, as depicted in Table 1.

3. METHODS

This study examines the application of Ajzen's TPB model to measure entrepreneurial intention among STU students using an SEM-PLS approach.

Table 1: Hypotheses (Core and Demographic)

Description	
Core hypotheses	
Personal attitude positively influences entrepreneurial intention	PA → EI
Perceived behavioral control positively influences entrepreneurial intention	PBC → EI
Subjective norm positively influences entrepreneurial intention	SN → EI
Subjective norm positively influences personal attitude	SN → PA
Subjective norm positively influences perceived behavioral control	SN → PBC
Demographic hypotheses	
Gender positively influences ATE	
Gender positively influences SN	
Gender positively influences PBC	
PEE positively influences ATE	
PEE positively influences SN	
PEE positively influences PBC	
PSE positively influences ATE	
PSE positively influences SN	
PSE positively influences PBC	

3.1. Sample and Procedure

Participants in the study consisted of students from all the four faculties of the Sunyani Technical University namely, the Faculty of Applied Science and Technology, Faculty of Built Environment and Applied Art, Faculty of Business and Management Studies and Faculty of Engineering. University students constitute a common sampling frame in entrepreneurship research (Almobaireek and Manolova, 2012; Autio et al., 2001; Fayolle et al., 2006b; Kolvereid, 1996b; Krueger et al., 2000; Linan and Chen, 2009; Moriano et al., 2012; Tkachev and Kolvereid, 1999; Kautonen et al., 2013; Siu and Lo, 2011; Veciana et al., 2005). According to Linan and Chen (2009), a sample of university students offers the advantage of similar age and qualifications, which promotes homogeneity. Reynolds et al. (2002) established that university graduates between the ages of 25 and 34 show the highest propensity toward starting a business. Data were collected via paper and pencil close-ended questionnaire which was designed in order to measure those variables that have an impact on entrepreneurial intentions. Questionnaires were administered in class, with prior permission from the lecturer. Students were briefed on the purpose of the study by a member of the research team and then asked to voluntarily fill the questionnaire. All questionnaires were completed anonymously to ensure confidentiality.

3.2. Measures

The survey is structured by a series of close-ended questions in which varied block of statements are subjectively valued on a Likert-type scale concerning entrepreneurial intention. The 5-point Likert-type on which the items were belt on are; 5 = strongly agree, 4 = agree, 3 = neither agree nor disagree, 2 = disagree, 1 = strongly disagree. Four core variables were used in this direction: PBC, SN, ATE and EI. A range of variables were measured including: age, gender, participation in entrepreneurial education, parental self-employment.

Entrepreneurial intention was measured with three items and based on the proposals of Autio, et al. (2001), Linan and Chen (2009),

Miranda et al. (2017). Miranda et al. (2017)'s Cronbach Alpha was 0.891. The Cronbach Alpha value for Entrepreneurial Intention in this study is 0.791 as depicted in Table 2.

Attitude towards Entrepreneurship was measured with an adapted questionnaire by Kolvereid (1996). The Cronbach Alpha value for Attitude towards Entrepreneurship is 0.680 as depicted in Table 2, compared to Kolvereid's (1996) values which ranged from 0.68 to 0.90, though he used a 7-point Likert-type scale.

Subjective Norm was measured based on previous studies by Kolvereid (1996), Krueger et al. (2000), Obschonka et al. (2015). Miranda et al. (2017)'s Cronbach Alpha was 0.819. Autio et al. (2001) reported a Cronbach's alpha value of 0.70. The Cronbach Alpha value for Subjective Norm is 0.698 as depicted in Table 2.

PBC was measured with four items and based on the proposals of Autio, et al. (2001). The Cronbach Alpha value for PBC is 0.553 as depicted in Table 2.

4. RESULTS

4.1. Profile of Respondents

A total of 574 respondents completed the questionnaire and were subjected to analysis, of which 78.2% were males and 21.8% were females. In terms of Educational Background of Respondents' parents, 25.3% ticked No formal education, 16.9% for Secondary school, 25.8% for University or higher education, 15.3% for Below high school, 10.3% for Technical and Vocational education and Not Applicable was 6.4%. With respect to programme or department 5.9% are from Secretaryship and Management Studies, 6.6% from Accountancy, 11.8% from Computer Science, 14.5% from Electrical Engineering, 24.9% from Building Technology, 7.7% from Marketing, 13.2% from Procurement and Supply Chain Management, 6.6% from General Agriculture, 5.1% from Civil Engineering, and 3.7% from Mechanical Engineering. With regard to studying entrepreneurship course, 74.2% said No, they have not previously taken a class in entrepreneurship as opposed to 25.8%

who said YES. With reference to age, 51.2% fall in the 20–24 age category and 37.3% fall into the 25-29 age category. In connection with the year or level of the respondents, 48.3% were in the 1st year, 26.3% in the 2nd year and 25.4% were in the 3rd year. Vis-a-vis, parental self-employment, 65.9% responded YES whereas 34.1% indicated NO. On the subject of whether they have plans to be self-employed in the foreseeable future after graduation, an overwhelming percentage of 79.8 affirmed YES whereas 20.2% responded NO. With respect to religion, 82.8% were Christians and 16.2% were Moslems.

4.2. Partial Least Squares

According to Hair et al. (2010) a two-dimensional process can be applied for structural equation modelling (SEM): an

- Assessment of the proposed measurement model and
- Assessment of the structural model. This process ensures the constructs' measures are valid and reliable before attempting to draw conclusions regarding any relationships among constructs (Barclay et al., 1995).

The theoretical framework presented in Figure 1 was tested using Partial Least Squares (PLS), a multivariate analysis technique for testing structural models (Barroso et al., 2010). PLS also allows assessment of the reliability and validity the of measure of theoretical constructs and estimation of the relationships among these constructs (Barclay et al., 1995). According to Wold (1985), the PLS is basically intended for causal-predictive analysis, where the problems explored are complex and prior theoretical knowledge is scarce. Concerning our study, little is known about the application of TPB in the technical university context, hence PLS is a suitable technique to use in this research. PLS is robust for small to moderate sample sizes (Cassel et al., 1999) which makes it appropriate for this study. Lee and Tsang (2001) posit that this technique has been applied in numerous researches developed recently in the entrepreneurship discipline. According to Rigdon (1998) SEM has taken an important centre stage within the academic literature of many disciplines. Currently, SEM is the preferred methodology among researchers in assessing the relationship between constructs such as intention, attitude, satisfaction and role ambiguity. Since SEM is intended for working with manifold related equations simultaneously, it has a number of advantages over some more familiar methods, hence gives a general framework for linear modeling (Monecke and Leisch, 2012). According to the framework for this study, demographic variables will exert a direct influence on entrepreneurial antecedents. Therefore some variables are captured as explaining ATE, SN and PBC. The demographic variables; Gender, Participation in Entrepreneurial Education and Parental Self-Employment) are dichotomous in nature. The statistical analysis conducted using SMART PLS 3.0. The initial model to be tested is presented in Figure 1.

4.3. Measurement Model

Assessing the measurement model for the reflective indicator in PLS is based on individual item reliability, construct reliability, average variance extracted analysis and discriminant validity. Individual item reliability is considered adequate when an item has a factor loading greater than 0.707 on its respective construct.

Table 2: Full-sample measurement model (reliability indicators)

Construct/ Indicator	Loadings	Composite reliability	AVE	Cronbach's alpha
ATE		0.862	0.758	0.680
ATE1	0.880			
ATE2	0.860			
EI		0.878	0.706	0.791
EI 1	0.829			
EI 2	0.818			
EI 3	0.872			
Gender		1.000	1.000	1.000
PBC		0.814	0.687	0.553
PBC 1	0.881			
PBC 2	0.774			
PEE		1.000	1.000	1.000
PSE		1.000	1.000	1.000
SN		0.831	0.622	0.698
SN 1	0.725			
SN 2	0.798			
SN 3	0.839			

This means more shared variance between the construct and its measures than error variance. In this study, the reflective indicators have loadings above or very near 0.7 (Table 2: Outer Loadings).

Construct Reliability was assessed using a measure of internal consistency: Composite Reliability (rc). We interpreted this value using the rules offered by Nunnally (1978), who suggest 0.7 as a benchmark for a “modest” reliability applicable in the initial stages of research. In this study, both the construct and reflective dimensions are reliable (Table 2).

The Average Variance Extracted quantifies the amount of variance that a construct captures from its manifest indicators relative to the amount due to measurement error (Chin, 1998). The Average variance extracted value should be greater than 0.50. This means that 50% or more variance of the indicators should be accounted for. Consistent with this rule, the average variance extracted measures for the common latent variables for this study are greater than 0.580 (Table 2).

In order to assess Discriminant Validity, Average Variance Extracted should be greater than the variance shared between the construct and other constructs in the model (i.e. the squared correlation between two constructs). For adequate discriminant validity, the diagonal elements should be significantly greater than the off-diagonal elements in the corresponding rows and columns (Barclay et al., 1995). This condition is met as depicted in Table 3.

4.4. Explanation of Target Endogenous Variable Variance

The coefficient of determination R² is 0.442 for the EI endogenous latent variable. This implies that the three latent variables

(ATE, SN and PBC) moderately explain 44.2% of the variance in EI as shown below.

R Square	
ATE	0.089
EI	0.442
PBC	0.127
SN	0.030

4.5. Coefficient of Determination (R²)

A major part of structural model evaluation is the assessment of the coefficient of determination (R²). In this study, EI is the main construct of interest. From the PLS Path model estimation diagram (Figure 2), the overall R² is found to be relatively good. A threshold value of 0.25, 0.5 and 0.7 are often used to describe a weak, moderate and strong coefficient of determination (Hair et al., 2013). In our case, it suggests that the three constructs ATE, SN and PBC can jointly explain 44.2% of the variance of the endogenous construct EI.

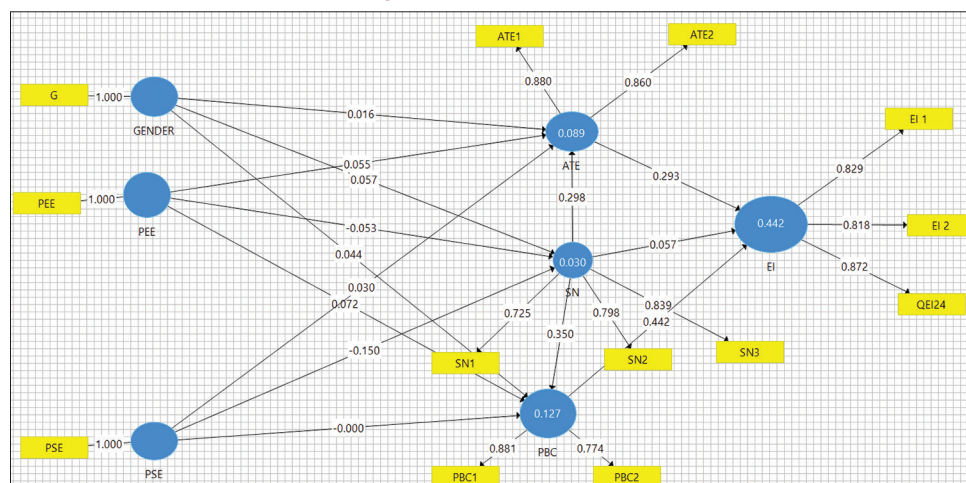
4.6. Indicator Reliability

After examining the outer loadings for all latent variables, one indicator that formed the ATE was removed because its outer loading was smaller than the 0.4 threshold level (Hair et al., 2013). Meanwhile, five indicators (ATE10, ATE11, ATE12, PBC18 and PBC19) were found to have loadings between 0.4 and 0.7. A loading relevance test is therefore performed for these 5 indicators to check if they should be retained in the model. In a loading relevance test, problematic indicators should be deleted only if their removal from the PLS model leads to an increase of AVE and Composite Reliability of their constructs over the 0.5 thresholds. As the elimination of these 5 indicators would result in an increase of AVE and composite reliability of their respective latent construct, they are removed from the PLS model. The remaining indicators are retained because their outer loadings are all 0.7 or higher. An indicator's outer loading should be 0.708 or above since that number squared (0.708²) equals 0.50, meaning the latent variable should be able to explain at least 50% of each indicator's variance. The PLS algorithm is re-run and the resulting path model estimation is presented in Figure 2. The outer loadings of various constructs are shown in Table 2.

Table 3: Discriminant validity

	ATE	EI	Gender	PBC	PEE	PSE	SN
ATE	0.870						
EI	0.533	0.840					
Gender	0.027	0.032	1.000				
PBC	0.506	0.610	0.056	0.829			
PEE	0.034	0.042	-0.133	0.042	1.000		
PSE	-0.012	0.055	0.012	-0.049	0.055	1.000	
SN	0.291	0.296	0.062	0.348	-0.069	-0.152	0.789

Figure 2: PLS-SEM results



4.7. Internal Consistency Reliability

The Composite Reliability for the constructs ATE, SN, PBC and EI are shown to be 0.862, 0.831, 0.814 and 0.878 respectively (Table 2), indicating high levels of internal consistency reliability (Nunnally and Bernstein, 1994). Prior research suggests that a threshold level of 0.60 or higher is required to demonstrate satisfactory composite reliability in an exploratory study (Bagozzi and Yi, 1988) but not exceeding the 0.95 level (Hair et al., 2013).

4.8. Convergent Validity

To check convergent validity, each latent variable's AVE is evaluated. The AVE of the constructs ATE, SN, PBC and EI are shown to be 0.758, 0.622, 0.687 and 0.706 respectively (Table 2). It is found that all of the AVE values are greater than the acceptable threshold of 0.5, so convergent validity is confirmed.

4.9. Discriminant Validity

Fornell and Larcker (1981) suggest that the square root of AVE in each latent variable can be used to establish discriminant validity, assuming this value is larger than other correlation values among the latent variables. Table 3 clearly shows that discriminant validity is met for this study because the square root of ATE, SN, PBC and EI are much larger than the *r* corresponding LVC. It should be noted that the AVE values are shown on the diagonal and printed in bold; non –diagonal elements are the latent variable correlations (LVC).

4.10. Evaluation of the Structural Model in PLS-SEM: Collinearity Assessment

In addition to checking the measurement model, the structural model has to be appropriately evaluated before drawing any conclusion. Collinearity is a potential issue in the structural model and that variance inflation factor (VIF) value of 5 or above typically indicates such a problem (Hair et al., 2011). The collinearity assessment results are summarized in Tables 4 and 5. It can be observed that all VIF values are lower than 5, signifying that there is no indicative collinearity between each set of predictor variables.

4.11. Checking Structural Path Significance in Bootstrapping

Using a two-tailed t-test with a significance level of 5%, the path coefficient is significant if the T-statistics is larger than 1.96. In this paper it can be observed that only the SN – EI linkage (1.462) is not significant as depicted in Table 6; referring to the core hypotheses. Figure 3 shows the variance explained (R²) in the dependent constructs and the path coefficients (b) for the model. Consistent with Chin (1998), bootstrapping (500 re-samples) was used to generate standard errors and t-statistics. Bootstrap represents a non-parametric approach for estimating the accuracy of PLS estimation. This helps in the assessment of the statistical significance of the path coefficients. Four out of our five core hypotheses were supported since these exceed the minimum level prescribed by a Student's t-distribution with one tail and n-1 (n = number of re-samples) degrees of freedom (Table 7). H3 was not supported. This shows that SN is not a significant antecedent variable of EI. The model seems to have an appropriate predictive power for the dependent variable (Figure 3). Hence EI attains a

Table 4: Outer VIF value

Items	VIF
Gender	1.000
ATE1	1.362
ATE2	1.362
EI1	1.604
EI2	1.622
EI3	1.893
PBC1	1.171
PBC2	1.171
PEE	1.000
PSE	1.000
SN1	1.291
SN2	1.407
SN3	1.408

Table 5: Inner VIF values

	ATE	EI	Gender	PBC	PSE	SN
ATE		1.372				
EI						
Gender	1.022			1.022		1.018
PBC		1.429				
PEE	1.024			1.024		
PSE	1.026			1.026		1.003
SN	1.031	1.161		1.031		

moderate explained variance figure (0.442). As may be observed, the model is generally supported by this analysis, with the only exception of subjective norm-intention relationship. Therefore, hypotheses 1 and 2 are confirmed, whereas hypothesis 3 is not. It has been argued earlier that the main influence of SN would be exerted through its effects on PA and PBC. Hypotheses 4 and 5 were intended to test this possibility. They have been fully supported since both paths are significant. Demographic variables have relatively small significant effects on the antecedents of entrepreneurial intention and in general, they are small in magnitude. Only the effect of PSE on SN is significant. The model explains 44.2% of the variance in entrepreneurial intention based on SN, ATE and PBC. This result is satisfactory since most previous research using linear models typically explain <40%.

The effect size is assessed with a tool known as F Square indicated in Table 6 and Figure 4. Following Cohen (1988) an F Square value of above 0.35 is considered large effect size; values ranging from 0.15 to 0.35 are medium effect size; values between 0.02 and 0.15 is considered small effect and values <0.02 are considered NO effect size. From Figure 4 it can be observed that the PBC-EI relationship is the highest i.e. 0.245. As can be inferred from the other relationship (i.e. SN-ATE, SN-PBC, PSE-SN and ATE-EI), their P-values were significant but going by the F Square rule, their significant effect is not a meaningful one. Regardless, the model has successfully explained more than 40% of the variance of entrepreneurial intention.

5. DISCUSSION

Based on the findings presented in this article, support for the entrepreneurial intention model can be professed. The applicability of the TPB to entrepreneurship has received wide empirical

Figure 3: Boost rapping run

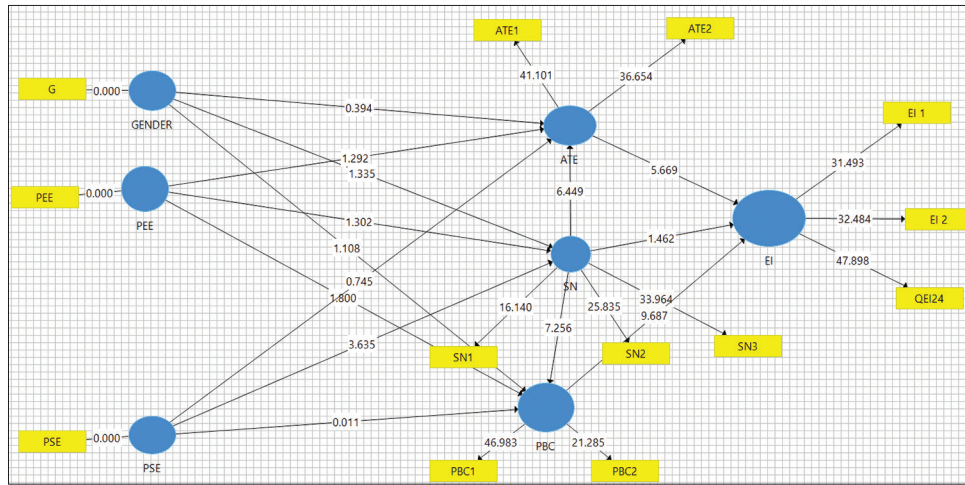


Figure 4: F square

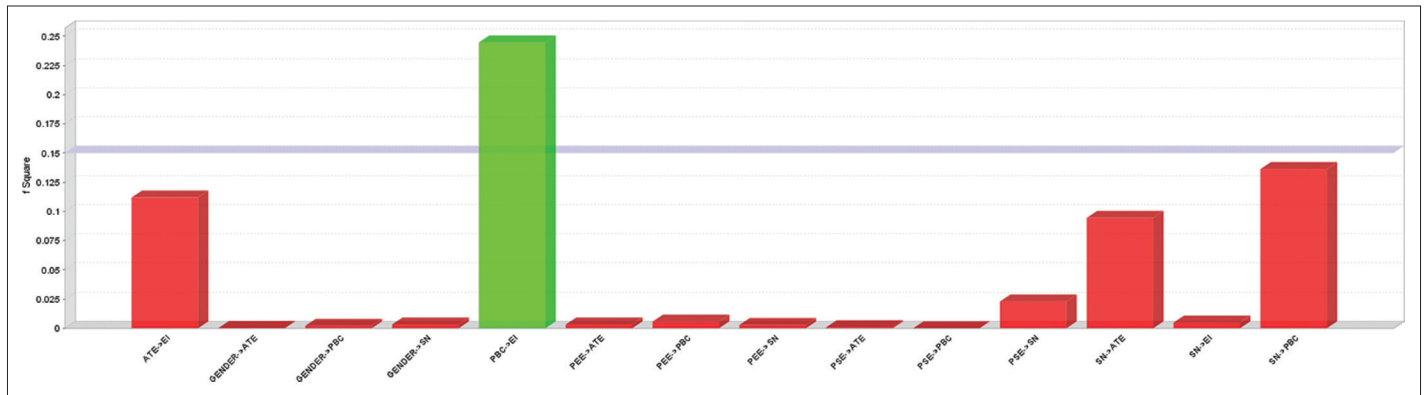


Table 6: F square

	ATE	EI	Gender	PBC	PEE	PSE	SN
ATE		0.112					
EI							
Gender	0.000			0.002			0.003
PBC		0.245					
PEE	0.003			0.006			0.003
PSE	0.001			0.000			0.023
SN	0.095	0.005		0.136			

support over the years (Kolvereid and Isaksen, 2006). Generally, the results are satisfactory since most of the core hypotheses have been confirmed and the explained variance is moderately high (44.2%), compared to prior studies. In particular, 4 out of the 5 core-model relationships were significant. SN would exert its influence on both ATE and PBC (which in turn explain intention), but not significant on entrepreneurial intention.

According to Wyrwich (2015) socialization in a family of entrepreneurs enhances the development of positive values and attitudes towards entrepreneurship. Role models (e.g. parents) can be an influential force on PBC regarding the start-up of a business because wards can learn certain skills and behavior essential for an entrepreneurial venture by observing their role models or parents (Zellweger et al., 2011), which has the propensity to increase PBC. According to Lazear (2005) individuals with a balanced set of skills provided by entrepreneurial

education should possess a higher likelihood of being self-employed. The existence of direct relationships between demographic variables and entrepreneurial intention was tested, with all but one showing a non-significant relationship.

The results reveal that SN is not only insignificant but also the weakest link of entrepreneurial intention which is consistent with previous studies (Autio et al., 2001; Linan and Chen, 2009; Krueger et al., 2000). However, the results confirm previous empirical studies that found support for SN positively affecting antecedents of entrepreneurship intentions: attitude toward entrepreneurial behavior and perceived behavioural control (Linan and Chen, 2009; Mathews and Moser, 1996; Scherer et al., 1991). It is relevant to note that hypotheses 1, 2, 4 and 5 are confirmed hence, the robustness of the model seems to be confirmed. In fact, the research findings have shown that SN exerts influence on both ATE and PBC, which is consistent with previous studies (Linan, 2004; Linan and Chen, 2009). Thus the findings are in line with previous studies concerning the application of TPB as an important model in predicting entrepreneurial intentions of students (Engle et al., 2010; Gird and Bagaim, 2008; Iakovleva et al., 2011; Luthje and Franke, 2003; Souitaris et al., 2007). Previous testing of the TPB in the entrepreneurial research suggested that ATE, SN and PBC typically explain 30-45% of the variance in intentions (Linan and Chen, 2009; Sutton, 1998). Contrary to most studies portraying ATE to be the strongest predictor of EI (Linan and Chen, 2009;

Table 7: Structural model results

Construct	(O)	(M)	STDEV	T statistics	P-values	Hypothesis
PBC -> EI	0.442	0.441	0.046	9.687	0.000	Accept
SN -> PBC	0.350	0.352	0.048	7.256	0.000	Accept
SN -> ATE	0.298	0.300	0.046	6.449	0.000	Accept
ATE -> EI	0.293	0.294	0.052	5.669	0.000	Accept
PEE -> PBC	0.072	0.073	0.040	1.800	0.072	Reject
GENDER -> SN	0.057	0.057	0.043	1.335	0.182	Reject
SN -> EI	0.057	0.058	0.039	1.462	0.144	Reject
PEE -> ATE	0.055	0.055	0.043	1.292	0.196	Reject
GENDER -> PBC	0.044	0.044	0.040	1.108	0.268	Reject
PSE -> ATE	0.030	0.031	0.040	0.745	0.457	Reject
GENDER -> ATE	0.016	0.016	0.040	0.394	0.694	Reject
PSE -> PBC	-0.000	0.001	0.041	0.011	0.992	Reject
PEE -> SN	-0.053	-0.053	0.041	1.302	0.193	Reject
PSE -> SN	-0.150	-0.150	0.041	3.635	0.000	Accept

(O): Original sample, (M): Sample mean, STDEV: Standard deviation

Nabi and Linan, 2013), our study found PBC to be the strongest predictor of EI, which is consistent with a study by Karimi et al. (2017). In fact Schlaegel and Koenig (2014) meta-analysis study found strong SN-EI and ATE-EI relationships. These differences may be attributed to cultural differences. Besides, the turbulent economic conditions, political climate and self-efficacy can impact on entrepreneurial intention and behavior.

6. CONCLUSION

Taking into consideration TPB, three variables that make up this model were analysed: ATE, PBC and SN. The findings suggest that TPB is an important tool for predicting entrepreneurial intentions. However, the subjective norm predictor was not upheld as an antecedent of entrepreneurial intention. The importance of support from family, friends and other social groups fall in a state of limbo with respect to entrepreneurial intention. However, the other two antecedents of entrepreneurial intention (ATE and PBC) were validated, hence stakeholders in the technical universities should take the lead in preparing graduate for the changing needs of the job market by inculcating in them the 21st century skills such as TVET, critical and creative thinking and problem-solving skills.

6.1. Limitations of the Study

One limitation of this study was the structural equations, which assume linearity of relationships between latent variables (Hair et al., 1998).

Secondly, as the study was carried out in a particular geographical context (Ghana), we must be cautious in the generalization of the results to include other jurisdictions. Besides, the generalizability of the findings may be constrained by the sample which comprises students from a single technical university. The potential for bias prevails inasmuch as the sample respondents may have had an intrinsically high orientation towards entrepreneurship. Therefore, there is a need to examine a more diverse population of students.

Moreover, the study is cross-sectional, hence we cannot claim causality in any of the relationships. For this reason, we have emphasized that the results support our hypotheses, but we cannot optimistically suggest that the causal correlations are as proffered until a longitudinal study is carried out.

Furthermore, the focus of this study is on the intention rather than on actual start-up decisions. A caveat is that there could be a gap between students' entrepreneurial intention and actual action. Entrepreneurial intention is only assessed at the current point in time, hence we are not certain that students' entrepreneurial intention may or may not be altered in the future, bearing in mind that a successful formulation of dreams or intentions may not necessarily lead to successful implementation.

6.2. Theoretical and Practical Implications

In spite of its limitations, this paper demonstrates some theoretical and practical implications. The theoretical implications of our study relate to evidence of the consistency of the theory of planned behavior in explaining entrepreneurial intention in the Ghanaian context. The robustness of entrepreneurial antecedents of the TPB was shown by the STU students. One of the reasons for the conversion of some polytechnics to technical universities is to promote entrepreneurship among the students, where unemployment is relatively high. Our knowledge of the antecedents of entrepreneurial intention and the factors affecting these antecedents is critical in the promotion of entrepreneurship among the technical university students. In view of this technical and vocational training programmes can be designed to change the mentality and attitudes of the students. There should be pragmatic measures to pull the students from the conventional career mentality to an entrepreneurial orientation by probably exposing them to entrepreneurial role models, a strong entrepreneurial culture, and the institution of an enabling environment among others. Another key proposition of the technical university concept is university-industry collaboration. In this current dispensation, educational institution of higher learning cannot afford to operate in isolation, hence they should collaborate with industry, community and government. Fortunately, this is one of the key ingredients in the technical university model, in which the students, lecturers and other stakeholders are expected to liaise with industry. In fact prominent among the aims of technical universities in Ghana is to remain focused on the application of Competency-Based Training to all teaching staff.

6.3. Directions for Future Research

Taking into consideration both the conclusions and the limitations of this paper, we propose the following lines of future research.

This paper used cross-sectional data, though the variables under consideration shape a process that develops over time and whose impacts are only embraced in the long run. Future studies might delve into a longitudinal study that implements measures at different times to test the correlation in the framework. Furthermore, future research is needed to test the generalization of the findings, by covering more technical universities in Ghana and if possible beyond the boundaries of Ghana.

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