



Research article

Entrepreneurial training effectiveness, government entrepreneurial supports and venturing of TVET students into IT related entrepreneurship – An indirect-path effects analysis



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ABSTRACT

Over the periods of 2015–2018 there have been declining trends for Nigeria in Global Entrepreneurship Index (GEI) signifying a major challenge to its entrepreneurship development. To understand some of the explanatory variables for this phenomenon Theory of Planned Behavior (TPB) was deployed and extended to examine indirect effects of entrepreneurial training effectiveness and government entrepreneurial supports on the Technical and Vocational Education and Training (TVET) students venturing intention into IT related entrepreneurship through attitude and perceived behavioral control for gaining insights to address the aforesaid challenge. Quantitative approach was employed through data collected from sampled TVET students which was analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM). The result supports all the hypothesized indirect-path effects. It implied that naturally built attitude and behavioral control alone cannot influence TVET students venturing intention; it needs enhancement through effective entrepreneurial training and government entrepreneurial supports. The research opens new research paradigm for studying the antecedents of the original determinants of intention through indirect path analyses. Applying these findings can reduce the reliance on public sector for employment. It could equally create jobs that could reduce societal crisis through employment into privately owned businesses.

1. Introduction

Over the periods, there have been declining trends for Nigeria in Global Entrepreneurship Index (GEI). Data from Global Entrepreneurship and Development Institute showed that the country's index declined from 28.90% in 2015, 28.10% in 2016, 19.85% in 2017 to 19.75% in 2018, which implied a negative trend of -2.77 %, -29.34 % and -0.54 % for 2016, 2017 and 2018. On the other hand, the level of unemployment in the country has been worsening. It was asserted unemployment has risen to 21.1% in 2010 (Aiyedogbon & Ohwofasa, 2012), and 23.9% in 2016 and Nigeria was ranked 165th nation with high level of unemployment in the world (CIA, 2016). The recent report by the National Bureau of Statistics also confirmed that unemployment in the country is soaring upwards as the country records an unemployment rate of 27.1% in the second quarter of 2020 (National Bureau of Statistics, 2020). Therefore, it could be possible as result of the above scenario; which means that the decline in entrepreneurship could result in unemployment considering that public sector which is mostly relied upon could not provide the

required employment opportunities for teeming graduates in Nigeria (Ngege, 2020). subsequently, employment opportunities could be much more expected from small businesses (Ajuwon et al., 2017).

One of the strategies developed by the Nigerian government to promote entrepreneurship was the introduction of entrepreneurship courses in tertiary institutions, including TVET institutions (Agboola, 2010). TVET program has been designed to provide practical skills, attitudes, knowledge and understandings of technology and related sciences for self-reliance (UNESCO, 2012). However, ineffectiveness has been reported in such training programs (Fiala, 2014). An effective entrepreneurial training should be in relation to teaching modern entrepreneurship skills relevant to IT; the one that will give sufficient opportunities to learn and practice the IT skills so as to enable students to transform the knowledge acquired into practical entrepreneurship ventures (Rafukka et al., 2013). While this is the expectation, however, training programs are ineffective in developing countries (Fiala, 2014). Difference exists between the practical skill being taught and the requisite skills for the job market (Dasmani, 2011), short supply of training

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materials (Islam and Mia, 2007). In Nigeria, most of training programs are inadequate in content and ineffective in training methodology (Iboko, 1976). Additionally, some schools lack electric power supply to use in their workshops which make it difficult to gain practical experience (Odo et al., 2012). A study of Rafukka et al. (2013) revealed that TVET's training has been ineffective due to some problems such as instructional/workshop attendants, women under-representation among instructional staff, lack of constant supply of electricity to the instructional rooms, and poor awareness for youth about the TVET programme. There is also failure of the curriculum content to motivate entrepreneurial actions and provide real life simulations of the process of entrepreneurship (Maxwell et al., 2018). This ineffectiveness in training could have a negative impact on attitudes and behavioral control towards entrepreneurship, and eventually venturing intention by the concerned students.

Another issue of concern with respect to developing countries such as Nigeria is government entrepreneurial supports particularly in the provision for finances and designing favorable policies. It was concluded that training alone even when it is effective could not work alone until it is paired with other interventions. Therefore, one of such important aspect to pair with is microfinance or provision of capital, which make trainee to use good skills they learned (Fiala 2014). In Nigeria, efforts have been made in providing many forms of funding supports for young individuals to supports their entrepreneurial aspirations such as Youth Empowerment Development Initiative (YADI), Young Entrepreneurs of Nigeria (YEN) and Nigeria Youth Investment Fund (NYIF). However, despite the existence of several government entrepreneurial support programs, studies reported ineffectiveness in the operation of entrepreneurship support agencies in Nigeria (Abioye et al., 2017). This could be possible due to population challenges, because it will be difficult for these supports services to satisfy the teeming young potential entrepreneurs in the country. Therefore, these possible inadequacies and predicaments in the country may adversely affects attitudes and behavioral control of the students towards entrepreneurship, and eventually venturing intention into IT related entrepreneurship. The fact is that government support has been an important variable with regards to entrepreneurship development not only in Nigeria but among many developing countries including those in Gulf region (Saber and Hamdan, 2019).

Literature documents that the proponents for TPB suggest for its expansion so as to gain more understanding on factors influencing intention, and subsequently behavior (Ajzen, 1991; Trivedi et al., 2005). Thus, several studies answered this call within the field of entrepreneurship (Sabah, 2016; Wibowo, 2019; Alam et al., 2019). One of the important aspect in this regard indirect effect of additional variables through the mediation role of TPB variables. In this, Liñán et al. (2013: 76) argued that some external variables could have indirect effect on intention through the mediation role of TPB variables. Thus, Malebana (2017: 76) stated that entrepreneurial support could influence entrepreneurial intention through attitude, and Nowiński et al. (2020) validated this claim through empirical evidence, but known considered the mediated model of entrepreneurship training effectiveness and government entrepreneurial support through attitude and behavioral control to influence venturing intention into IT-related entrepreneurship despite the possible role entrepreneurship training effectiveness and government entrepreneurial support as highlighted above. Hence, the need to deploy and expand TPB to gain insights on how training effectiveness and government entrepreneurial supports could contribute towards venturing intention of TVET's students into IT related entrepreneurship which could eventually create jobs and reduce unemployment.

The motivation of this paper is fourfold. First, despite declining trends in Nigeria's Entrepreneurship Index for the number of years couple with the ineffectiveness in TVET training and government entrepreneurial supports, empirical evidences are lacking with respect to the influence of these variables on venturing intention. Secondly, though there is exhaustive application of TPB in many countries such as Pakistan (Alam et al., 2019), South Africa (Malebana, 2017), Spain and Britain (Liñán

et al., 2013), this study tends to further depict the continued relevance of this theory in developing countries due to their peculiarities compared with advanced nations through indirect effects analysis. The dimension taken in this paper has made this study different from the previous ones. Third, even among the developed nations, no existing study to the best of the researcher's knowledge has ever modeled the indirect path effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports through the mediation of attitudes and behavioral control on the venturing intention into IT related entrepreneurship. This also motivates the study. Lastly, not much have applied TPB in relation to TVET settings among the existing studies, while TVET remain important training component of entrepreneurship particularly among the developing nations, this also motivates the study. In essence, the study would provide insights for future application of TPB within the TVET setting among the developing countries.

Following this motivations, the study contributes in three ways. It provides new avenue for continued application of TPB in developing countries based on their peculiarities. Secondly, it extends the TPB through indirect path effect analysis which was not prevalent in the extant literature. Lastly, the study contributes to the deployment of TPB in TVET settings which has not exhaustively applied in the existing entrepreneurship literature.

Therefore, the objective of the paper is to apply TPB in TVET setting and expands it to examine indirect path effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports through the mediation of attitudes and behavioral control on the venturing intention into IT related entrepreneurship. Eventually, this will serve as means getting insights from the theory for possible policy suggestions towards promoting self-reliance after graduation by students of tertiary institutions, thereby creating jobs through entrepreneurship and reducing reliance on public sector for employment. The next part of the paper is literature review, followed by methodology and methods, results and discussions, and lastly conclusions.

1.1. Venturing intention of TVET students into IT related entrepreneurship

Behavioral intention has been highlighted in the Theories of Reasoned Action (Fishbein and Ajzen, 1975) and later in the Theory of Planned Behavior (Ajzen, 1991) as the major proximal antecedent to behavior. Intention refers to the one's willingness to exert action or attain a particular goal (Ajzen, 1991). It is the products of attitude towards the goals or action to be exerted and subjective norms associated with such goal or action. This definition is based on TRA (Fishbein and Ajzen, 1975). However, it has been extended to consider the individual's perceived behavioral control in TPB (Ajzen, 1991). The argument was that not only attitude towards behavior and subjective norms that influence one's intention and behavior, but also the resources available to him such as situational confidence and intrinsic motivations (Ajzen, 1991).

Despite this extension from TRA to TPB, both were opened for inclusion of additional predictor of intention and subsequently behavior so as to gain more explanation regarding its (Trivedi et al., 2005). The openness of the TPB led to its widespread and extensive application in many disciplines since its evolution in the seminal work of Ajzen (1991). However, until today its application is lacking in the extant literature in TVET setting particularly in the potential area such as IT related entrepreneurship, so also its expansion to address peculiarities of developing countries such as Nigeria where exist relative ineffectiveness in entrepreneurship training (Iboko, 1976; Odo et al., 2012; Maxwell et al., 2018) and government entrepreneurial supports (Abioye et al., 2017). Therefore, this motivates the need for examination of indirect effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports on the venturing intention into IT related entrepreneurship through attitudes and behavioral control with the notion to apply and expand TPB through this indirect effect which as suggested by Liñán et al. (2013: 76). Therefore, TPB is expanded in line

with this suggestion and based on the peculiarities of Nigeria so as to understand the role of these variables in boosting venturing intention, thereby enhancing entrepreneurship development in the country.

1.2. Entrepreneurial training effectiveness

Entrepreneurial training effectiveness is defined here as the degree to which a training program enhance students' knowledge, skills and abilities in such a way that changes his/her behavioral pattern towards entrepreneurship. In this, an effective entrepreneurial training supposed to provide answers to three basic questions. Did entrepreneurship training do what is supposed to do? That is the extent to which the training program teaches the students relevant entrepreneurship skills. Did the students learn what they supposed to learn through the training program? That is the degree to which the student learned the relevant skills through the training programs. In fact, literature highlights that effective training change students attitudes towards what they were trained after the training (Mat et al., 2011).

Empirically, in one hand, literature highlights that effective training could have effects on students' attitude in many disciplines including agriculture (Oladele, O. I., Subair, S. K., & Thobega, M. (2011), fields of engineering (Mohd et al., 2009), and health care (Farotimi et al., 2018). On the other hand, TPB established that attitude influence behavioral intention (Fishbein and Ajzen, 1975; Ajzen, 1991). These evidences highlights that effective entrepreneurship training could be antecedent to TVET students' attitudes towards entrepreneurship and consequentially will affect their intention to venture into entrepreneurship. Specifically, indirect effect of training effectiveness was found on intention through other variables different from attitude. In this, supervisor support on training which serves as a key to training effectiveness was found to have indirect effect on transfer training participation via transfer climate (Nijman and Gelissen, 2011). The indirect effect of training was also reported between job satisfaction and turnover intention (Kolarova, 2010). Similarly, an indirect effect of entrepreneurial training was found on entrepreneurial intention through the enhancement of desirability (Boukamcha, 2015). Furthermore, the proponent of TPB (Ajzen, 1991) suggests for examination of additional relationships that could provide more explanation to intention. However, extent literature fall short to empirically established this indirect effect of training effectiveness on intention via attitude not only in the field of entrepreneurship training but also in other discipline. In line with this gap in the extant literature it is proposed here to investigate the indirect-path effect of entrepreneurship training effectiveness on TVET students' venturing intention into IT related entrepreneurship through the intervention of attitude towards entrepreneurship. Hence, the following hypothesis is postulated.

H1. *entrepreneurial training effectiveness significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their attitudes towards entrepreneurship.*

Beyond its effects on attitude, effective training could also affect behavior control. Perceived behavioral control has been defined by Ajzen (1991) as the resources available as well as confidence which individual possesses; the confidence can be internal or situational confidence. In either case, effective training could be antecedent to perceived behavioral control. In one hand, effective entrepreneurship training could be a valuable resource that individual need to exact a behavior. On the other hand, it is unarguable that effective training could improve self-confidence which could lead to behavior control towards the desired action, and eventually influence intention and actual behavior. In fact literature discussed that effective training enhances self-confidence and self-reliance (Alfandi, 2016). In line with the highlights from the literature on the influence of entrepreneurial training effectiveness on perceived behavioral control through building self-confidence (Sila, 2014; Alfandi, 2016), and its consequently influence on intention (Ajzen, 1991), empirical evidence confirmed the significant indirect effect of supervisor support on training which serve as a key to training

effectiveness was found on transfer training participation through transfer climate (Nijman and Gelissen, 2011). Training was also found to be indirect predictor of turnover intention through job satisfaction (Kolarova, 2010). Also, entrepreneurial training was found to have indirect effect on entrepreneurial intention through the enhancement of desirability (Boukamcha, 2015). However, despite these empirical evidences such indirect effect of entrepreneurial training effectiveness on intention was not empirically established via perceived entrepreneurship behavior control, thus, the following hypothesis is formulated.

H2. *entrepreneurial training effectiveness significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their perceived entrepreneurship behavior control.*

1.3. Government entrepreneurial supports

Government entrepreneurial supports refer to the provision of much needed resources within the capacity of government to support and promote entrepreneurship; such as favorable business environment, funding policies, and simplification of guidelines to remove bottleneck for emerging entrepreneurs (Obaji and Olugu, 2014). Obaji and Olugu (2014) proposed that supportive policies, policy implementation and funding are supports offered by government to encourage and support entrepreneurship. Government of most developing countries has been investing heavily in efforts and resources to uplift entrepreneurship (Oni and Daniya, 2012). Specifically, in Nigeria several policies and funding supports were implemented to encourage youth entrepreneurship. Nevertheless in some instances, ineffectiveness in the operation of entrepreneurship support agencies was reported (Abioye et al., 2017), which could be due to population challenges to satisfy all the prospective beneficiaries.

It has been argued that training alone even when it is effective do not work alone until it is paired with other interventions, and one important aspect to pair with is microfinance or provision of capital, which make trainee to use good skills they learn (Fiala 2014). This implied the need to explore the effect of perceived government entrepreneurial supports along that entrepreneurial training effectiveness on attitude towards entrepreneurship and subsequently intention. The report of Fiala (2014) highlights the possibility for government support to affect attitude in one hand, though not empirically validated, and, on the other hand TPB (Ajzen, 1991) established the influence of attitudes on intention. Logically, these two insights highlight the possibility for government entrepreneurial supports to influence entrepreneurial venturing intention indirectly through the intervention of attitude. Despite that the direct effect of training effectiveness through gender difference was studied by Al-Swidi and Al Yahya (2017), however, extent literature has been scant in validating this indirect effect through attitude.

Interestingly, Malebana (2017: 76) stated that entrepreneurial support could influence entrepreneurial intention through attitude. Similarly, the indirect influence of entrepreneurial support on entrepreneurial intention through TPB elements has been argued by Linán et al. (2013: 76). In fact, a recent empirical evidence was provided on the indirect effect of public support on entrepreneurship intention through the mediation of one of the TPB variables, specifically attitude (Nowiński et al., 2020). While this recent empirical evidence is with respect to public support on entrepreneurship, it highlights the possibility for governmental entrepreneurial support to exert such indirect effect on venturing intention into IT related entrepreneurship, in line with this highlight, the following hypothesis is developed.

H3. *perceived government entrepreneurial supports significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their attitudes towards entrepreneurship.*

Beside the influence of government entrepreneurial supports on entrepreneurship venturing intention indirectly through attitude, TPB (Ajzen, 1991) highlights two dimension of perceived behavioral control;

resources and confidence. The confidence was also seen as bi-dimensional; internal and situational confidence. In the field of entrepreneurship, government entrepreneurial supports in both financial and technical aspects of entrepreneurship can be seen as resources, which could be translated into situational confidence since acquisition of such resources can give one a more confidence to venture into entrepreneurship beyond others who do not possess such resources. The argument here is obtaining such resources will give TVET student a situational confidence, thereby exacting their behavioral control towards IT related entrepreneurship and eventually developing a good intention to actual participation. Extensive review of literature made it difficult to spot empirical evidence on the influence government entrepreneurial support on perceived entrepreneurial behavior control, except for the study of Lin et al. (2017) which examined as part of several other hypotheses how perceived authority support influence perceived behavioral control of citizen compliance to environmental regulation. In one hand this highlight the possible direct effects of government entrepreneurial supports on perceived entrepreneurial behavior control, on the other hand, TPB (Ajzen, 1991) established the linkage between perceived behavior control and intention.

Empirically, studies confirmed the influence of informal institutional support (Kazumi and Kawai, 2017) and educational support (Saeed, Yousafzai, Yani -De -Soriano, & Muffatto, 2015) on perceived behavioral control, and eventually, perceived behavioral control was found to have influence on intention (Ajzen, 1991). This highlights the possibility of government entrepreneurial support to influence venturing intention indirectly through perceived behavioral control. In fact, Ajzen (1991) suggests for the examination of additional variables that could provide more explanation to intention, which could through examination of indirect effects of variables such as the one proposed here. In line with this, Liñán, et al. (2013: 76) argued that entrepreneurial support could influence entrepreneurial intention indirectly through TPB elements. Interestingly, the indirect effect of public support on entrepreneurship intention was established through mediation of perceived behavioral control (self-efficacy) (Nowiński et al., 2020). However, still empirical evidence is lacking on the indirect-path effect of government entrepreneurial supports on entrepreneurial intention through the intervention of perceived entrepreneurial behavior control. Following this gap in the extant literature the following hypothesis is formulated.

H4. *perceived government entrepreneurial supports significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their perceived entrepreneurship behavior control.*

1.4. Theoretical framework and path model

The path model presented in Figure 1 has been developed through the support of TPB (Ajzen, 1991) as its theoretical framework. In developing the model, gaps have been identified in the literature resulting to the scant empirical evidence on the indirect effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports on the TVET students venturing intention into entrepreneurship through the intervention of attitude and perceived entrepreneurship behavior control, even though such have been highlighted (Liñán et al., 2013; Nowiński et al., 2020). Providing these empirical evidences through testing and confirming the four hypotheses postulated in 2.2 and 2.3 could lead to the validation of the model. The expectation is for the policymakers to adopt the validated model in boosting entrepreneurship intention for job creation and reduce reliance on public sector for employment by graduates from TVET institutions in the country.

2. Materials and methods

The research is built on the positivist paradigm as it used quantitative data collected from four TVET institutions in Jigawa state covering Hussaini Adamu Federal Polytechnic, Kazaure, Jigawa State Polytechnic, Dutse, Bilyaminu Usman Polytechnic, Hadejia, and Jigawa State Institute of Information Technology, Kazaure. The use of positivist paradigm can be justified by the quantitative nature of the research design; considering that the data for the study was collected through questionnaire, which was converted into numerical values through which analysis was carried-out; the discussions from the analyses were mainly from the results not personal convictions of the researchers, in this way, the results can be considered as highly objective (Park et al., 2020).

2.1. Population and sample

The study has a total population of 1,179 students from the four TVET institutions in Jigawa state. The students were undergoing Higher National Diploma (HND) and National Diploma (ND) in IT related disciplines; computer science and computer engineering. A sample of 291 was identified from the population using the sample size selection table developed by Krieger and Morgan (1970). The sample was randomly selected through stratification of the students based on their TVET institutions. The random selected was made from the list of the students' register, which served as the sampling frame. These sample have undergone similar entrepreneurship training which has been a national policy among tertiary institutions since the introduction "National Economic Empowerment and Development

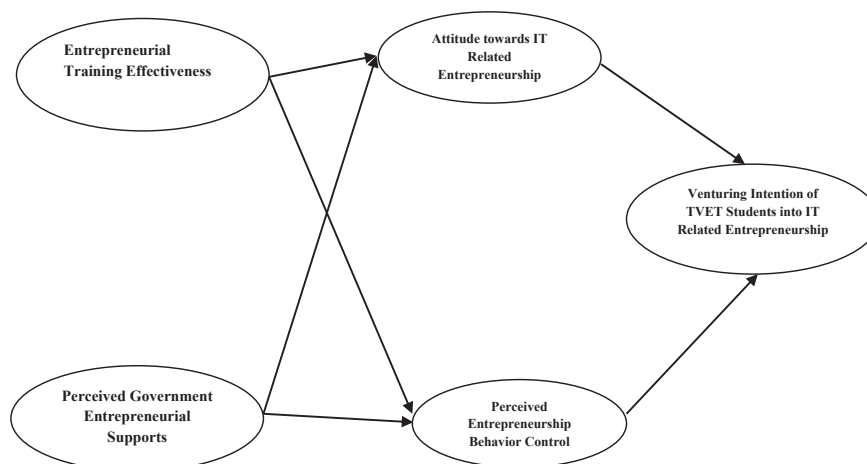


Figure 1. Path model.

Strategy" (NEEDS) in 2004 for addressing the problems poverty, and unemployment generation and facilitate wealth creation and value re-orientation (Agboola, 2010). Considering low responses rate of survey studies in Nigeria (see Ajumobi et al., 2018; Raimi et al., 2013), the increment of the sample by 30% (87) was considered giving a total of 378 questionnaires distributed to the sampled students.

2.2. Data collection

Data was collected through a research instrument adapted and modified from previous studies. TPB variables; intention, attitude and perceived behavioral control were adapted from Ajzen (1991). The measures of entrepreneurial training effectiveness were modified from Hicks's (2006) indicators of training transfer, and that of perceived government entrepreneurial supports were modified from the measures of government support used by Makgato and Bankole (2016). These variables were measured using five-point Likert scale ranging from Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly Agree (5).

Prior to the main data collection, a pre-test was conducted, the instrument was subjected to face and content validity using both experts and student samples. The comments received from this validity assessments were considered and corrections were effected. Following this validity assessment, reliability assessment was also conducted using 30 questionnaires for pre-testing, the results implied that all the variables achieved an acceptable level of reliability based on the Cronbach Alpha of 0.70 (Nully, 1978).

For the main data collection, out of the 378 distributed questionnaires, a total of 215 usable questionnaires were retrieved from the students; this gave a total response rate of 56.9% of the original sample, which was considered sufficient according to Sekaran and Bougie (2003), who suggests 30% responses rate for quantitative survey studies. Considering that sufficient data was collected within reasonable time, no extensive follow ups were made, and consequently non-response bias test was considered not necessary.

2.3. Data analysis

Following the relative complexity of the research model which tends to examine indirect-path effects of two exogenous variables and also the suggestion of Hair et al. (2011) on the use of Partial Least Squares Structural Equation Modeling (PLS-SEM) in the aforesaid situation, the analysis was performed using Smart PLS-SEM version 2.0. In applying this analytical procedure the suggestion of Henseler et al. (2009) of using two-step process was followed. This process requires researcher to evaluate measurement and structural model. The use of PLS-SEM could be justified for three reasons; (1) the complexity of the model with two indirect path effects, (2) the study is not testing theory, rather using a theory to predict relationships between variables, (3) the study is confirmatory since the measurements used already exist, and not newly developed to justify using other SEM such CB-SEM (Hair et al., 2011).

3. Results and discussions

3.1. Measurement model results and discussions

There are four (4) criteria given by Hair et al. (2012), Hair et al. (2011), Hair et al. (2013), Hair et al. (2016); and Fornell and Larcker (1981) for assessing PLS-SEM measurement model. Firstly, the evaluation of the reliability of indicators of each latent constructs using its loading of $\geq .40$. Secondly, the evaluation of reliability of each latent constructs using composite reliability (CR) of $\geq .70$. Thirdly, it required the evaluation of convergent validity using Average Variance Extracted (AVE) of $\geq .50$. Lastly, it is required that the discriminant validity should be evaluated, one of such evaluation criteria is Fornell and Larcker

(1981) criterion. Having assessed the measurement model using these four (4), the results are presented in Tables 1 and 2 below.

It is evident from Table 1 that the requirement of indicator loadings of $> .40$ has been fulfilled, as all the indicators have loading above the cut-off value of $> .40$, it ranged from .46 to .91. Likewise, the requirement of internal consistency reliability measured through CR was also met, all the latent constructs have CR above the commonly acceptable threshold of .7; it ranged from .87 to .93. Similarly, the results also confirmed the fulfillment of convergent validity requirement measured using AVE which was above the cut-off value of .50, the AVE range from .50 to .81. The last criterion is discriminant validity whose result is presented below in Table 2.

Evidence from Table 2 confirmed the fulfillment of the discriminant validity requirement as the square-root of AVE of all the latent constructs in the path model is higher than its squared correlations with any other construct in the model. Therefore, having successfully satisfied the four criteria the data can be said to be valid and reliable for testing the hypothesized relationships to validate the indirect-path model.

3.2. Structural model results and discussions

Following the successful fulfillment of the measurement model requirements which confirmed the reliability and validity of the measures; both at indicator and construct levels, the result of the structural model is hereby analyzed as reported in Tables 3, 4, 5, and 6. In carrying-out the structural model result analyses, the suggestion of Hair et al. (2011), Hair et al. (2013) and Hair et al. (2016) who proposed four (4) criteria for evaluation of structural model were followed. These criteria include; the assessments of the significance of path-coefficients for testing the hypothesized relationships using 5000 bootstrapped samples, followed by level of r-squared, effect size, and lastly the predictive relevance of the path model. Therefore, the results of the significance of path-coefficients four hypothesized indirect-path effects are presented in Table 3.

It can be recalled that hypothesis one postulated that entrepreneurial training effectiveness significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their attitudes towards entrepreneurship. The results support this hypothesis ($\beta = 0.31$, $t = 4.01$, $p = .00$). It revealed that effective entrepreneurship training could boost the attitude of TVET students towards IT related entrepreneurship and subsequently to form the intention towards for actual participation. It showed that effectiveness in entrepreneurship training could be a reliable tool for changing students' attitudes towards IT related entrepreneurship there by boosting their intention to participate in entrepreneurship ventures for job creation and reducing reliance on public sector for employment. This finding corroborates with that Kolarova (2010) who found that effective training could have indirect effect on intention, however, not through attitude as found here but through the mediation effect of job satisfaction. It also confirmed the finding of Boukamcha (2015) on indirect effect of entrepreneurial training on entrepreneurial intention not through attitude established in this study but through enhancement of desirability.

Hypothesis two proposed that entrepreneurial training effectiveness significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their perceived entrepreneurial behavior control. The result confirmed this postulation ($\beta = 0.16$, $t = 2.06$, $p = .04$). The results highlights that effective entrepreneurship training has the potential of increasing TVET students' confidence as they possess the resources necessary for venturing into IT related entrepreneurship. The result presents the implication that offering effective entrepreneurial training could boost entrepreneurial efficacy TVET students towards IT related entrepreneurship and eventually enhance their willingness to actual participation. It implied that being equipped with an effective entrepreneurial training could improve TVET students' intrinsic confidence and capability thereby having a behavioral control towards venturing into IT related entrepreneurship. The fact is that in line with TPB (Ajzen, 1991), perceived behavioral control refer to internal and

Table 1. Indicator loading, composite reliability and convergent validity.

Constructs	Indicators	Loadings	CR	AVE
Attitude towards Entrepreneurship	ATT1	0.83	0.91	0.64
	ATT2	0.81		
	ATT3	0.81		
	ATT4	0.79		
	ATT5	0.79		
	ATT6	0.78		
Government Entrepreneurial Support	GS2	0.93	0.93	0.81
	GS3	0.87		
	GSI	0.91		
Intention to Venture into IT Related Entrepreneurship	INT1	0.90	0.88	0.66
	INT2	0.83		
	INT3	0.75		
	INT4	0.75		
Perceived Entrepreneurial Behavior Control	PBC1	0.81	0.87	0.63
	PBC2	0.77		
	PBC3	0.79		
	PBC4	0.82		
Entrepreneurship Training Effectiveness	TE1	0.63	0.93	0.50
	TE10	0.74		
	TE11	0.67		
	TE12	0.57		
	TE13	0.72		
	TE14	0.59		
	TE15	0.67		
	TE16	0.46		
	TE2	0.77		
	TE3	0.72		
	TE4	0.70		
	TE5	0.75		
	TE6	0.62		
	TE7	0.74		
	TE8	0.75		
	TE9	0.77		

Table 2. Fornell and lacker criterion for discriminant validity.

Constructs	1	2	3	4	5
Attitude towards Entrepreneurship	0.80				
Perceived Government Entrepreneurial Supports	0.57	0.90			
Intention to Venture into IT related Entrepreneurship	0.70	0.54	0.81		
Perceived Entrepreneurship Behavior Control	0.69	0.55	0.61	0.80	
Entrepreneurial Training Effectiveness	0.70	0.62	0.65	0.70	0.71

situational confidence, thus, training has the potential to enhance one's internal confidence and capability, and eventually control his/her behavior towards action, in this case, participation into IT related entrepreneurship. The finding of this study coincides with that of [Nijman and Gelissen \(2011\)](#) who found supervisor support on training which is a key to training effectiveness could have indirect effect on intention to participate in transfer training participation via transfer climate as

Table 3. Path model results for hypotheses testing.

Hypotheses	Beta	SE	T	sig	Decision
Entrepreneurial Training Effectiveness-> Attitude toward Entrepreneurship -> Venturing Intention	0.31	0.08	4.01	0.00	Supported
Entrepreneurial Training Effectiveness-> Perceived Entrepreneurship Behavior Control -> Venturing Intention	0.16	0.08	2.06	0.04	Supported
Perceived Government Entrepreneurial Supports-> Attitude toward Entrepreneurship -> Venturing Intention	0.11	0.05	2.23	0.03	Supported
Perceived Government Entrepreneurial Supports-> Perceived Entrepreneurship Behavior Control -> Venturing Intention	0.07	0.03	2.18	0.03	Supported

mediating variable though not through government entrepreneurial support as proposed here, but still confirming the indirect effect of training on intention. It also confirmed the finding of [Boukamcha \(2015\)](#) on the indirect effect of effective training on intention.

In line with the proposition of hypothesis three which assumed that perceived government entrepreneurial supports significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their attitudes towards entrepreneurship, the result supports such postulation ($\beta = 0.11, t = 2.23, p = .03$). The implication of this is that offering government entrepreneurial supports to TVET students positively affects their attitude towards entrepreneurship and subsequently forming intention towards actual participation. This supports the [Fiala \(2014\)](#) conclusion that training alone cannot be effective tool to built positive attitude towards entrepreneurship; it needs to be paired with other supports programs such as financial supports. This finding can be supported by the argument made by [Liñán et al. \(2013\)](#) who proposed the indirect influence of entrepreneurial support on entrepreneurial intention through TPB elements. It also coincides with that of [Malebana \(2017: 76\)](#) who stated that entrepreneurial support could influence entrepreneurial intention through attitude. It is also consistent with that of [Nowiński, et al \(2020\)](#) who empirically confirmed the indirect effect of public support on entrepreneurship intention through the mediation of one of the TPB variables, specifically attitude.

Lastly, following the postulation of hypothesis four which states that perceived government entrepreneurial supports significantly but indirectly affects TVET students venturing intention into IT related entrepreneurship through their perceived entrepreneurship behavior control, the result also support such postulation ($\beta = 0.07, t = 2.18, p = .03$). The implication of this finding is that obtaining government entrepreneurial supports could give TVET student a situational confidence, thereby influencing his/her behavior towards IT related entrepreneurship. This can be supported by the second aspect of perceived behavior control which relate to situational confidence ([Ajzen, 1991](#)) and its eventual influence on intention and subsequently behavior. The finding can also be supported by the assertion of [Liñán et al. \(2013\)](#) who argued that entrepreneurial support could influence entrepreneurial intention indirectly through TPB elements, which was confirmed through empirical evidence reported by [Nowiński et al. \(2020\)](#), who discovered the indirect effect of public support on entrepreneurship intention through the mediation of perceived behavioral control. Following the test the test of hypotheses, the R-squared of model are presented in [Table 4](#).

Three R-squared are reported. The R-squared of the first endogenous latent variable; venturing intention into IT related entrepreneurship is 0.52, which implied that entrepreneurial training effectiveness, government entrepreneurial support, attitude towards entrepreneurship and perceived entrepreneurial behavior control collectively explained 52% of the changes of students venturing intention into IT related entrepreneurship, the rest of could be explained by other variables not considered here. For the first intervening variable; attitude towards entrepreneurship which facilitates the indirect effect of entrepreneurial training effectiveness and government entrepreneurial support on venturing intention, the R-squared was .53, which implied that entrepreneurial training effectiveness and government entrepreneurial support accounts for 53% variation in attitude towards entrepreneurship. Lastly, the R-squared of the second intervening variable; perceived entrepreneurial behavior control which also facilitates the indirect effect of entrepreneurial training effectiveness and government entrepreneurial support

Table 4. R-Squares.

Endogenous Constructs	R Square
Attitude towards Entrepreneurship	0.53
Perceived Entrepreneurial Behavior Control	0.54
Intention to Venture into IT related Entrepreneurship	0.52

on TVET students venturing intention was 0.54, which implied that 54% of the change in perceived entrepreneurial behavior control could be explained by entrepreneurial training effectiveness and government entrepreneurial support. Overall, for all the three endogenous variables moderate R-squared are reported in line with Hair et al. (2011).

To understand the specific effect of each exogenous variable on the endogenous latent constructs, effect size (f^2) was analyzed in line with Cohen (1988) who classified f-squared to have .02, .13, and .36 as small, medium and large effects respectively. The result is presented in Table 5.

It is evident from Table 5 that two constructs; attitude towards entrepreneurship and perceived entrepreneurial behavior control have medium (31%) and small (6%) effects respectively on venturing intention. Moreover, two constructs; entrepreneurial training effectiveness and government entrepreneurial support have large (43%) and small (6%) effects on attitude towards entrepreneurship. Lastly, two constructs; entrepreneurial training effectiveness and government entrepreneurial support have large (52%) and small (2%) effects respectively on perceived entrepreneurial behavior control. Conclusively, the effective entrepreneurial training could provide more explanation to attitude towards entrepreneurship and perceived entrepreneurial behavior control indirectly to TVET students venturing intention.

Lastly, the predictive relevance (Q^2) of the model is reported in Table 6. It was evaluated using constructs cross-validated redundancy in line with Geisser (1974) and Stone (1974) who suggested that for a model to have a predictive relevance, the Q^2 should be greater than zero.

It is evident from Table 6 that the result of the constructs cross-validated redundancy for all the three endogenous latent constructs is greater than zero indicating a good predictive relevance for the indirect-path model.

4. Conclusion and implications

The paper deployed and extends TPB to examine indirect effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports on the TVET students venturing intention into IT related entrepreneurship through the intervention of attitude and perceived entrepreneurship behavior control so as to get insights for policy suggestions towards boosting entrepreneurship development in the country. Findings revealed significant indirect-path effects of both entrepreneurial training effectiveness and perceived government entrepreneurial supports on the TVET students venturing intention through attitude and perceived entrepreneurship behavior control, thereby highlight important policy and theoretical implications as discussed hereunder. The study follows the conclusion of Nowiński et al. (2020) with regards to positive perceptions on entrepreneurship public support, but here entrepreneurial training effectiveness and government

Table 5. Effect Size (f^2).

Exogenous Constructs	Endogenous Constructs					
	Attitude towards Entrepreneurship		Perceived Entrepreneurship Behavior Control		Intention to Venture into IT related Entrepreneurship	
	(f^2)	Size	(f^2)	Size	(f^2)	Size
Entrepreneurial Training Effectiveness	.43	Large	.52	Large	-	-
Perceived Government Entrepreneurial Supports	.06	Small	.02	Small	-	-
Attitude towards Entrepreneurship	-	-	-	-	0.31	Medium
Perceived Entrepreneurial Behavior Control	-	-	-	-	0.06	Small

Table 6. Predictive relevance.

Endogenous Constructs	SSO	SSE	1-SSE/SSO
Attitude towards Entrepreneurship	1290	858.8135	0.3343
Perceived Entrepreneurial Behavior Control	860	567.9728	0.3396
Intention to Venture into IT related Entrepreneurship	860	576.6169	0.3295

entrepreneurship support can boost entrepreneurial intentions of TVET students through enhancing their personal attitude towards entrepreneurship and perceived entrepreneurship behavioral control.

4.1. Implication to the theory

The results contribute to TPB through the examination of indirect-path effects of entrepreneurial training effectiveness and perceived government entrepreneurial supports, which highlights the need to enhance the effectiveness of entrepreneurial training and governments entrepreneurial supports so as to shape TVET students attitudes and behavioral control towards IT related entrepreneurship. While these have been a gap in the literature, this study find it difficult to trace incidences in which these indirect-path effects were empirically established in the extant literature so as to highlight possible policy suggestions for enhancing venturing intention of Nigeria's TVET students. Consequently, the research could be the first to extend TPB (Ajzen, 1991) through these indirect-path effects, and specifically from the context of TVET institutions in developing country – Nigeria where many TVET institutions exist but entrepreneurship development through EDI weakens.

4.2. Practical and policy implications

It implied to the policymakers that a naturally inbuilt attitude and behavioral control alone cannot influence venturing intention unless it is supported with effective entrepreneurial training and government entrepreneurial supports. This study implied that the effectiveness of entrepreneurial training should be enhanced, and in essence it will boost students' attitude towards venturing into entrepreneurship for self-reliance after graduation. The current challenge in Nigeria is that students mostly anticipate to get employment in public sector, which is far not capable to accommodate all TVET graduates. Therefore, when tertiary institutions provide effective entrepreneurship training, such will change their mindset to develop entrepreneurship attitude, and eventually venture into entrepreneurship. An effective entrepreneurship training with regards to IT here means the one that teaches modern entrepreneurship skills relevant to IT, provide sufficient opportunities to learn and practice the IT skills so as to enable the students to transform the knowledge into practical entrepreneurship ventures.

Another policy implication is with respect to government entrepreneurial supports, which should be through provision of seed capital and other financial supports as well as blending entrepreneurship policies to ease ways of doing business and providing efficient markets operation. Eventually, sufficient provision of these antecedents could positively enhance attitude and behavior control towards IT related

entrepreneurship, and ultimately venturing intention which could be transformed into actual participation that could reduce the reliance on public sector for employment. It could equally create jobs that could reduce societal crisis through employment into privately owned businesses.

4.3. Implications for future research

The research opens doors for future researchers in number of ways. The simple one is replication of findings in other similar settings and possibly settings with different peculiarities. Second, it opens ways to the exploration of antecedents of original TPB variables and its eventual implication to intention and behavior. Third, the coefficient of determination for each of the three endogenous constructs accounts slightly above half of the variations of TVET students venturing intention, attitude towards entrepreneurship, and perceived entrepreneurial behavior control, it indicates that there are other predictors that need to be studied to provide further explanations to such constructs in varying situations. Lastly, pairing effective training with government support as suggested by Fiala (2014) revealed that government entrepreneurial supports offers less contribution than expected especially when compared with the contribution of effective training. Thus, it implied the need for pairing of training with other constructs for possible optimization of students' attitude and perceived entrepreneurial behavior control which will subsequently encourage venturing into IT related entrepreneurship.

Declarations

Author contribution statement

J.B. Salisu: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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