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The mediating effects of entrepreneurial self-efficacy in the relationship between entrepreneurship education and start-up readiness

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In Nigeria, there is a growing concern that graduates from science and engineering fields are not ready for entrepreneurship due to low business creation among young individuals. Another perspective suggests that entrepreneurship curriculum only prepares the students to seek for employment rather than become entrepreneurs. Previous studies have revealed that there are several cognitive factors responsible for readiness to start a business other than entrepreneurship education. The purpose of this study is to determine social cognitive factors that can stimulate start-up readiness. Thus, this study examined the mediating effects of entrepreneurial self-efficacy (ESE) in the relationship between entrepreneurship education and start-up readiness. Three dimensions of entrepreneurship education and four dimensions of ESE were examined as determinants of start-up readiness using survey research approach. Data from 289 exit-level students from three Technical Vocational Education and Technology (TVET) colleges were analysed using SPSS 25 and Smart PLS 4 software. Entrepreneurship education (in terms of technical skills and business management skills) shows partial support for ESE (in terms of searching, planning, and implementing). However, entrepreneurship education (in terms of personal skills) only shows support for ESE (in terms of marshalling). The results of the mediation analysis suggest that ESE (in terms of searching, planning, and implementing) partially mediates the relationship between entrepreneurship education and start-up readiness, while ESE marshalling failed to mediate the relationship between entrepreneurship education and start-up readiness. This study also revealed that apart from ESE marshalling, all components of ESE have a direct and significant relationship with start-up readiness. Another contribution of this study indicates that personal entrepreneurial skills are required antecedent for enhancing business resources gathering skills towards start-up readiness among young individuals in Nigeria. The study suggests fostering entrepreneurial mindset via simulation-based techniques, role playing, and mentoring with practical translations.

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Introduction

Globally, entrepreneurial activity has become a dominant phenomenon that contributes to the increase in the rate of employment and socio-economic development (Boubker et al., 2021; Cassol et al., 2022). This is evident in the recent transformation and growth in the banking, telecommunications, and retail industries in Africa (Herrington and Coduras, 2019). Many countries in the Sub-Saharan African region, including Nigeria are gradually turning their attention from raw material mineral extraction to technology innovation (McKinsey Global Institute Analysis, 2017). However, a recent report suggests that Sub-Saharan Africa has the highest shortage of employment opportunities, with Europe 71%, North America 64%, Asia 62%, Latin America 79%, North Africa 70%, and Sub-Saharan Africa 88% (ILO, 2018). Africa is projected to be home to the youngest and largest population by 2050, but 60% of its population lives in poverty (McKinsey Global Institute, 2022). Scholarships in entrepreneurship increasingly argue that entrepreneurship offers the pathway out of poverty (Chigunta, 2017; Dvouletý and Orel, 2019). In the light of this, young individuals can no longer rely on the private sector and government to create jobs. There is a sense of respect for people who start their own business to become self-employed, and possibly, provide employment for others.

Despite being the largest economy in Africa, Nigeria is ranked among countries with high poverty rate (40.1%) in Africa (World Population Review, 2023). As of 2022, 53.4% of young people are without jobs (National Bureau of Statistics, 2023), making it the second country with the highest unemployed youth in Africa after South Africa at 66.5% (Statistic South Africa, 2022). In Nigeria, there is a growing concern that graduates, especially from science and engineering fields are not ready for entrepreneurship due to low business creation among the youth (Edokpolor and Owenbiugie, 2017). Another perspective suggests that the entrepreneurship education curriculum only prepares the students to seek for employment rather than become entrepreneurs (Jegade and Nieuwenhuizen, 2020). Previous studies have revealed that there are several cognitive factors responsible for readiness to start a business other than entrepreneurship education (Fayolle and Gailly, 2015; Potishuk and Kratzer, 2017). Besides, some individuals may not act if certain personality traits are not triggered (Adeniyi, 2021). Entrepreneurial self-efficacy (ESE) has been described as a precursor for entrepreneurial action. The purpose of this study is to determine the mediation effect of entrepreneurial self-efficacy in the relationship between entrepreneurship education and start-up readiness among young individuals in Nigeria. To achieve this purpose, the following research objectives were stated:

- To examine the effects of entrepreneurship education on entrepreneurial self-efficacy
- To determine the mediating effects of ESE in the relationship between entrepreneurship education and start-up readiness.
- To measure the influence of ESE on start-up readiness.

This study is one of the first efforts to validate the relationships between dimensions of entrepreneurship education and dimensions of entrepreneurial self-efficacy for start-up readiness in a developing context, specifically in Africa.

Highlights

- The findings revealed that entrepreneurship education shows a partial relationship with ESE.
- ESE partially mediates the relationship between entrepreneurship education and start-up readiness.

- Personal entrepreneurial skills are essential antecedents that can enhance the ability to gather economic resources for business start-ups.
- Another contribution of this study indicates that there is need for universities and entrepreneurship professionals to improve the level of social cognitive value (personal entrepreneurial traits) via relevant entrepreneurship training with practical translation.

Literature review and hypotheses formulation

In this study, self-efficacy was conceptualised from the social cognitive theory to create a synthesis with previous application of self-efficacy to entrepreneurship in order to understand the construct of ESE. The relationship between entrepreneurship education and ESE was extensively unpacked from previous studies to identify gaps in literature. This study aims to determine factors that can stimulate start-up readiness among young individuals in Nigeria.

Self-efficacy

Self-efficacy is a multidisciplinary phenomenon, and multi-dimensional in nature, and therefore holds no consistent definition (Drnovšek et al., 2010). For example, the social cognitive theorists conceptualise self-efficacy as individuals' belief in their ability to perform a task that influences attitudes and behaviours (Bandura, 1994; Lent and Maddux, 1997). Psychologists hold the assumption that self-efficacy is the estimation of one's capabilities to implement a specific behaviour to achieve a desired outcome (Bieschke, 2006). The psychologists maintain that all psychological processes and behavioural functions are determined by the alteration of an individual's sense of mastery known as self-efficacy (Bandura, 1986; Maddux, 2013). Scholars in this school of thought also emphasise the need to define self-efficacy not only as a personality trait, but within the context of relatively specific behaviour in specific contexts (Bandura, 1986; Maddux, 2013).

For this reason, economists examine the achievement of set economic goals by an individual in relation to perceived self-efficacy. Scholarships in this field view self-efficacy as individuals' domain-specific capabilities that control internal constraints in order to propel economic behaviour (Wuepper and Lybbert, 2017). The economists argue that sufficient self-efficacy is required to create investment and set more ambitious goals, which is a promising avenue out of poverty (Wuepper and Lybbert, 2017). This assumption is evident in the empirical finding that increased self-efficacy is associated with opportunity-driven entrepreneurship (Tyszka et al., 2011), which is referred to as economic self-efficacy (Grabowski et al., 2001).

Social psychologists refer to self-efficacy as an individual's personal belief in his or her capacity to accomplish a specific action or behaviour (Grabowski et al., 2001). Researchers in this domain approach self-efficacy as a sense of competence and potency to navigate social situations (Rudy et al., 2012). Social psychologists explored the social aspect of self-efficacy as individuals' confidence in their ability to perform social interactional tasks required to activate and maintain interpersonal relationships (Smith and Betz, 2000). In this context, it is considered as social self-efficacy, which is a useful tool to shape career decisions through the management of social engagements (Smith and Betz, 2000, Rudy et al., 2012).

Entrepreneurship scholars attempt to define self-efficacy from two perspectives of task-specific ability (Boyd and Vosikis, 1994; De Noble et al., 1999), and performance of action or outcome (Segal et al., 2002). For instance, proponents in the former refer to self-efficacy as the belief in ones' ability to successfully launch a

business start-up (Boyd and Vozikis, 1994, Wilson et al., 2007), while the latter view self-efficacy as individuals' perception about their capabilities to organise and implement entrepreneurial behaviour required to achieve a given outcome (Segal et al., 2002). It is referred to as entrepreneurial self-efficacy when viewed as a key construct to starting a new business (Chen et al., 1998). However, a unification approach was proposed by Drnovšek et al. (2010) by incorporating the task specificity and environmental factors of ESE. The scholars stated that ESE is a multidimensional construct made up of goal and control beliefs, and propositions as it shapes the process of starting a business, and the effects of these beliefs on task performance and outcome attainment (Drnovšek et al., 2010). ESE is domain-specific which is fundamental to its multidimensional attributes. This study draws on the above-mentioned theoretical clarifications to underscore the mediating effects of entrepreneurial self-efficacy in the relationship between entrepreneurship education and start-up readiness.

ESE construct

It has been argued that ESE is best viewed as a multidimensional construct which focuses on goal and control perceptions, and propositions to comprehend how these dimensions will impact the process of developing a new start-up (Drnovšek et al., 2010). A considerable number of studies have been conducted on the various dimensions of ESE (Chen et al., 1998; Pihie and Bagheri, 2013; Setiawan, 2014). Each study identified a different pattern of ESE structure. In demonstrating the differing level of ESE between managers and entrepreneurs, Chen et al. (1998) applied five underlying dimensions of ESE construct but utilised a total ESE score to distinguish managers from entrepreneurs. The scholars offered little understanding on the most specific component of ESE that can stimulate the creation of entrepreneurial intention.

In a bid to assess university students' entrepreneurial intention, Pihie and Bagheri (2013) adopted five components of ESE to assign task and roles of an entrepreneur which are marketing, accounting, personnel management, production management and organising. The authors successfully proved that ESE is the most significant and positive factor that can influence entrepreneurial intention, but failed to provide the specific, or most significant determinant of entrepreneurial intention. Setiawan (2014) adapted De Noble et al.'s (1999) six dimensions of ESE which are developing new product and market opportunities, building an innovative environment, initiating investor relationship, developing critical human resources, defining core purpose, and coping with unexpected challenges. Using descriptive statistics, the author was able to rate and compare the students' ESE dimensions (task ability) but did not statistically measure the impact on their start-up development (outcome ability).

Discourse on various dimensions of ESE is well documented in literature. Drnovšek et al. (2010) examine the relationship between entrepreneurial start-up process and ESE components which are entrepreneurial intent, opportunity search, decision to exploit, and opportunity exploitation. The authors demonstrated that ESE is best adopted as a multidimensional construct in measuring phases of entrepreneurial behaviour. Chen et al. (1998) adopted five sources of ESE dimension to differentiate managers from entrepreneurs; these are, marketing skills, innovation skills, management skills, risk-taking, and financial control. De Noble et al. (1999) proposed six dimensions of ESE: risk and uncertainty management skills, innovation and product development skills, interpersonal and networking management skills, opportunity recognition, procurement and allocation of critical resource, and development and maintenance of an innovative environment. The authors show that these skill factors have significant

association with entrepreneurial intention (De Noble et al., 1999). Barbosa et al. (2007) assess cognitive style and risk preference on four task phases of ESE, which are opportunity ESE, managerial ESE, relationship ESE, and tolerance ESE. The study identified individuals' ESE variations in relation to risk-taking ability. Mueller and Goic (2003) investigated differences in business students ESE task phases in US and Croatia. While all pairs of ESE task phases (searching, planning, and implementing) significantly impacted the students' entrepreneurial orientation, ESE marshalling had low score among students from Croatia. ESE task phases of searching, planning, marshalling, and implementing were originally conceptualised by Stevenson et al. (1985), and the scales were further refined by McGee et al. (2009). This study's analytical grid is generated from these four components of ESE (McGee et al., 2009; Adeniyi et al., 2022). Smith and Betz (2000) contend that the theory of self-efficacy can be adopted to explain one's career decision and behaviour and help to conceptualise interventions capable of strengthening efficacy perception within a specific career domain. Accordingly, entrepreneurship education is drawn as a strengthening variable for ESE to impact start-up readiness among students of TVET colleges.

Entrepreneurship education

Entrepreneurship education has been proven to be one of the mechanisms to create job opportunities, improve standard of living, sustainable economic growth and development, and increases individuals' entrepreneurial mindset (Chigunta, 2017; Herington and Coduras, 2019). Entrepreneurship education is essential for business start-ups and acquisition of knowledge (Young, 1997). Accordingly, entrepreneurship education aims at enhancing entrepreneurial mindset, entrepreneurial attitudes and skills as well as dimensions of idea generation, start-ups, growth and innovation (European Commission, 2012). Entrepreneurship education is a crucial predictor of personality traits for business creation (Hampel-Milagrosa, 2010). Business start-ups are a catalyst for economic development as they help to reduce unemployment. Entrepreneurship education is one of the most relevant drivers of business start-ups.

Previous study indicated that there is a large shortage of managerial skills in SMEs (Jack and Anderson, 1999), and suggested the incorporation of specific skills set in entrepreneurship education (Martins and Pear, 2015; Almahry and Sarea, 2018). In the light of this, Hisrich and Peter (1998), as cited by Henry et al. (2005), categorised three specific skills as determinants of business success required by entrepreneurs, namely, technical skills, business management skills and personal entrepreneurial skills. In a similar vein, the Organisation for Economic Co-operation and Development (OECD) annual report in 2014 identified technical skills, business management skills and personal entrepreneurial skills as the required skills for young entrepreneurs (OECD, 2014). Extant studies have advocated for the adoption of these specific entrepreneurial skills as content of entrepreneurship education towards business start-ups (Martins and Pear, 2015; Almahry and Sarea, 2018). In addition, Martins and Pear (2015) demonstrated the need for entrepreneurship education to interact with other personality traits for business success. This discussion informs the introduction of ESE as the most consistent predictor of entrepreneurial success (Drnovšek et al., 2010).

Entrepreneurship education and ESE

Scholarships in entrepreneurship have shown that entrepreneurship can be learned through training (Wilson et al., 2007; Fayolle, 2018), and the required personality ability, and attitudes to become an entrepreneur can be impacted through entrepreneurship education (Maritz and Brown, 2013). Entrepreneurship

education has the potential to stimulate students' ESE through the accomplishment of task-specific entrepreneurial activities. Accordingly, prior studies reveal that entrepreneurship education and training can influence individuals' ESE, attitude and behavioural intention towards business start-ups (Piperopoulos and Dimov, 2015; Nowiński et al., 2019). Maritz and Brown (2013) contributed to the value of entrepreneurship education programme and entrepreneurial learning on individuals' ESE by applying ESE measures to entrepreneurship education. Results indicated that participation in the entrepreneurship training programme had a positive significant impact on the ESE of the participants. Piperopoulos and Dimov (2015) assessed entrepreneurial intention of students in relation to theoretical and practical entrepreneurship courses. The authors found that higher ESE is associated with lower entrepreneurial intentions in theoretical-related courses, while higher entrepreneurial intentions are associated with practical related courses. This supports the assumption that entrepreneurship is practice oriented. Using the entrepreneurship tool developed by Gedeon and Valliere (2018), Mozahem and Adlouni (2021) demonstrated that students who have taken entrepreneurship courses show higher self-efficacy than students who are yet to take the courses. Ahmed et al. (2020) applied the components of theory of planned behaviour and empirically proved that entrepreneurship training programme significantly influence perceived control (self-efficacy) of students. Nowiński et al. (2019) also proved that entrepreneurship education positively affects ESE task-specific of searching for opportunities, business planning, resource marshalling, and financial skills. Therefore, the relationship between entrepreneurship education components (technical skills, business management skills, personality skills) and ESE business searching, business planning, resource marshalling, and business implementing is hypothesised as follows:

Hypothesis 1

H1a: EE in terms of (a) technical skill, (b) business management skill, (c) personality skill significantly contributes to ESE business searching for start-up establishment.

H1b: EE in terms of (a) technical skill, (b) business management skill, (c) personality skill significantly contributes to ESE business planning for start-up establishment.

H1c: EE in terms of (a) technical skill, (b) business management skill, (c) personality skill significantly contributes to ESE resource marshalling for start-up establishment.

H1d: EE in terms of (a) technical skill, (b) business management skill, (c) personality skill significantly contributes to ESE business implementing for start-up establishment.

Mediating roles of ESE

ESE has also been found to significantly mediate the relationship between intent to start a business and behaviours of individuals as influenced by entrepreneurship education. The study conducted by Hien and Cho (2018) reveals that entrepreneurship based on self-efficacy shows significant mediating effects on innovative start-up intentions of university students in Vietnam. Nowiński et al. (2019) examined the contribution of entrepreneurship education to entrepreneurial intention of university students from Czech Republic, Slovakia, Hungary, and Poland. The results showed that entrepreneurship education had direct impact on the students' entrepreneurial intention in Poland only, being the only one of the four countries that established entrepreneurship education at high school level. Additionally, the authors found that ESE task related to searching, planning, marshalling and implementing mediated the influence of entrepreneurship education on entrepreneurial intention. The study conducted in China by Wu

et al. (2022) showed that ESE had complete mediating effects between entrepreneurship education and college students' entrepreneurial intention to start a business. In a similar vein, Hoang et al. (2021) investigated the mediating roles of self-efficacy between entrepreneurship education and entrepreneurial intentions of university students in Vietnam. The authors argue that entrepreneurship education positively influences entrepreneurial intention, and the relationship is strongly mediated by self-efficacy. Yeh et al. (2021) further elucidate the significant mediating effects of Internet ESE in the relationship between entrepreneurial education and internet entrepreneurial performance. The study conducted by Prabhu et al. (2012) on proactive personality and entrepreneurial intent reveal that ESE completely mediated the relationship between proactive personality, and two manifestations of entrepreneurial intention (lifestyle EI and high growth EI). In India, Kumar and Shukla (2022) demonstrated that ESE fully mediated the relationship between creativity and entrepreneurial intention of management students. Likewise, Udayanan (2019) highlighted that the influence of self-efficacy on entrepreneurial intention was fully mediated by ESE.

In African context, few empirical studies have been conducted to comprehend the importance of ESE in strengthening entrepreneurial readiness for start-ups. The empirical study conducted in Ghana by Puni et al. (2018) indicated that ESE is a central cognitive mechanism that can transform entrepreneurship education to start-up intention. The authors found that ESE significantly mediated the relationship between entrepreneurship education and students' start-up intentions. Oyugi's (2015) study found that ESE partially mediated the relationship between entrepreneurship education and entrepreneurial intention among university students in Uganda. Scholars have argued that theoretical entrepreneurship education in Africa may work differently in developed countries (Puni et al., 2018), and call for further investigation on the effects of ESE as a determinant of start-ups readiness. Mc Gee et al. (2009) added that one of the challenges hindering the development and effective application of ESE construct is researchers' over reliance on data collected from university students. The application of ESE construct within the context of TVET institutions is under-researched (Pihie and Bagheri, 2011), especially in Africa (Adeniyi et al., 2022).

Based on the mediating effects of ESE in the relationship between entrepreneurship education and readiness to start a new business, the hypothesis is formulated thus:

Hypothesis 2

H2a: ESE business searching significantly mediates the relationship between EE in terms of (a) technical skill, (b) business management skill, (c) personality skill and start-up readiness.

H2b: ESE business planning significantly mediates the relationship between EE in terms of (a) technical skill, (b) business management skill, (c) personality skill and start-up readiness.

H2c: ESE resource marshalling significantly mediates the relationship between EE (technical skill, business management skill, personality skill and start-up readiness).

H2d: ESE business implementing significantly mediates the relationship between EE in terms of (a) technical skill, (b) business management skill, (c) personality skill and start-up readiness.

Start-up readiness

Based on the social cognitive theory, start-up readiness is measured from the cognitive element, and personal willingness of an individual to engage in entrepreneurial activities (Mitchell et al., 2000). In line with this assertion, Lau et al. (2012) define start-up readiness as a person's cognitive characteristics of capability, and

willingness to act entrepreneurially. In defining entrepreneurial readiness, Coduras et al. (2016) acknowledge the cognitive element as personality traits that differentiate entrepreneurially inclined individuals with readiness for entrepreneurship, and competence to exploit environmental potentials. This suggests that individuals' readiness for start-ups depends on the ability to harness environmental opportunities, and utilises entrepreneurial capability (Olugbola, 2017). This position conforms with the view of Shane et al. (2003) who assert that the success of any business start-up depends on the entrepreneurial readiness to turn ideas or opportunities into a business enterprise. In this regard, Schillo et al. (2016) view start-up readiness as a significant force to individuals' entrepreneurial intention, and individual start-up readiness has been found to have significant association with entrepreneurial behaviour (Raza et al., 2019). This study argued that potential entrepreneurs are more likely to start a business if they were willing to harness business opportunities and possess the entrepreneurial capability to succeed in the start-up. There is only a small body of literature on the start-up readiness of young people in Africa, especially within the context of TVET institutions. The current study aims to fill this gap.

ESE and start-up readiness

The attainment of a goal for starting a new business is associated with efficacious individuals. ESE is, perhaps, the most predominant and significant catalyst towards readiness for business start-ups. (Newman et al., 2019; Adeniyi et al., 2022). Empirical bank of data exists on how ESE improves readiness to engage in entrepreneurial activities. For instance, through an entrepreneurial priming intervention, Bachmann et al. (2021) show how improved level of ESE can increase positive attitude towards starting a new business venture by comparing two control groups. Gielnik et al. (2020) found that ESE is positively related to business ownership after a year entrepreneurship training programme for nascent African entrepreneurs. Based on Bandura's self-efficacy theory, Yusof et al. (2018) found that increase in performance achievement self-efficacy and verbal persuasion self-efficacy yielded equal increase in Malaysian students' entrepreneurial intention. The study conducted by Hechavarria et al. (2012) on nascent entrepreneurs revealed that having a specific goal and higher ESE are related to the establishment of a new business. The authors also found a strong relationship between ESE and business planning. A multi-construct approach by Nowinski et al. (2019) proves that ESE searching, planning, and marshalling activities mediates the impact of entrepreneurship education on entrepreneurial intention. However, the study conducted by Mueller and Goic (2003) and Adeniyi et al. (2022) revealed that ESE marshalling shows an insignificant relationship with students' entrepreneurial readiness to start a new business. Therefore, this study postulates thus:

Hypothesis 3

H3: ESE in terms of (a) business searching, (b) business planning, (c) resource marshalling and (d) business implementing significantly impact start-up readiness for business creation.

Theoretical framework

The theory of planned behaviour is arguably the most predominant concept in determining entrepreneurial behaviour due to its logical ability to predict individuals' entrepreneurial perception. According to Ajzen (1991), the theory of planned behaviour is grounded in three underlying predictors of human behaviour. This includes subjective norms (opinions of social relations such as family and friends), attitude towards behaviour (favourable or unfavourable), and perceived control over the

behaviour (ease or impossibility of performing the act). Several studies within entrepreneurship domain have underscored the three components to comprehend the nature of actual behaviour (Carr and Sequeira, 2007; Kautonen et al., 2015; Gorgievski et al., 2018; Joensuu-Salo et al., 2021; Maheshwari and Kha, 2022). For instance, Carr and Sequeira (2007) adopted a symbolic interactionist view to demonstrate the relationships between perceived family support, attitudes of nascent entrepreneurs and ESE. The results indicated that prior exposure to family business shows significant effects on entrepreneurial intention. Kautonen et al.'s (2015) study on 969 adults from Austria and Finland revealed that attitude, subjective norm and behavioural control were able to predict 59% variations in entrepreneurial intentions. The authors concluded that the theory of planned behaviour possesses the empirical justification to predict subsequent entrepreneurial intentions and business start-up behaviour (Kautonen et al., 2015).

The study conducted by Sabah (2016) among undergraduate students in Turkey revealed that all variables in the model of TPB show significant support for entrepreneurial intention particularly self-efficacy and personal attitude as moderated by start-up experience. A cross-country analysis by Gorgievski et al. (2018) suggests that TPB constructs (attitude, social norms and self-efficacy) and value partially mediated differences in entrepreneurial intentions of 823 students from Netherland, Germany, Poland and Spain. The study by Joensuu-Salo et al. (2021) found that subjective norm shows direct support for takeover intentions, while the effect of entrepreneurship competence was mediated by attitudes and perceived behavioural control. In addition, empirical findings from Maheshwari and Kha (2022) found that all components of TPB and ESE significantly and positively mediated the relationship between entrepreneurship education and entrepreneurial intentions. Ajzen (1991) stated that the concept of perceived behavioural control is most compatible with perceived self-efficacy which influences behavioural actions. This implies that the adopted task related ESE in this study is best fit into the framework of perceived control (Liñán et al., 2011) which could also be determined by the context of opportunity such as entrepreneurship education towards business start-ups (Ajzen, 1991). Hence, TPB is a useful tool to underscore the mediating effect of ESE in the relationship between entrepreneurship education and start-up readiness.

Research model

The model in Fig. 1 below shows the association between entrepreneurship education components (technical skills, business management skills, personality skills) and ESE task-specific components (searching, planning, marshalling, implementing) (Nowinski et al., 2019). The mediating effects of ESE between entrepreneurship education and start-up readiness (Wu et al., 2022) to create a new business is also addressed in this study. The model also depicts the direct relationship between ESE and start-up readiness.

Methodology

This study is underscored within the positivist philosophical worldview. The scientific principle of hypotheses formulation and validation were applied to determine the entrepreneurial readiness of young individuals toward starting a business.

Samples. One of the objectives of this study was to examine the linkages between entrepreneurship education, entrepreneurial self-efficacy, and start-up readiness within the context of TVET colleges. A survey method was adopted via self-administration of questionnaire to 301 college students from three selected TVET

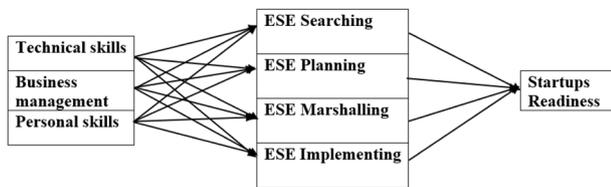


Fig. 1 The Mediating Effects of ESE in the Relationship between EE and start-ups readiness.

institutions in Nigeria. The basic mission of establishing TVET colleges was to equip young minds with technical and entrepreneurial skills to become self-employed. Some of the exit level students were already self-employed at the time of this study. A total of 296 questionnaires were completed but only 289 were valid for analysis due to missing answers. According to Hair et al. (2017), a minimum sample size of 130 allows a research model with 2 exogenous variables to determine R^2 coefficient of 0.10 and a 1% level of significance within 80% statistical power, which is generally applied. Therefore, the sample size in this study justified the use of PLS analysis approach.

A little above half (55%) of the sample was male and 45% was female. The age distribution of the participants was <20 (83%), 20–24 (15.6%), 25–29 (0.7%), and >35 (0.7%). All the participants were sampled from all the designated departments in the selected TVET colleges. The majority of the sample (30.1%) were from Business Studies department, (17.6%) from Computer Engineering, Automobile Engineering (14.2%), Graphic Arts (9%), Catering (9%), Mechanical Engineering (8.3%), Bricklaying and Concrete (0.7%), Garment making (0.7%), Electrical Electronic (0.7%), Plumbing and Fittings (5.9%), and Welding and Fabrication (5.9%).

Measures

Entrepreneurship education. The items of entrepreneurship education used in this study were adapted from Elmuti et al. (2012) who validated the construct by proving that entrepreneurial behaviour, managerial skills and personal skills are essential for successful business performance. A total of 37 modified items were adopted as measures for entrepreneurship education. The participants were required to rate the extent to which they possess these skills using a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree).

Entrepreneurial self-efficacy. ESE was measured using McGee et al. (2009) multi-dimensional ESE scale. The items focused on ESE performance stages (searching, planning, marshalling, implementing) of becoming nascent entrepreneurs. A total of 19 items were validated with an internal consistency of 0.8 reliability value. Additionally, 22 validated items by Maritz and Brown (2013) were also adapted for measuring ESE task-specific phases in this study. This makes a total of 33 measuring items for ESE multi-construct. The same 6-point Likert scale was used as explained above.

Start-up readiness. Measures for start-up readiness were adapted from the validated instrument developed by Coduras et al. (2016), which was used to measure an individuals' entrepreneurial readiness. The items were scored on the same 6-point Likert scale as mentioned above.

Data analyses. First, a test of normality was performed by examining the skewness and kurtosis of the distribution.

As shown in Table 2 above, the coefficient of skewness and kurtosis suggests that the sample is moderately skewed. The

skewness shows that all the values are not within the acceptable range of -0.5 and 0.5 for normal distribution. The value of kurtosis for all the variables was not within the acceptable range of -3 and $+3$. For this reason, it is important to conduct a multicollinearity test to further assess variance inflation factors.

A dimension reduction process was performed to check for multi-collinearity of the variables by assessing the Variance Inflation Factors.

Results from Table 3 above shows that the variance inflation (VIF) values were all below 10, as well as high tolerance values (tolerance >0.10). Thus, multi-collinearity was not an issue, and the correlation and Partial least square analysis results can be relied upon.

The result of the correlation analysis in Table 4 revealed that all the components of entrepreneurship education and ESE show significant relationship with start-up readiness. The result also shows that all the dimensions of entrepreneurship education significantly influence all the dimensions of ESE.

Furthermore, Partial Least Square Structural Equation Modelling (PLS-SEM) from the Smart PLS 4 software (Ringle et al., 2022; Basco et al., 2022) was used to examine the theoretical model. The PLS-SEM technique is a causal modelling approach that focuses on maximising the variance of the dependent latent constructs explained by the independent variables (Nitzl, 2016; Guenther et al., 2023). Smart PLS has been widely used to measure relationships and mediation effects in various management and entrepreneurship studies (Kaynak et al., 2015; Cassol et al., 2022; Salameh et al., 2023).

Measurement model. The assessment of the reflective measurement models, which applies to all but one construct in the model, includes indicator reliability, internal consistency reliability, convergent and discriminant validity. As shown in Table 1 above, Cronbach's alpha and composite reliability values were above 0.7, generally considered acceptable and reflecting internal consistency reliability.

As shown in Table 1 above, this study assessed convergent validity through indicator reliability and average variance extracted (AVE). Regarding indicator reliability, most of the indicator's standardised outer loadings were above the critical threshold of 0.7. Two items (*ESEIMP4*, *SRI*) with extremely low loadings (<0.4) were deleted and the model was rerun. Except for a few constructs, the AVE values were well above the 0.5 threshold, supporting convergent validity (Hair Jr et al., 2022). However, even if AVE was less than 0.5 but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate (Fornell and Larcker, 1981). In other words, the Composite Reliability establishes that the construct can be retained even when AVE is less than .5.

The study further assessed how well the construct measures discriminate empirically, termed discriminant validity. Table 2 above shows the results of the heterotrait-monotrait ratio (HTMT) assessment for discriminant validity, which is superior to both the Fornell and Larcker criterion and the assessment of cross-loadings (Henseler et al., 2015). All but a few HTMT values were higher than the recommended threshold of 0.90. A bias-corrected and accelerated (BCa) bootstrap confidence interval with 5000 resamples (Cheah et al., 2019) showed that the HTMT values >0.90 were statistically different from 1. These results provide support for discriminating validity for all constructs.

To assess the structural model, this study reported the coefficient of determination (R^2), path coefficients, and corresponding p values, including their significance tests.

The R^2 values, ranging from 0.542 to 0.702, suggest that the model provided good explanatory power. The model explained

Table 1 Constructs reliability and convergent validity.

Constructs and items	Loading	α	CR	AVE			
<i>Entrepreneurship education: technical skills</i>							
TS: I can communicate my views with fluency in English.	0.691	0.870	0.896	0.464			
TS: I find it easy to listen and understand what others are saying.	0.672						
TS: I can use technology effectively to communicate with others.	0.687						
TS: I find it easy to confront other peoples' problems and resolve them.	0.573						
T: I can write my ideas and opinions clearly to convince my audience.	0.771						
TS: I find it easy to make clear and concise presentations to others.	0.616						
TS: I try to find the real cause of problems before acting.	0.735						
TS: I can think in a logical manner when approaching and solving problems.	0.702						
TS: I am able to look at the big picture when approaching a problem that needs solving.	0.662						
TS: I can ask questions to get information that can give me a better understanding of a problem.	0.680						
<i>Entrepreneurship education: business management skills</i>							
BMS: I can make quick but clear decisions to encourage others into action.	0.688	0.894	0.912	0.487			
BMS: I take responsibility for decisions I make and actions I take.	0.757						
BMS: I can easily get information to help me make decisions.	0.686						
BMS: I usually set achievable/realistic targets.	0.628						
BMS: I develop plans for specific goals and tasks.	0.744						
BMS: I consider a wide range of alternatives before taking a decision.	0.790						
BMS: I am able to set a budget.	0.708						
BMS: I am able to keep financial records.	0.679						
BMS: I am able to communicate with business partners from other countries.	0.671						
BMS: I am able to understand the value of my local currency for foreign exchange.	0.700						
BMS: I have sound financial awareness.	0.605						
<i>Entrepreneurship education: personal skills</i>							
PS: I prefer to work under my own direction.	0.628	0.892	0.911	0.482			
PS: I can identify business opportunities online for myself and my community.	0.738						
PS: I can search for business information on the internet.	0.730						
PS: I can sell or market products through the social media.	0.686						
PS: When I see something needs doing, I do it without being asked.	0.651						
PS: I find it easy to convince people to accept an idea or buy a product.	0.699						
PS: Being the best in the field is very important to me.	0.664						
PS: I can adapt easily to new situations.	0.675						
PS: I have open and friendly approach towards people.	0.706						
PS: I find it easy to develop relationships with people.	0.716						
PS: I can easily direct people and motivate them.	0.731						
<i>Entrepreneurial Self-efficacy: searching for opportunities.</i>							
ESEBUS: I am confident that I have the ability to identify a good business opportunity.	0.806	0.831	0.881	0.598			
ESEBUS: I am confident that I have the ability to identify the need for new products or services.	0.764						
	0.807						
ESEBUS: I am confident that I have the ability to identify a new product that can satisfy customers' needs.	0.738						
ESEBUS: I am confident that I have the ability to come up with a new idea for a product or service	0.747						
ESEBUS: I am confident that I have the ability to identify business opportunities from people's needs.	0.691						
<i>Entrepreneurial Self-efficacy: business planning</i>							
ESEPLN: I am confident that I can develop my idea into a business plan.	0.704				0.736	0.835	0.559
ESEPLN: I am confident that I have the ability to design an effective marketing/advertising strategy for a new product or service.	0.752						
ESEPLN: I am confident that I have the ability to determine the right workers and environment for my business idea.	0.825						
ESEPLN: I am confident that I have the ability to clearly explain my business plan both in writing and verbally.	0.705						
<i>Entrepreneurial Self-efficacy: marshalling resources</i>							
EEMSH: I am confident that I have the ability to influence people to believe in my new business.	0.767	0.792	0.857	0.544			
EEMSH: I am confident that I have the ability to raise money to start a business.	0.752						
EEMSH: I am confident that I can convince people to make financial contributions towards starting my business.	0.747						
EEMSH: I am confident that I have the ability to motivate people to partner with me.	0.710						
EEMSH: I am confident that I have the ability to convince people to commit their time and energy for my business.	0.711						
<i>Entrepreneurial Self-efficacy: implementing business.</i>							
ESEIMP: I am confident that I have the ability to start a small business with limited resources.	0.691	0.838	0.878	0.507			
ESEIMP: I am confident that I have the ability to manage my financial resources.	0.731						
ESEIMP: I am confident that I can satisfy my customers by addressing their needs.	0.711						
ESEIMP: I am confident that I have the ability to sustain my business for more than 5 years	0.308						
ESEIMP: I am confident that I have the ability to use new technology that will make my business competitive.	0.717						
ESEIMP: I am confident that I have the ability to deal effectively with day-to-day problems and crises.	0.667						
ESEIMP: I am confident that I have the ability to face challenges I come across in my business.	0.712						
ESEIMP: I am confident that I have the ability to make my unique idea a reality.	0.738						
<i>Start-up readiness</i>							
SR: I believe I have the technical skills needed to run a business in the 21 st century.	0.269				0.903	0.918	0.484
SR: I can improve on an existing technology by creating a better version to satisfy peoples' needs.	0.766						
SR: If I fail at something, I have the ability and endurance to try again until I get a result.	0.693						
SR: I am able to browse the internet for business solutions	0.711						
SR: I am able to identify and protect my business against any online fraud activities.	0.716						
SR: I can cope with multiple demands on me at the same time.	0.689						
SR: I am able to use computer software that applies to my technical and vocational field.	0.662						

Note: Items corresponding to bolded values were deleted from the model due to insufficient factor loading.
 α Cronbach alpha, CR composite reliability, AVE average variance extracted, TS technical skills, BMS business management skills, PS personal skills, ESEBUS ESE business searching, ESEPLN ESE planning, EEMSH ESE marshalling, ESEIMP ESE implementing, SR start-up readiness.

the variation in ESEBUS by 54.2%, ESEPLN by 61.2%, EEMSH by 54.4%, ESEIMP by 70.2%, and SR by 54%. The R^2 values are higher than what would indicate a substantial model.

The path analytic results (Table 3 and Fig. 1) showed that ESEBUS was significantly and positively influenced by TS ($\beta = 0.436, p < 0.001$) and BMS ($\beta = 0.302, p < 0.01$), but an insignificant relationship was found between PS and ESEBUS ($\beta = 0.034, p > 0.05$). Therefore, H1aa and H1ab were accepted, while H1ac was rejected. In a similar vein, ESEPLN was significantly and positively influenced by TS ($\beta = 0.479, p < 0.001$) and BMS ($\beta = 0.283, p < 0.01$), but the relationship between PS and ESEPLN shows an insignificant score ($\beta = 0.061, p > 0.05$). Therefore, H1ba and H1bb were accepted, while H1bc was rejected. Additionally, ESEIMP was significantly and positively influenced by TS ($\beta = 0.355, p < 0.001$) and BMS ($\beta = 0.379, p < 0.001$), but no significant relationship was found between PS and ESEIMP ($\beta = 0.156, p > 0.05$). As result of this, H1ca and H1cb were accepted, but H1cc was rejected (Fig. 2).

However, EEMSH was significantly and positively influenced by TS ($\beta = 0.238, p < 0.05$), BMS ($\beta = 0.287, p < 0.01$), and PS ($\beta = 0.264, p < 0.01$). Thus, H1da, H1db, and H1dc were accepted. Examination of the relationship between ESE and SR revealed that SR was significantly and positively influenced by ESEBUS ($\beta = 0.178, p < 0.05$), ESEPLN ($\beta = 0.158, p < 0.05$), EEMSH ($\beta = 0.136, p < 0.05$), and ESEIMP ($\beta = 0.340, p < 0.001$). Therefore, H3a, H3b, H3c and H3d were accepted.

Mediation analysis: Indirect effects. In terms of mediating effects, Table 7 evaluates specific indirect path coefficients and their magnitudes and significance.

ESEBUS significantly ($\beta = 0.078; p < 0.05$) mediates the relationship between TS and SR but failed to significantly mediate the relationship between other pairs of entrepreneurship education (BMS $\beta = 0.054; p > 0.05$; and PS $\beta = 0.006; p > 0.05$) and SR. Thus, H2aa was accepted, while H2ab and H2ac were rejected.

In the same vein, only the relationship between TS and SR was significantly mediated by ESEPLN ($\beta = 0.075; p < .05$), while insignificant relationships were found between other pairs of entrepreneurship education (BMS $\beta = 0.054; p > 0.05$; PS $\beta = 0.010; p > 0.05$) and SR. Therefore, H2ba was accepted but H2bb and H2bc were rejected.

On one hand, ESEIMP significantly mediates the relationship between two pairs of relationships: TS and SR ($\beta = 0.121; p < 0.01$) and BMS and SR ($\beta = 0.129; p < 0.001$) but insignificantly mediate the relationship between PS and SR ($\beta = 0.053; p > 0.05$). Therefore, H2ca and H2cb were accepted, while H2cc was rejected. On the other hand, EEMSH shows insignificant mediation between all the components of entrepreneurship education and SR (TS $\beta = 0.032; p > 0.05$; BMS $\beta = 0.039; p > 0.05$; PS $\beta = 0.036; p > 0.05$). Consequently, H2da, H2db, and H2dc were rejected.

Discussion of findings. Entrepreneurship is the epicentre of economic prosperity. Entrepreneurship education is the tool that can combat unemployment by providing entrepreneurial skills for employment opportunities and creation of start-ups. Previous studies have demonstrated that exposure to entrepreneurship education may not necessarily influence individual entrepreneurial intention or self-efficacy (Zhang et al., 2014; Bae et al., 2014). Accordingly, ESE may not promote entrepreneurial readiness (Nowiński et al., 2019; Adeniyi et al., 2022). Thus, the mediating effects of ESE in the relationship between entrepreneurship education and start-up readiness within developing context remains elusive among young minds in TVET colleges and this requires more empirical validation.

The influence of entrepreneurship education on ESE was investigated. Furthermore, the mediating effects of ESE in the relationship between entrepreneurship education and start-up readiness were examined in this study. The findings show that ESE business searching, ESE business planning, and ESE business implementing were significantly influenced by technical skills and business management skills. The significant effects of technical skills, communication, and cognitive skills have been proven to improve entrepreneurial skills among postgraduate students (Salamzadeh et al., 2022). Entrepreneurial skills such as the ability to search and identify business opportunities, develop business plans, and establish a new business have been reported to increase students' ESE (Izquierdo and Buelens, 2011). In some developed contexts, the practice of entrepreneurship education is aimed at enhancing the mechanism associated with ESE (Zhao et al., 2005). This is evident in the empirical report of Nowiński et al. (2019), in which entrepreneurship education directly and significantly influenced ESE business searching ability, ESE business planning, and ESE business implementing of university students from Visegrad countries. The finding also supports the

Table 2 Test of normality.

	N statistic	Skewness		Kurtosis	
		Statistic	Std. error	Statistic	Std. error
TS	289	-1.646	0.143	3.672	0.286
BMS	289	-1.611	0.143	3.153	0.286
PS	287	-1.659	0.143	3.539	0.287
ESEBUS	289	-1.580	0.143	3.132	0.286
ESEPLN	289	-1.345	0.143	2.199	0.286
EEMSH	289	-1.339	0.143	2.052	0.286
ESEIMP	289	-1.679	0.143	3.939	0.286
SR	288	-1.576	0.143	3.677	0.286

Table 3 Test of multicollinearity.

	B	Std. error	T	Sig.	Tolerance	VIF
Constant	0.476	0.219	2.179	0.030		
TS	-0.75	0.082	-0.911	0.363	0.229	4.366
BMS	0.289	0.083	3.467	<0.001	0.221	4.528
PS	0.294	0.076	3.873	<0.001	0.277	3.607
ESEBUS	0.158	0.062	2.527	0.012	0.355	2.817
ESEPLN	0.076	0.067	1.136	0.257	0.301	3.318
EEMSH	0.027	0.059	0.450	0.653	0.348	2.873
ESEIMP	0.120	0.077	1.552	0.122	0.242	4.126

Dependent variable: start-up readiness.

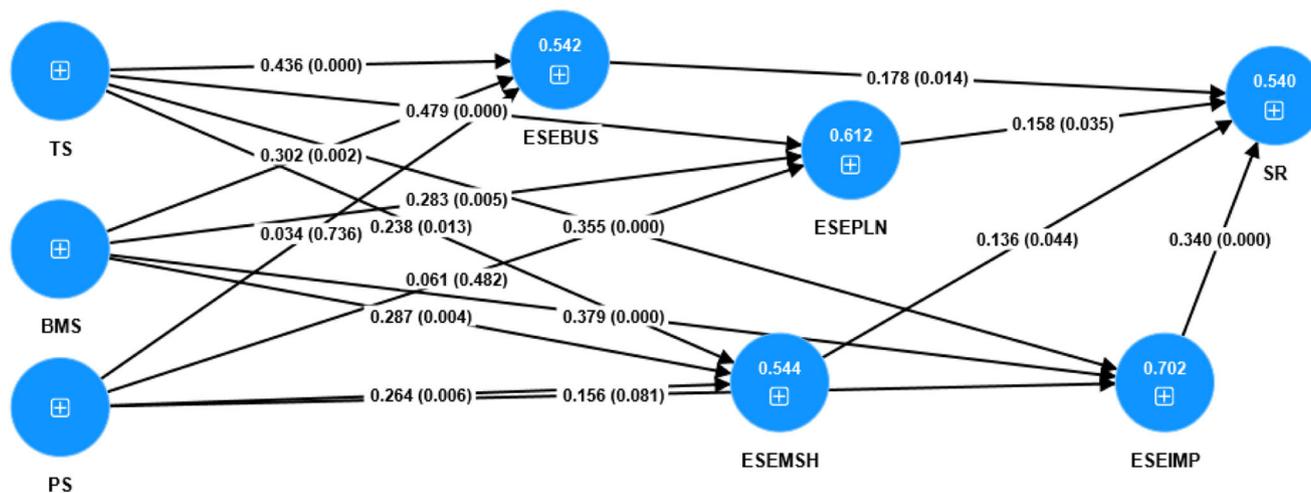


Fig. 2 Structural Equation Model.

Table 4 Spearman's correlation coefficient.

Variables	1	2	3	4	5	6	7
1 TS	1						
2 BMS	0.725**	1					
3 PS	0.678**	0.701**	1				
4 ESEBUS	0.604**	0.593**	0.497**	1			
5 ESEPLN	0.672**	0.653**	0.567**	0.691**	1		
6 EEMSH	0.577**	0.618**	0.620**	0.609**	0.652**	1	
7 ESEIMP	0.711**	0.722**	0.668**	0.592**	0.682**	0.660**	1
8 SR	0.631**	0.713**	0.703**	0.565**	0.614**	0.602**	0.636**

**Correlation is significant at the $p < 0.01$ level (2-tailed).

report of Zhao et al. (2005) and Dana et al. (2021), in which learning from entrepreneurship-related modules show significant support for ESE, and tech start-up development in the US.

The insignificant relationship between personal skills and ESE business searching ability, ESE business planning, and ESE business implementing shows the essential need to develop personal entrepreneurial attributes to accomplish specific entrepreneurial activities. This is consistent with the finding of Cassol et al. (2022), in which entrepreneurship education failed to support determinants of entrepreneurial intention. However, this result is in contrast with a similar study conducted by Awang et al. (2014), in which personality traits provide support for students' intention to choose entrepreneurial career after graduation. Likewise, Boubker et al. (2021) found a significant relationship between entrepreneurship education, attitudes towards entrepreneurship and students' entrepreneurial intention. Despite the essential role of entrepreneurship education in skills development, the opportunities are yet to be harnessed in Africa (Herrington and Coduras, 2019). Sabokro et al. (2018) argue that the lack of basic entrepreneurial skills for task accomplishment is the key factor of an entrepreneur's failure. One of the perceived learning outcomes of entrepreneurship education is entrepreneurial skills education. However, several studies suggest that the structure of the entrepreneurship curricular in Africa is deficient of quality content and practical translations (Nwambam et al., 2018; Jegede and Nieuwenhuizen, 2020), which is one of the causes of low business spin-offs and youth unemployment in the continent (Ogbonna et al., 2022).

The result of this study also validates the significant contribution of entrepreneurship education to ESE marshalling ability, in which all pairs of entrepreneurship education

significantly influence ESE ability to marshal economic resources for start-up readiness. This report buttresses Nowiński et al.'s (2019) finding, in which entrepreneurship education directly contributed to ESE marshalling ability to enhance university students' intention. However, previous empirical studies reveal that ESE ability to marshal economic resources failed to provide direct support for students' entrepreneurial intention both in developed (Mueller and Goic, 2003) and developing economies (Adeniyi et al., 2022). These results further explain the importance of entrepreneurship education as a mechanism for strengthening ESE. According to these results, there is evidence to suggest that personal entrepreneurial skills are essential antecedents to enhance the ability to gather economic resources for start-up readiness, especially in a developing context like Nigeria.

Izquierdo and Buelens (2011) noted that higher level entrepreneurship education would report higher level of ESE, and in turn, more start-up readiness. Entrepreneurship education must address personal entrepreneurial attributes such as risk-taking, innovativeness and resilience skills towards starting a new business (Ramadani et al., 2022; Hosseini et al., 2022). Previous studies within the developing contexts have indicated that entrepreneurship education content should incorporate simulation-based training, role play, mentoring and case studies via practical translations (Badri and Hachicha, 2019; Cassol et al., 2022; Salameh et al., 2023).

Examination of the relationship between ESE and SR revealed that SR was significantly and positively influenced by all dimensions of ESE. This finding further provides support for previous empirical evidence that ESE is a catalyst for start-up readiness (Newman et al., 2019; Bachman et al., 2021), and business ownership (Gielnik et al., 2020). Besides, the four

task-phases of ESE have been validated to stimulate entrepreneurial readiness in a developing context (Adeniyi et al., 2022). This study also revealed that ESE business implementing ability has the highest score ($\beta = 0.340$, $p < 0.001$) and most significant mediating factor that can stimulate start-up readiness among the students. ESE business implementing deals with taking business actions such as decision making, managing all human and financial resources, and sustaining the business. It is the most complex entrepreneurial skill as it deals with a lifelong activity without which other skills are docile. It is worthy of note that implementing a new business in a country like Nigeria requires a resilience attitude for success. This is evident in the GEM 2019 report, in which government bureaucracies, poor education, lack of access to finance, and corruption put administrative burdens on start-ups cost (Dvouletý and Orel, 2019).

The assessment of the mediating effects of ESE shows that ESE business searching, and ESE planning significantly mediated the relationship between technical skills and start-up readiness but failed to significantly mediate the relationship between other pairs of entrepreneurship education (business management skills and personal skills) and start-up readiness. This outcome is in line with Oyugi's (2015) study, in which the author found that ESE partially mediated the relationship between entrepreneurship education and entrepreneurial intention. However, the result is quite different from the report of the studies conducted by Hoang et al. (2021) and Wu et al. (2022), in which all components of ESE completely mediated the relationship between entrepreneurship education and entrepreneurial intention. This variation justifies the views of Smith and Betz (2000). The authors provide clarification on the need to strengthen specific self-efficacy within specific career domains such as TVET. This finding also validates that TPB holds in Nigeria. Increase in favourable perceived behavioural control or ESE increases the chance of start-up readiness especially in technological domain (Azjen, 2020). Accordingly, the partial mediation effect of ESE indicates the importance of enhancing ESE towards increasing the rate of tech start-ups among science and engineering students, thereby reducing the rate of youth unemployment in Nigeria.

Further investigation indicates that ESE business implementing significantly mediates the relationship between two components of entrepreneurship education (in terms of technical skills and business management skills) and start-up readiness but shows insignificant relationship between personal skills and start-up readiness. The lack of mediation effect of ESE in the relationship between personal skills and start-up readiness further justifies the low level of personal entrepreneurial traits of young individuals from the selected TVET colleges. Recall that apart from ESE marshalling, personal skills show no significant influence with ESE business searching ($\beta = 0.34$, $p > 0.05$), ESE business planning ($\beta = 0.061$, $p > 0.05$), and ESE business implementing ($\beta = 0.156$; $p > 0.05$). These findings provide more insights on the importance of developing personal entrepreneurial skills (in terms of risk-taking skills, innovative skills and resilience skills) for start-up readiness as indicated by various scholars (Almahry and Sarea, 2018; Badri and Hachicha, 2019). Findings from this study have shown the crucial need to develop personal entrepreneurial attributes toward business start-ups. Accordingly, there is evidence to suggest that entrepreneurship education can build students' confidence to implement a business start-up.

Furthermore, ESE business marshalling did not significantly mediate the relationship between all the components of entrepreneurship education and start-up readiness. This further suggests the lack of business marshalling ability or resource gathering skill among the selected students from Nigeria. It is worthy of note that the ability to gather capital, employees, suppliers, and assets for business creation is a major challenge for nascent entrepreneurs in

Nigeria. This is because the entrepreneurial ecosystem in Nigeria is entrepreneurially hostile as student-entrepreneurs often struggle to access financial support to grow their new start-ups. Access to finance is a major challenge for potential entrepreneurs in Africa, including Nigeria (Global Entrepreneurship Monitor, 2019). Some of the nascent entrepreneurs who managed to secure loans from financial institutions still struggle to grow the business due to stringent economic policies such as high interest rates on loans and high tax rates. To this end, extant literature revealed that nascent entrepreneurs demonstrate higher tax evasion compared to established entrepreneurs (Batrancea et al., 2022), and this, perhaps is as a result of lack of intrinsic motivation to comply to pay (Ramona-Anca and Larissa-Margareta, 2013).

Contribution highlights.

- The findings revealed that entrepreneurship education shows a partial relationship with ESE.
- ESE partially mediates the relationship between entrepreneurship education and start-up readiness.
- Personal entrepreneurial skills are essential antecedents that can enhance the ability to gather economic resources for business start-ups.
- Another contribution of this study indicates that there is need for universities and entrepreneurship professionals to improve the level of social cognitive value (personal entrepreneurial traits) among young individuals in Nigeria.

Theoretical implications. This is one of the first studies to examine the mediating effects of ESE among students of TVET colleges in a developing context. This study provides empirical evidence that ESE is best measured as a multidimensional construct (McGee et al., 2009). Different from Nowiński et al. (2019), which focused on the relationship between entrepreneurship education, entrepreneurial self-efficacy, gender and entrepreneurial intention, and Wu et al. (2022), which examined the relationship between entrepreneurship education, entrepreneurial self-efficacy on entrepreneurial intention, a multi-construct entrepreneurship education and entrepreneurial self-efficacy effects on start-up readiness were examined in this study. The finding that entrepreneurship education provides partial support for ESE towards start-up readiness has some important implications. The insignificant relationships between personal entrepreneurial skills and ESE, and partial mediating effect of ESE in the relationship between personal entrepreneurial skill and start-up readiness, shows the low level of social cognitive value compared to human capital value. Previous study has shown that human capital value is more associated with organisational performance (Aman-Ullah et al., 2022), while social cognitive value is concerned with embedded personality traits and use of personal initiative to accomplish a task for goal achievement (Bandura, 1994; Maddux, 2013).

The insignificant mediation effect of ESE marshalling in the relationship between entrepreneurship education and start-up readiness validates the reports from previous studies on the demand for resource gathering skills among young people (Mueller and Goic, 2003; Adeniyi et al., 2022). Findings from this study revealed areas of strength and weakness for both ESE and entrepreneurship education in relation to starting a new business by examining different components of both constructs. Another contribution from this study is the finding that personal entrepreneurial skills are cognitive elements that can stimulate resource gathering ability for start-up readiness. This is a contribution to identified gaps in previous studies which provided little understanding on the specific stimulating factors of entrepreneurial success.

Table 5 Discriminant validity assessment using the Heterotrait-Monotrait ratio (HTMT) criterion.

	TS	BMS	PS	ESEBUS	ESEPLN	EEMSH	ESEIMP	SR
TS								
BMS	0.932							
PS	0.890	0.909						
ESEBUS	0.832	0.794	0.717					
ESEPLN	0.939	0.886	0.816	0.940				
EEMSH	0.812	0.821	0.809	0.867	0.945			
ESEIMP	0.921	0.915	0.854	0.886	0.972	0.921		
SR	0.744	0.811	0.788	0.736	0.782	0.735	0.787	

Managerial implications. Firstly, the examination of dimensions of entrepreneurship education and ESE task-activities indicates a partial relationship. Mostly, personal entrepreneurial skills did not show support for ESE searching, ESE planning, and ESE implementing. Entrepreneurship educators and policy makers should consider these dimensions for creating a new business when designing entrepreneurial curricula. Traditional entrepreneurship education focuses on knowledge in business and management skills, the insignificant role of personal skills suggests that educators place greater emphasis on personality traits of students regarding entrepreneurship activities.

Based on the outcome of this study, the partial and positive mediating role of ESE dimensions suggests the importance of promoting task-related entrepreneurial activities for creating new start-ups. The low level of resource gathering skills for start-up readiness should be addressed through practical entrepreneurial engagements. Economic indicators such as sound monetary policy (inflation and tax regulations) and business regulations (credit and labour) (Bătrâncea and Nichita, 2015) should be made flexible and suitable for new start-ups to thrive.

Conclusion

Several studies have shown that ESE significantly mediated the relationship between entrepreneurship education and intentions (Yang, 2020; Maheshwari and Kha, 2022; Al-Qadasi et al., 2023). The mediating effect of ESE between entrepreneurship education and start-up readiness in developing context is under-researched, especially in Sub-Saharan Africa. Therefore, this study contributed to existing knowledge by demonstrating the contributing effects of ESE to business start-ups. This finding suggests that the more confident young people become in their ability to engage in entrepreneurship, the more their interest toward entrepreneurial activity. Therefore, the adopted dimensions of ESE adopted in this study should be considered as an essential part of entrepreneurship education. This study also contributes to previous studies on the importance of promoting personal entrepreneurial attributes for entrepreneurial careers. Thus, exposing students to entrepreneurship at an early stage can help develop positive entrepreneurial traits from their formative years toward starting a new business and initiating new ideas within existing firms (Izquierdo and Buelens, 2011).

This study also demonstrates the direct effect of entrepreneurship education on ESE. The partial contribution of entrepreneurship education to ESE implies the crucial need to activate learning by doing in entrepreneurship education. The pedagogical approach can incorporate real life experience and business case activities via practical engagements (Tables 5–7).

Limitations of study and future research. Cross-sectional data were used to validate the hypotheses and examine the association between entrepreneurship education, entrepreneurial

Table 6 Structural estimates (hypotheses testing).

	Path coefficients	p values	R ²	Relationship
TS → ESEBUS	0.436***	0.000	0.542	Positive
BMS → ESEBUS	0.302**	0.002		Positive
PS → ESEBUS	0.034	0.736		Positive
TS → ESEPLN	0.479***	0.000	0.612	Positive
BMS → ESEPLN	0.283**	0.005		Positive
PS → ESEPLN	0.061	0.482		Positive
TS → EEMSH	0.238*	0.013	0.544	Positive
BMS → EEMSH	0.287**	0.004		Positive
PS → EEMSH	0.264**	0.006		Positive
TS → ESEIMP	0.355***	0.000	0.702	Positive
BMS → ESEIMP	0.379***	0.000		Positive
PS → ESEIMP	0.156	0.081		Positive
ESEBUS → SR	0.178*	0.014	0.540	Positive
ESEPLN → SR	0.158*	0.035		Positive
EEMSH → SR	0.136*	0.044		Positive
ESEIMP → SR	0.340***	0.000		Positive

*p < 0.05, **p < 0.01, ***p < 0.001.

Table 7 Mediation analysis: indirect effects.

Specific indirect effects	Mediators	Path coefficients	p values
TS → ESEBUS → SR	ESEBUS	0.078*	0.023
BMS → ESEBUS → SR		0.054	0.104
PS → ESEBUS → SR		0.006	0.755
TS → ESEPLN → SR	ESEPLN	0.075*	0.039
BMS → ESEPLN → SR		0.045	0.142
PS → ESEPLN → SR		0.010	0.583
TS → EEMSH → SR	EEMSH	0.032	0.126
BMS → EEMSH → SR		0.039	0.100
PS → EEMSH → SR		0.036	0.164
TS → ESEIMP → SR	ESEIMP	0.121**	0.004
BMS → ESEIMP → SR		0.129***	0.000
PS → ESEIMP → SR		0.053	0.161

*p < 0.05, **p < 0.01, ***p < 0.001.

self-efficacy, and start-up readiness. However, the causal relationships were not proven. Future research should re-examine these relationships from a longitudinal perspective. McGee and Peterson’s (2019) study on the influence of entrepreneurial self-efficacy on entrepreneurial performance, with the collection of data at three specific given times revealed that time lag mitigated the influence of entrepreneurial self-efficacy on entrepreneurial performance. The length of time after school has been reported to affect readiness to start a new business. Longitudinal study during and after school would help to clarify

the relationship between entrepreneurship education, entrepreneurial self-efficacy and start-up readiness within the developing context.

Data availability

The data set is available on the Humanities and Social Sciences Communications Dataverse repository: <https://doi.org/10.7910/DVN/MKQUIY>.

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Competing interests

The author declares no competing interests.

Ethical approval

This study has been ethically reviewed and approved by the University of KwaZulu-Natal, South Africa, Humanities and Social Sciences Research Ethics Committee (approval number HSSREC/00000289/2019). All procedures in this study were in accordance with the institutional research and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all the participants in this study, and confidentiality of the participants was treated according to the POPIA guidelines. The participants were made to sign an informed consent form to validate their voluntary participation in the study.

Additional information

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