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Emotional intelligence and entrepreneurial intention among university undergraduates in Nigeria: exploring the mediating roles of self-effic y domains

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Abstract

How emotional competencies influence entrepreneurial behaviour especially among college students remains an under-researched subject in the entrepreneurship literature. In a unique perspective, this study examined the mediating roles of self-efficacy belief dimensions in the relationship between emotional intelligence and entrepreneurial intention of Electrical/Electronics Technology Education (EETE) students. The study was carried out among 192 EETE university students in 4 federal universities in South-East Nigeria. The hypothesized causal relationships based on literature were tested using covariance-based structural equation modelling (CB-SEM). Andrew Hayes' PROCESS plugin in SPSS was used to simultaneously estimate the mediating effects of the self-efficacy components (perceived competence, perceived control, and perceived persistence). Data analysis results revealed that emotional intelligence had a significant positive effect on entrepreneurial intention in isolation, while the direct effect of emotional intelligence in the structural (mediation) model was not significant. Out of the three dimensions of self-efficacy, perceived competence and perceived persistence had significant partial mediating effects. The implications of the findings and recommendations were discussed.

Keywords: Entrepreneurial intention, Emotional intelligence, Self-efficacy belief, Electrical/Electronics Technology Education

Introduction

Entrepreneurship is widely recognized in literature as a catalyst of economic growth and sustainable development (Mirjana et al., 2018). In Nigeria and some other developing nations, the recognition of the vitality of entrepreneurship as an instrument of economic development is demonstrated in the provision of incentives in the form of grants and loans to encourage venture creation, particularly among the youths.

Technical Vocational Education and Training (TVET) programmes in Nigerian tertiary institutions are designed to equip the learners with the requisite skills and attitudes needed for economic self-reliance via entrepreneurship (Efuwape & Aremu, 2013;

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Ogbuanya & Chukwuedo, 2017; Ogbuanya et al., 2017). Thus, the Federal Government of Nigeria in her National Policy on Education described TVET programmes as a panacea for equity and economic development through the provision of skilled human resources required to boost the nation's economy (Federal Republic of Nigeria, 2013). Electrical/Electronics Technology Education (EETE) programme in Nigerian universities is a subset of TVET aimed at producing skilled graduates to meet the technological needs of the country, thereby contributing to economic growth and sustainability. The programme modules are designed to equip the students with employable technical skills in electrical and electronics technology trades such as: electronic circuit designs, design and construction of innovative and usable electronic gadgets, electrical energy installation in private and medium scale commercial buildings, maintenance of electronic and electrical gadgets, etc. (Chukwuedo & Ohanu, 2022; Ohanu et al., 2022). The graduates of the programme are expected to be gainfully employed in related industries, or establish themselves as entrepreneurs based on the training received in school. However, previous studies have shown that many EETE graduates are not engaged as electrical/electronics technology entrepreneurs (Ohanu & Ogbuanya, 2018; Orji & Ogbuanya, 2020), indicating a negligible inclination to entrepreneurial venture creation on the part of the students. This anomaly has stimulated research on the possible factors associated with the entrepreneurial intention of the students (Nwibe & Bakare, 2022; Ohanu & Ogbuanya, 2018) as the programme's mandate to produce entrepreneurial "spearheads" is being reduced to a mirage.

Entrepreneurial intention entails an individual's inclination to start up a new business venture, which is adequately followed up with the necessary action (Bazkiaei et al., 2020; Chang et al., 2016; Shinnar et al., 2012; Thompson, 2009). In the context of this study, entrepreneurial intention is defined as a measure of the readiness of EETE students to start up and manage their own business enterprise related to electrical and/or electronics trades. Since its first appearance in literature, the concept of entrepreneurial intention had stimulated various studies across many countries and continents of the globe. The magnitude of the studies is a reflection of the growing interest of scholars in the subject (Doanh & Bernat, 2019; Lai & To, 2020; Saraih et al., 2018). Mirjana et. al. (2018) noted that the various streams of research on entrepreneurial intention identify two sets of factors affecting entrepreneurial behaviour—personal characteristics of the individual and the economic environment such as industrial trends, and institutional factors. According to the theory of reasoned action by Ajzen and Fishbein, an individual's engagement in entrepreneurial behaviour is preceded by the intention, which is dependent on the attitude of the individual towards the behaviour and subjective norm (Ajzen, 1991). The theory of reasoned action, which later metamorphosed into the Theory of Planned Behaviour (TPB), explained entrepreneurial intention in terms of personal attribute of the individual (attitude and perceived behavioural control) and environmental perceptions (subjective norm). Other models such as Shapero's Entrepreneurial Event Model (Ohanu & Ogbuanya, 2018; Solesvik, 2017), and the Triple Helix Model (Feola et al., 2019) have also been utilized in many studies to explain entrepreneurial intention.

Self-efficacy had also been confirmed in some recent studies to have a significant effect on entrepreneurial intention (Doanh and Bernat, 2019; Naktiyok et al., 2010; Pihie & Bagheri, 2013; Tiwari et al., 2017). Self-efficacy belief (SEB) is defined as an individual's judgement

of the extent to which he is able to overcome obstacles and achieve set goals (Mouton et al., 2013; Uzunboylu & Selcuk, 2016). It entails the conviction of an individual pertaining to his ability to carry out specific tasks or accomplish set goals. With respect to entrepreneurship, self-efficacy belief is viewed as having the conviction that one has the capability to engage and succeed in an entrepreneurial venture (Saraih et al., 2018). Based on their findings, Pihie and Bagheri (2013) explained that self-efficacy improves students' entrepreneurial intention by enhancing their sense of control over the entire entrepreneurial activity, attitude to entrepreneurship, as well as their capacity to manage the process. A number of studies have equally explored the link between personality traits (Bazkiaei et al., 2020; Bonesso et al., 2018; Israr & Salem, 2018), and entrepreneurship education (Lai & To, 2020; Nowinski et al., 2017) on entrepreneurial intention. However, there is scarcity of studies focused on the connection of emotional characteristics of an individual and the entrepreneurial intention (Ahmetoglu et al., 2011), particularly in sub-Saharan Africa.

Research on the predictive significance of emotional intelligence (EI) on various aspects of human endeavour had been on the bullish trend in the past few decades (Jan & Anwar, 2019; Skipper & Brandenburg, 2013). Emotional intelligence, according to the pioneer authors of the concept, is defined as the ability of an individual to recognize, understand, and manage emotional information from oneself and others, and the use of such information to facilitate thought and actions (Mayer & Salovey, 1997). In the view of Ingram et. al. (2017), emotional intelligence encompasses a set of interrelated skills possessed by an individual to handle his or her emotions and that of others. Mayer and Salovey's Ability Model conceptualized EI as an aggregate of interpersonal and intrapersonal skills in four domains: emotional perception, emotional regulation, management of emotions, and use of emotions (Abdollahi et al., 2016; Gayathri & Meenakshi, 2013; Odaci et al., 2017).

Due to the increasing interest of scholars in the EI theory, various studies have scrutinized its effects on job performance/success (Adetula, 2016; Schlaegel et al., 2020; Weinzimmer et al., 2016), and academic performance (Chew et al., 2013; Joshi et al., 2012; Li & Shi, 2019; Pope et al., 2012; Unnikrishnan et al., 2015). The findings of most of these studies agree that EI is a significant predictor of live success. Nevertheless, only few (Bonesso et al., 2018; Cardon et al., 2012) investigated the influence of EI on entrepreneurial behaviour, particularly entrepreneurial intention. In addition, fewer works have examined the mediating role of self-efficacy in EI and entrepreneurial intention relation (Mortan et al., 2014). One limitation of these prior research is that self-efficacy was studied as a unidimensional construct. This results in lack of details as to the dimensions of self-efficacy that actually contribute to the observed findings. This study overcomes this shortcoming by providing a comprehensive analysis of the mediating role of self-efficacy in terms of its dimensions. Thus, this approach will yield deeper insights, thereby extending the frontiers of existing research on the applicability of EI in entrepreneurship theory and practice.

Literature review and hypothesis formulation

Emotional intelligence

The emergence of the concept of emotional intelligence in literature stems from Thorndike's concept of social intelligence circa 1920, and Gardner's Theory of Multiple Intelligences in 1983 (Gardner, 2006; Gardner & Qualter, 2010). Its earliest definition was proposed by Salovey and Mayer in the 1990s (Mayer et al., 2016). They defined EI

as the ability to be sensitive to one's emotions and that of others, monitor emotional fluctuations, and subsequent use of information generated to guide one's thoughts and actions. Goleman's popular book entitled "Emotional Intelligence" in 1995 was pivotal in *spreading the word* about EI (Gomez-Leal et al., 2021). Goleman asserted that cognitive intelligence quotient only accounted for 20% of success in every human endeavour, while the remainder is attributed to other factors including one's emotional and relational competence (Gill et al., 2015). EI according to Goleman is a set of intrapersonal relational skills summarized in four domains namely: self-awareness, self-management, social awareness, and relationship management (Goleman, 1995).

The conceptions of EI in literature are as diverse as the studies on the concept. Based on theory and mode of assessment, three models of EI are identifiable in literature viz: performance-based ability model, self-report ability model, and the self-report mixed model (Gutierrez-Cobo et al., 2017; Park & Kim, 2021). The self-report and performance-based ability models are based on the pioneer works of Mayer and Salovey (1997). Mayer and Salovey's ability model identified four dimensions of EI: perceiving emotions or emotional perception, self-regulation of emotions or emotional self-regulation, use of emotions, and managing emotions. Emotional perception occupies the first branch of the 4-branch model. It entails the ability to decode emotional information expressed in facial, postural, voice, and other related modes of communication (Mayer et al., 2004). Use of emotions to facilitate thought involves the ability to infuse emotional information into logical reasoning; "It involves the capacity of emotion to assist thinking" (Mayer et al., 2004, p. 199). Use of emotions to facilitate thought is of utmost importance in entrepreneurship as entrepreneurs are faced with the challenge of making rational decisions upon which the success and future of their business/organization depends. Understanding emotions is the ability to analyse and distinguish types of emotions. According to Mayer et. al. (2016), the ability to understand emotions develops in a similar pattern as language with respect to age. In other words, an adult is more equipped to discriminate among types of emotions than a growing kid. For a competent entrepreneur, the ability to segregate different types of emotions from customers or employees could assist rational decision-making. This implies that the ability to understand emotions is an antecedent to use of emotions to facilitate thought. Emotional management encompasses the set of abilities that help to confide emotions within one's goals, and self-awareness (Fernandez-Berrocal & Extremera, 2016; Lopes, 2016; Mayer et al., 2008).

The performance-based and self-report ability models are conceptually the same, the only difference lies in the mode of assessment. The EI quotient of an individual based on the performance model is measured with performance tests which consist of correct and incorrect responses (Gomez-Leal et al., 2018). The performance tests measure the degree of emotional aptitude possessed by an individual in relation to emotional perception, management, regulation, and utilization (the four dimensions of ability-based EI). The most representative of instruments in this category is the "Mayer–Salovey–Caruso Emotional Intelligence Test" (Park & Kim, 2021). The self-report ability model is based on the individual's subjective appraisals of his/her emotional intelligence quotient in relation to the dimensions. Ability model self-report measures include the Wong & Law EI Scale (WLEIS), which consists of 16 items grouped into four dimensions—"self-emotion appraisal", "others' emotion appraisal", "use of emotion", and "regulation of emotion"

(Wong & Law, 2002); Emotional Assessment Scale (EAS) developed by Schutte et. al. (2009).

In relation to the conceptual disparities in the models, the ability model describes EI as a distinct facet of intelligence that can be deliberately developed and adapted in various emotional contexts (Longobardi et al., 2020). On the other hand, the mixed model views EI as a broad set of emotional and relational skills including empathy, motivation, intrapersonal, interpersonal, relationship skills, occupying the lower strata of the personality hierarchies (Gomez-Leal et al., 2021). Thus, in the ability model, EI is a distinctive form of mental intelligence; while in the mixed model, EI is an array of personality-related emotional competencies. The mixed model is also referred to as the trait emotional intelligence model (Andonian, 2017; Jan & Anwar, 2019). This study is based on the self-report ability model because it offers a more concrete and defined conceptualization of EI that is measurable in a less rigorous and valid approach (Gill et al., 2015). In addition, this study is based on the premise that EI as a set of abilities can be consciously developed by an individual, which best aligns with the ability model. Due to its lack of definiteness in the conceptualization of EI, the mixed model is considered rather amorphous and might not be suitable for empirical studies on the applicability of EI particularly in the entrepreneurship domain.

Emotional intelligence and entrepreneurial intention

The predictive potential of emotional intelligence on entrepreneurial behaviour is beginning to draw the attention of scholars. Ingram et. al. (2017) examined the impact of emotional intelligence on venture performance among small business owners in the United States of America. The researchers found that interpersonal dimensions of emotional intelligence—emotional perception and management had significant direct impact on venture performance, in contrast to the intrapersonal skills (self-awareness and regulation of emotions). Ahmetoglu et. al. (2011) explained that the connection between EI and entrepreneurial behaviour is such that the former enhances creativity, a vital ingredient of entrepreneurship. Congruently, Ngah and Salleh (2015) reported that EI had a positive influence on the innovativeness of Malaysian entrepreneurs which resulted in their venture success. Decision-making is an intricate part of entrepreneurship and a process that requires information processing. Therefore, entrepreneurs require emotional intelligence skills to convert emotional stimulus to usable information for making effective and logical decisions. Entrepreneurial success requires more than devising intelligent plans on how to push the business forward; interpersonal skills are necessary for making the sophisticated plans a reality. Furthermore, emotional management skills are necessary to cope with physical, mental and emotional strains that are quite inevitable in the daily activities of an entrepreneur (Bibi et al., 2020).

In their study on the effects of EI on entrepreneurial intention and self-efficacy, Mortan et. al. (2014) discovered that two dimensions of emotional intelligence—regulation and appraisal of emotions, had significant positive correlations with entrepreneurial intention. Hence, based on the findings of previous studies, we hypothesize that:

H1 Emotional Intelligence will have a significant positive impact on entrepreneurial intention of EETE students.

Emotional intelligence and self-efficacy

Self-efficacy belief, also referred to as perceived self-efficacy, entails a self-appraisal of one's ability to carry out specific actions and achieve desired set goals (Rivers & Ross, 2018). Dullas (2018) identified three dimensions of perceived self-efficacy: perceived competence, perceived persistence, and perceived control. Dullas' 3-factor model of self-efficacy belief was utilized in this study due to its simplicity and availability of adequate measure with established psychometric properties.

A number of studies in literature have explored the link between emotional intelligence and self-efficacy belief. In a research study conducted among Iranian university students, Hashemi and Ghanizadeh (2011) reported a positive significant relationship between emotional intelligence and self-efficacy belief. The findings revealed that two dimensions of EI, self-actualization and stress tolerance, were significant predictors of self-efficacy belief. Ordun and Akun (2017) also found that EI is a significant predictor of self-efficacy among Turkish undergraduate students; EI explained 42% of the variance in self-efficacy. In a similar study conducted among Foreign Language teachers, Kostic-Bobanovic (2020) found a significant association between EI and self-efficacy belief. Thus, emotionally intelligent entrepreneurs tend to have a positive appraisal of their ability to overcome hurdles in the path of self-actualization (Alrajhi et al., 2017; Kostic-Bobanovic, 2020). Although majority of existing research findings agree that EI predicts self-efficacy, Di-Fabio and Palazzeschi (2008) noted that the relationship may be symbiotic—it could be that EI enhances self-efficacy belief, and the latter also promotes the development of EI. Based on prior studies, it is expected that EI will significantly predict the dimensions of self-efficacy according to the following hypotheses:

H2 Emotional intelligence will have a significant positive effect on perceived competence.

H3 Emotional intelligence will have a significant positive effect on perceived control.

H4 Emotional intelligence will have a significant positive effect on perceived persistence.

Self-efficacy and entrepreneurial intention

The connection between self-efficacy and entrepreneurial intention, particularly among undergraduate university students, has equally been a keen area of interest to entrepreneurship scholars (Nowinski et al., 2017). Doanh and Bernat (2019) investigated the relation between self-efficacy and entrepreneurial intention of Vietnamese students and reported that self-efficacy belief significantly predicted the entrepreneurial intention of the students. The study also found that the indirect effect of self-efficacy on entrepreneurial intention was mediated by attitude to entrepreneurship and perceived behavioural control. In a similar study conducted among undergraduate Engineering students in Malaysia, Saraih et. al. (2018) found a significant positive correlation between self-efficacy belief and entrepreneurial intention. Self-efficacy

accounted for 20% of the variation in entrepreneurial intention. Qiao and Huang (2019) also investigated the mediating role of career adaptability on entrepreneurial intention and self-efficacy relation among college students in Thailand. The study uncovered that self-efficacy significantly and positively affected entrepreneurial intention; the impact of self-efficacy was partially mediated by career adaptability. Qiao and Huang emphasized the need for proper career education as a means of maximizing the potentials of self-efficacy in enhancing business inclinations of the students. The findings of some other studies in literature reported same pattern of relationship between self-efficacy and entrepreneurial intention (Naktiyok et al., 2010; Pihie & Bagheri, 2013).

The crucial role of individual self-efficacy in the development of entrepreneurial behaviour finds theoretical roots in the social cognitive career theory (SCCT). The fundamental assumption of the SCCT is that individuals actively construct/develop career behaviours by harnessing cognitive (personal) and environmental factors (Ligouri et al., 2018). The cognitive resources include the individual's affects, motivation, and outcome expectancies. According to Lent et. al. (2002), SCCT basically postulates that individuals show a greater propensity to pursue a given behaviour for which they have stronger self-efficacy beliefs. Since entrepreneurship is a form of career behaviour, SCCT suggests that self-efficacy is antecedent to entrepreneurial intention. Thus, in keeping with theory and prior research findings, we expect that the dimensions of self-efficacy will significantly predict the entrepreneurial intention of EETE students according to the following hypotheses:

H5 Perceived competence will have a significant positive impact on entrepreneurial intention.

H6 Perceived control will have a significant positive impact on entrepreneurial intention.

H7 Perceived persistence will have a significant positive impact on entrepreneurial intention.

The findings of the studies reviewed indicate that emotional intelligence is a significant predictor of both self-efficacy belief and entrepreneurial intention. Since self-efficacy also predicts entrepreneurial intention, it logically implies that the former (self-efficacy) may partially mediate the EI and entrepreneurial intention relation. This has been confirmed with the findings of some recent related studies (Chu et al., 2020; Mishra & Singh, 2022). The model of the present research aims at probing the relative contributions of self-efficacy dimensions to the mediating effect of self-efficacy reported in previous studies. In this way, the study seeks to provide a more detailed explanations on the mechanism of impact of EI on entrepreneurial intention via self-efficacy.

Consistent with earlier research, it is presumed that:

H8 Perceived competence (PCM) will significantly mediate the impact of EI on entrepreneurial intention (EI → PCM → EIN).

H9 Perceived control (PCL) will significantly mediate the impact of EI on entrepreneurial intention (EI → PCL → EIN).

H10 Perceived persistence (PP) will significantly mediate the impact of EI on entrepreneurial intention (EI → PP → EIN).

Conceptual framework

See Fig. 1.

Research methods

Design and participants

The study adopted a correlational survey design to examine the hypothesized relationships among the study variables. The study was carried out in four universities in South-Eastern Nigeria that offer EETE programmes fully accredited by the National Universities Commission (NUC). These include: University of Nigeria, Nsukka (UNN), Enugu State; Enugu State University of Science and Technology (ESUT), Enugu State; Nnamdi Azikiwe University, Awka (UNIZIK), Anambra State; and Ebonyi State University (EBSU), Ebonyi State. The criteria for the selection of these universities for the study is based on the availability of EETE programmes in the Vocational and Technical Education Departments/Faculties, which are fully accredited by the NUC. The population of the study include all the 192 students of EETE in their 2nd, 3rd, and final years of study. Freshers (first year students) were not included as they are yet to be fully oriented in the programme. Due to the manageable size of the population, all the 192 students were included as the study sample. The sample consists of 60.4% males and 39.6% females; 45.3% were in second year, 30.2% in third year, and 24.5% in their finals; 17.7% were from UNN, 37.5% from ESUT, 21.9% from EBSU, and 22.9% from UNIZIK.

In general, the relatively meagre sample size is due to low enrolments of students in Vocational and Technical Education programmes when compared to the general and professional academic degrees, particularly evident in South-East part of Nigeria. The choice of the South-East universities for this study is particularly due to the observed

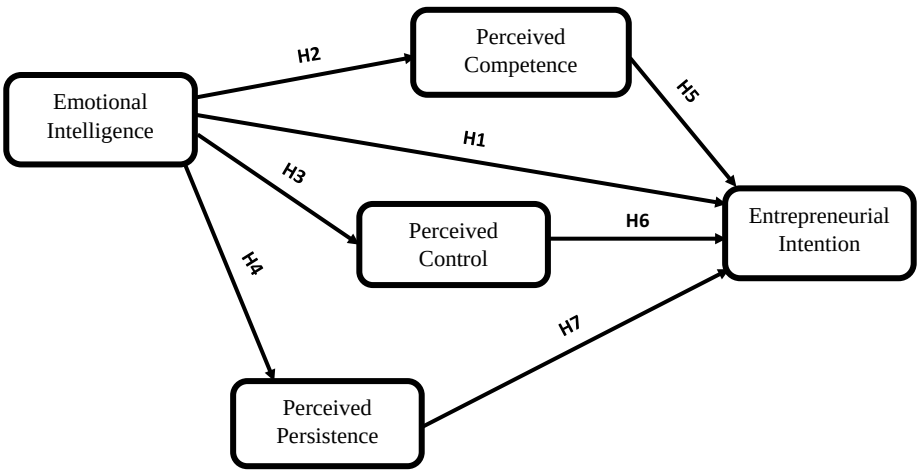

Fig. 1 Hypothesized research model

poor entrepreneurial activity of EETE graduates from this region. When compared to their northern counterparts, research (Ohanu & Ogbuanya, 2018) had shown that graduates of the programme seek for employment in other career fields not related to EETE, indicating poor entrepreneurial intent for EETE-related ventures. Hence, the theoretical quest of this research is aimed at understanding the entrepreneurial intent of the students in this region, as a possible means of ameliorating the observed anomaly.

Data collection procedures

Data collection was done with the aid of four research assistants, one for each university. The research assistants were academic staff of the Department of Technology and Vocational Education under which EETE programme is being offered. The assistants were educated on the essence of the research project and how the copies of the questionnaires were to be administered and filled by the respondents. In accordance with the sample size, 192 printed copies of the questionnaire used for data collection were mailed to the research assistants in the four universities. The research assistants explained the purpose of the study to the students and obtained their consents to participate as respondents. The students all agreed to participate in the study. Thus, 192 copies of the questionnaire were administered and retrieved from the respondents. It required between 20 and 25 min for the questionnaire to be filled. The researchers received 180 copies of filled questionnaire, giving a return rate of 93.7%. The data collection activity lasted about 2 weeks. In the course of data analysis, it was found that about 12 copies were not adequately completed and were not used for analysis. A total of 168 copies were finally used for data analysis.

Measures

Data collection for the study was done with a structured questionnaire. The questionnaire consists of measurement scales adapted from previous studies. Emotional Intelligence was measured with the adapted version of the Emotional Assessment Scale (EAS) originally developed by Schutte et. al. (2009). The measure is considered reliable as the Cronbach's alpha and composite reliability values (see Table 1) were within the acceptable range of value (Ary et al., 2010). Entrepreneurial intention was assessed using the Individual Entrepreneurial Intent Scale developed by Thompson (2009). The scale consists of six main items and four distracter items. Only the six main items were used for data collection since the distracter items were not meant to be included in scale analyses (Thompson, 2009). The entrepreneurial intention measure proved to be reliable (Table 1) in consistency with previous studies (Issa & Tesfaye, 2020; Qiao & Huang, 2019). The three dimensions of self-efficacy belief were measured using an adapted version of the Academic Self-Efficacy Scale originally developed by Dullas (2018). The scale had acceptable psychometric properties (see Table 1).

Method of data analysis

Confirmatory factor analysis (CFA) was used to verify the psychometric properties (validity and reliability) of the construct measures. Covariance-based structural equation modelling was used to test the direct relationship hypotheses (H1 to H7) concurrently. Mediation analysis was done with the aid of the Andrew Haye's PROCESS macro

Table 1 Measurement model

Abbr.	Constructs and measurement items	β	*t*-value (significance)	CR	AVE	α
	Entrepreneurial intention (EIN)			0.816	0.601	0.805
EIN1	Intend to set up a company in the future	0.669	Fixed			
EIN2	Never search for business start-up opportunities (R)[a]					
EIN3	Are saving money to start a business	0.914	8.647***			
EIN4	Do not read books on how to set up a firm (R)	0.721	8.096***			
EIN5	Have no plans to launch your own business (R)	0.531	7.344***			
EIN6	Spend time learning about starting a firm[a]					
	Perceived control (PCL)			0.715	0.511	0.698
PCL1	I can successfully determine the outcome of tasks I engage in	0.509	Fixed			
PCL2	I perform exceptionally in tasks because I am competent[a]					
PCL3	I am able to learn more about entrepreneurial opportunities	0.732	4.815***			
PCL4	I know am disciplined enough to deliver tasks timely	0.617	4.705***			
PCL5	My peers regard me because I am exceptional[a]					
	Perceived competence (PCM)			0.772	0.534	0.755
PCM1	I always strive to excel in all I do	0.525	Fixed			
PCM2	I am creative in handling tasks	0.702				
PCM3	Compared with my peers, I think I am quite exceptional[a]					
PCM4	I am convinced that I can excel in anything because I am a fast learner	0.862	7.835***			
PCM5	I do not worry about unexpected tasks because I know that I can deliver	0.610	6.869***			
	Perceived persistence (PP)			0.761	0.524	
PP1	Despite the odds, I continue to work hard	0.512	Fixed			
PP2	Regardless of obstacles I keep moving towards my goals	0.691	5.928***			
PP3	I always try to figure out how to solve difficult problems[a]					
PP4	If I don't give up, I am able to accomplish very difficult tasks	0.758	6.196***			
PP5	I know how to help myself and that is persistently working hard[a]					
	Emotional intelligence (EI)			0.706	0.445	0.679
EI1	I know when my emotions change[a]					
EI2	I know what others are feeling just by looking at them[a]					
EI3	I can tell how people are feeling by listening to the tone of their voice[a]					
EI4	I have control over my emotions	0.527	4.154***			
EI5	I expect that I will do well on most things I try[a]					
EI6	I seek out activities that make me happy	0.501	4.201***			
EI7	I know the best time to speak about my personal problems with others	0.508	4.245***			
EI8	I like to share my emotions with others	0.594	4.548***			
EI9	I help others feel well when they are down	0.663	4.743***			
EI10	When I am in a positive mood, I am able to come up with new ideas	0.569	4.468***			
EI11	When my mood changes, I see new possibilities	0.598	4.563***			

(R): reverse coded items

***$\rho \leq 0.001$

[a] Items with factor loadings less than 0.5

plugin, which facilitated simultaneous estimation of the indirect effects of the mediators according to H8, H9, and H10.

Results

Measurement model assessment

The psychometric properties of the measures were first assessed using confirmatory factor analysis (CFA) in AMOS (v.23). The pattern matrix was extracted from SPSS and exported to AMOS. Using the pattern matrix model builder plugin, the confirmatory factor model was drawn in AMOS and the observed variables all loaded perfectly under their respective constructs (data converged in 5 iterations). Items with factor loadings less than the threshold of 0.5 (Marticotte & Arcand, 2017) were deleted from the model. Using the modification indices, pruning was done (by deleting measurement items with the highest modification index) on the model until the requirements of model fit were satisfied. The final CFA model obtained is shown in Fig. 2. As shown in Table 1, the composite reliability (CR) and the Cronbach's alpha values were all above the cut-off point of 0.7 (Bagozzi & Yi, 2012; Schreiber, 2008), indicating that the measures are reliable. Also, the values of the AVE were above the acceptable limit of 0.50 (Khan et al., 2016), except for EI which was very close to 0.5 (AVE = 0.445). Nevertheless, Fornell and Larcker (1981) opined that the convergent validity of a construct is still adequate even if the AVE is less than 0.5, provided that the composite reliability is greater than 0.6. Malhotra and Dash (2011) in the same perspective argued that AVE is very strict; composite reliability

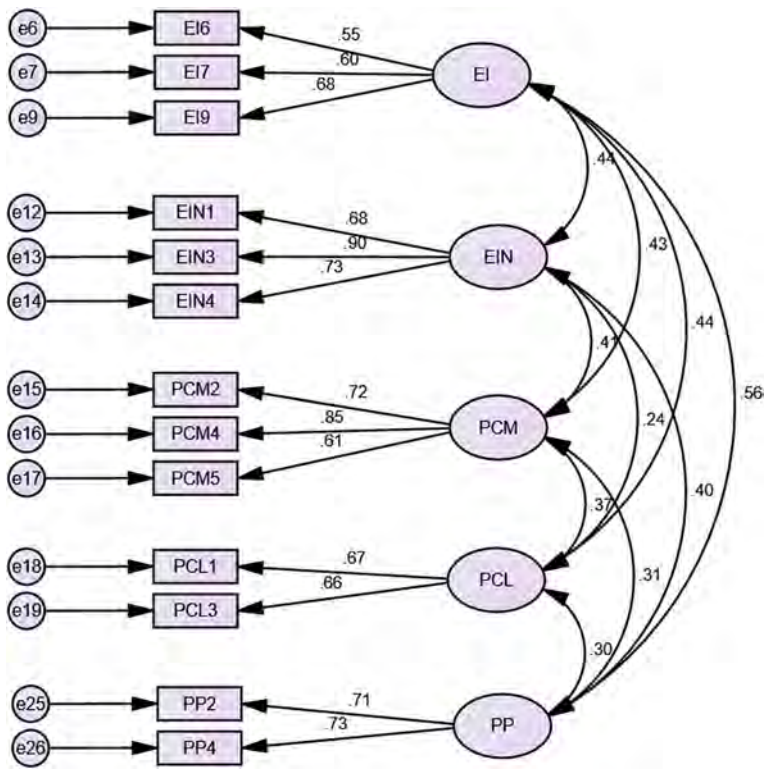

Fig. 2 Confirmatory factor model

Table 2 Inter-construct correlations and discriminant validity

	EI	EIN	PCM	PCL	PP
EI	**0.667**				
EIN	0.443***	**0.775**			
PCM	0.426**	0.408***	**0.731**		
PCL	0.439**	0.237*	0.369**	**0.714**	
PP	0.564***	0.400***	0.314**	0.304*	**0.724**

Significan e of correlations: *$p < 0.050$, **$p < 0.010$, ***$p < 0.001$

Table 3 Model fit indices

Model	CMIN	DF	CMIN/DF	IFI	TLI	CFI	RMSEA
Confirmatory factor	72.180	55	1.312	0.971	0.957	0.969	0.043
Structural	75.406	58	1.300	0.970	0.958	0.969	0.042

is sufficient for the assessment of convergent validity and reliability. Thus, the requirements for convergent validity were satisfied.

Discriminant validity was assessed using the Fornell and Larcker criterion. It was found that the square root of the AVEs (along the diagonals, Table 2) were all greater than the individual inter-construct correlations thereby satisfying the criteria for discriminant validity (Fornell & Larcker, 1981). The CFA model fit was evaluated using the Chi-square–degrees of freedom ratio (CMIN/$df = 1.312$) for the absolute fit; incremental fit index (IFI) = 0.971, Tucker–Lewis index (TLI) = 0.957, and comparative fit index (CFI) = 0.969 for the comparative fit; root mean square error of approximation (RMSEA) = 0.043. The values of the model fit indices (Table 3) were all within the acceptable range indicating a good fit of the model with the data (Peterson et al., 2020; Schreiber, 2008).

Path analysis and hypotheses testing

Path analysis was used to estimate the direct effects of the predictors on the criterion variables as specified in the hypotheses (Fig. 3). The results of the direct effects estimations are summarized in Table 4. The results reveal that emotional intelligence had a significant positive influence on all the three domains of self-efficacy: perceived competence ($\beta = 0.46$, $p \leq 0.001$), perceived control ($\beta = 0.48$, $p \leq 0.001$), and perceived persistence ($\beta = 0.58$, $p \leq 0.001$). However, perceived competence was the only self-efficacy factor that had significant effect on entrepreneurial intention ($\beta = 0.234$, $p \leq 0.05$). Therefore, H2, H3, H4 and H5 were supported. It was quite surprising to find that EI had an insignificant positive impact of entrepreneurial intention as opposed to some prior research findings (Ahmetoglu et al., 2011; Ingram et al., 2017). But in isolation (without covariance with other predictors in the model), EI had a significant positive effect on entrepreneurial intention ($\beta = 0.26$, $p \leq 0.05$) as depicted in Fig. 4. Based on the structural model (Fig. 2), H1, H6 and H7 were not supported. The structural model equally had a good fit with the data since all the model fit indices were all within the acceptable

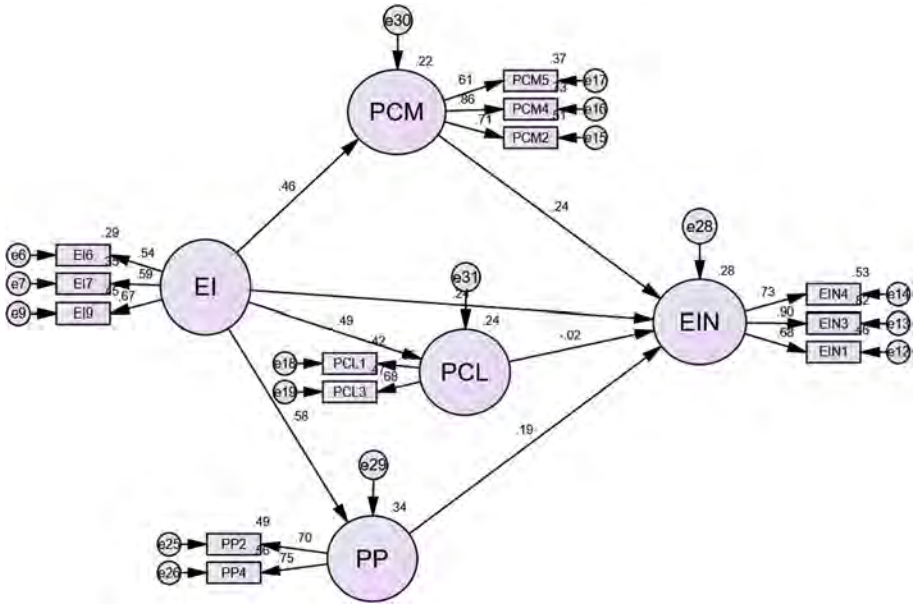

Fig. 3 Path analysis

Table 4 Path analysis and direct relationships test of hypotheses

Hypothesis	Path description	*β*	*t*-value	Remark
H1	Emotional intelligence → entrepreneurial intention	0.240	1.343	Not supported
H2	Emotional intelligence → perceived competence	0.464	3.678***	Supported
H3	Emotional intelligence → perceived control	0.486	3.118**	Supported
H4	Emotional intelligence → perceived persistence	0.584	3.878***	Supported
H5	Perceived competence → entrepreneurial intention	0.234	2.284*	Supported
H6	Perceived control → entrepreneurial intention	− 0.018	− 0.149	Not supported
H7	Perceived persistence → entrepreneurial intention	0.194	1.463	Not supported

*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$

range of values (CMIN/*df* = 1.300, IFI = 0.97, TLI = 0.958, CFI = 0.969, RMSEA = 0.042) as prescribed in literature (Schreiber, 2008).

Mediation analysis

The outcome of the mediation analysis is presented in Table 5. Mediation analysis was done with the aid of Andrew Haye's PROCESS macro plugin in SPSS. The research model is essentially a parallel mediation model with three hypothesized mediators (PCM, PP, and PCL). With the aid of the plugin, the indirect effects of emotional intelligence through the three mediators were tested simultaneously using the bootstrapping technique (5000 bootstrap samples). Composite values of the constructs were first computed in SPSS prior to the mediation analysis using the measurement items in the confirmatory factor model only (Fig. 2). This is to ensure that only the measurement items that survived the validity, reliability as well as model fit screening were used as representatives of the constructs. In addition, Common Method Bias test was performed using the Harman's single factor technique to ensure that the intercorrelations among the mediators are not significantly attributed to the common method

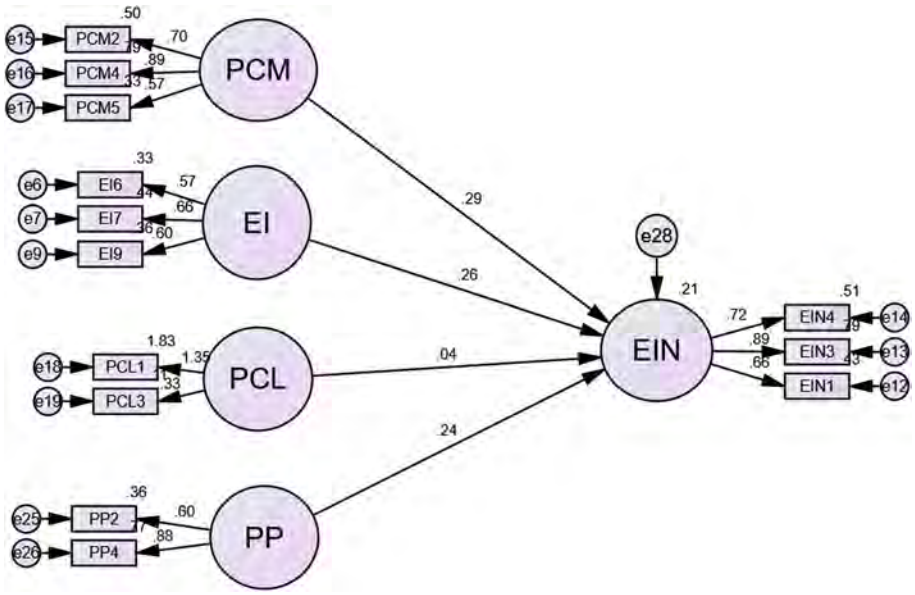

Fig. 4 Direct effects EI and mediators on entrepreneurial intention without covariance

Table 5 Mediation analysis

Hypothesis	Mediation path	Indirect effect (β)	LLCI	ULCI	Remark
H8	Emotional intelligence → perceived competence → entrepreneurial intention	0.0902	0.0347	0.1571	Significant (supported)
H9	Emotional intelligence → perceived control → entrepreneurial intention	0.0147	−0.0277	0.0592	Insignificant (not supported)
H10	Emotional intelligence → perceived persistence → entrepreneurial intention	0.0595	0.0028	0.1311	Significant (supported)
Total indirect effect		0.1644	0.0830	0.2548	Significant
Direct effect		0.1547	−0.0069	0.3164	Insignificant
Total effect		0.3270	0.1745	0.4796	Significant

of data collection employed. This was carried out in SPSS using the Principal Axis Factoring extraction. The indicators of the three dimensions of self-efficacy that survived factor analysis screening were used for the test. As evident in Table 6, the single factor variance explained only 29.6% of the total variance, which is much less than the cut-off value of 50% (Aguirre-Urreta & Hu, 2019). Therefore, the results agree that the data associated with the mediators are free from the common method variance problem. Furthermore, the results from the discriminant validity test using the Fornell and Larcker criterion provide statistical evidence that the dimensions of self-efficacy are distinct yet related construct; though they seem to be very similar conceptually.

The mediation analyses could not be executed in AMOS since the indirect effects plugin and the specific indirect effects estimand for AMOS cannot be used with the

Table 6 Common method bias/variance test of the mediators

Factor	Initial eigen values			Extraction sums of squared loadings		
	Total	% of variance	Cum. %	Total	% of variance	Cum %
1	15.439	31.248	31.248	14.466	29.625	29.625

version utilized for the SEM analysis (AMOS v.23). However, the aim of simultaneously estimating the indirect effects through the mediators was still achieved effectively using Haye's plugin in SPSS.

The outcome of mediation analysis revealed that perceived competence ($\beta = 0.090$, LLCI = 0.0347, ULCI = 0.1571) and perceived persistence ($\beta = 0.059$, LLCI = 0.0028, ULCI = 0.1311) dimensions of self-efficacy had significant partial mediating effects in the model. The indirect effects are considered significant since the number 'zero' is not contained within the bootstrapped confidence intervals (Hayes, 2017). On the contrary, the mediating effect of perceived control proved to be insignificant ($\beta = 0.014$, LLCI = −0.0277, ULCI = 0.0592). Therefore, the findings agree with H8 and H10, while H9 was not supported. The direct effect of emotional intelligence on entrepreneurial intention as per the mediation model was not significant, though it was found significant in isolation (Fig. 4). We also noted that the net indirect effect of the mediators in the model was significant ($\beta = 0.1644$, LLCI = 0.0830, ULCI = 0.2548). This suggests that the presence of the mediators in the model reduced the direct effect of EI on entrepreneurial intention. In other words, the predictive influence of EI on entrepreneurial intention is significantly channeled through perceived competence and perceived persistence dimensions of self-efficacy.

Discussion

This study examined the mediation role of self-efficacy belief in the impact of emotional intelligence on EETE students' entrepreneurial intention. Though a few prior studies (Chu et al., 2020; Mortan et al., 2014) have investigated this relation, this research focused on finding out the dimensions of self-efficacy that actually contribute to its mediating effect, since self-efficacy is a multi-dimensional construct (Dullas, 2018). Thus, the mediating effects of the three factors of self-efficacy were tested simultaneously in a parallel mediation model. The results revealed that overall, the indirect effect of self-efficacy factors in the research model was significant. However, only perceived competence and perceived persistence dimensions were found to have significant contributions to the mediating role of self-efficacy. Chu et. al. (2020) reported similarly that entrepreneurial self-efficacy significantly mediated the impact of emotional competence on the entrepreneurial intention of college students. In the same vein, Mishra and Singh (2022) found that entrepreneurial self-efficacy had a significant partial mediation role in the relation between emotional intelligence and entrepreneurial intention.

Emotional intelligence had a significant positive impact on entrepreneurial intention when tested in isolation (without covariance with the mediators), which is consistent with the findings of previous studies (Ahmetoglu et al., 2011; Ingram et al., 2017; Zampetaskis et al., 2009). It is generally expected in this regard that the more emotionally intelligent students would have a greater propensity to find a career path in

entrepreneurship. There is scarcity of literature focused on EI and entrepreneurial intention linkage, particularly among TVET students in Nigeria. This calls for the attention of entrepreneurship and TVET scholars to this crucial area of research. The observed significant positive impact of emotional intelligence on all the dimensions of self-efficacy confirms the findings of previous studies (Hashemi & Ghanizadeh, 2011; Kostic-Bobanovic, 2020; Moafian & Ghanizadeh, 2009; Mouton et al., 2013; Ordun & Akun, 2017). Whereas previous studies have proved that overall self-efficacy is a significant predictor of entrepreneurial intention (Doanh & Bernat, 2019; Nowinski et al., 2017; Saraih et al., 2018; Solesvik, 2017), we found that only one dimension of self-efficacy (perceived competence) actually had a significant effect on entrepreneurial intention. By implication, students who believe that they are competent are more likely to start up their own business ventures. Therefore, in relation to the enhancement of entrepreneurial intention, more emphasis should be placed on consolidating the perceived competence of the students.

In addition to the immense contributions to theory, the findings equally have crucial practical implications, particularly with respect to pedagogy, and entrepreneurship development in Nigerian TVET institutions. In the recent years, a good number of TVET institutions across Africa had been emphasizing entrepreneurship capacity building, as a means of building economic diversity and resilience. In Nigeria particularly, TVET institutions such as the UNESCO-UNEVOC Centre, University of Nigeria, Nsukka and Yaba College of Technology, have been carrying out live-stream webinars and workshops in partnership with the UNESCO Centre, Germany, aimed at strengthening the products of TVET institutions via entrepreneurship capacity building. In the light of these contemporary developments, the findings of this study present a template of resources for designing the curricular of entrepreneurship education. In other words, this study draws the attention of the entrepreneurship educators and trainers to the importance of emphasizing the development of affective competencies on the part of the students, particularly emotional intelligence, perceived persistence and perceived competence, as a means of fostering their entrepreneurial inclinations. In a related study carried out in Maussa-Pérez et. al. (2020) noted that entrepreneurship niches in colleges are a basic catalyst to the development of entrepreneurial behaviour, particularly among university students, as they provide not only educational, but also motivational supports for the students. The school serves as a cocoon where students are nurtured to become future mega-entrepreneurs. Thus, this study yields useful insights that may help to shape the course of entrepreneurship pedagogy, especially as it concerns Nigerian universities.

Generally, the observed low involvement of EETE graduates on entrepreneurial activities related to the course programme had been a source of major concern among TVET researchers recently (Nwibe & Barkare, 2022; Ohanu & Ogbuanya, 2018). In response to this anomaly, this study highlights the vital interactive roles of emotional intelligence and self-efficacy belief in relation to the entrepreneurial intention of the students. Based on the findings, emotional intelligence has a significant positive effect on entrepreneurial intention of EETE students by enhancing their self-efficacy beliefs (perceived competence and perceived persistence). Hence, this study uniquely provides an elaborate framework on how emotional intelligence contributes to the development of entrepreneurial behaviour.

Conclusion

Electrical/Electronics Technology Education (EETE) as a strand of TVET programme is specifically aimed at preparing her graduates to contribute to economic growth of the society, especially via the 'engine power' of entrepreneurship. This study contributes immensely to the existing borders of knowledge on psychological factors and mechanisms associated with entrepreneurial behaviour of university students, particularly undergraduates. The study found that emotional intelligence had a significant impact on entrepreneurial intention of the students. Analysis of the mechanism of the impact of EI on entrepreneurial intention revealed that perceived competence and perceived control dimensions of self-efficacy belief were significant mediators. Therefore, developing the emotional quotient of the students will likely increase their propensity for entrepreneurship by enhancing self-apprehension of their competencies and control of the behaviour (entrepreneurship).

Recommendations

Based on the implications of the findings, it is recommended that:

1. EETE should consciously seek to develop their emotional intelligence competencies in order to boost their self-efficacy perceptions to engage and succeed in entrepreneurial ventures.
2. EETE educators should also pay attention to the development of emotional quotient of the students, in addition to the popular cognitive intelligence. This can be achieved through the integration of courses on EI competencies in the curriculum. Such courses could be taught by specialists in the field of behavioural psychology.
3. Emotional intelligence development should be emphasized in capacity-building programmes such as workshops, conferences, and seminars designed by EETE stakeholders to prepare the students for a career as entrepreneurs.

Development of emotional competencies should be considered for inclusion when designing the curriculum/content of entrepreneurship courses for EETE students.

Limitations and suggestions for further research

The findings may have limited generalizability due to the relatively small size of the population included in the study. Therefore, it is necessary to replicate the study in other geographical contexts where the findings are needed for practical applications. The small size of the population is due to the low enrolment of students in the programme, particularly in the south-eastern universities used in the study. It is equally important to note that the findings of the study are based on data collected using self-report scales, and not experiments. Therefore, there might be some elements of bias in the results due to the subjective nature of self-reported surveys and as such, care should be taken in the interpretation and practical application of the findings. However, this effect was checked by performing 5000 times bootstrapping in the data analysis. The analytical procedures employed in this study are quite robust and

as such, the findings are considered reliable. Repetition of the same or similar study with a wider geographical coverage is recommended to enhance diverse applicability of findings.

Abbreviations

EETE	Electrical/Electronics Technology Education
CB-SEM	Covariance-based structural equation modelling
SPSS	Statistical Package for Social Sciences
TVET	Technical vocational education and training
TPB	Theory of planned behaviour
SEB	Self-efficacy belief
EI	Emotional intelligence
EAS	Emotional assessment scale
SCCT	Social cognitive career theory
PCM	Perceived competence
PCL	Perceived control
PP	Perceived persistence
NUC	National universities commission
UNN	University of Nigeria, Nsukka
ESUT	Enugu State University of Science and Technology
UNIZIK	Nnamdi Azikiwe University Awka
EBSU	Ebonyi State University
CFA	Confirmatory factor analysis
AMOS	Analysis of moments of structure
CR	Composite reliability
AVE	Average variance extracted
CMIN/DF	Chi-square–degrees of freedom ratio
IFI	Incremental fit index
TLI	Tucker–Lewis index
CFI	Comparative fit index
RMSEA	Root mean square error of approximation
LLCI	Lower limit of confidence interval
ULCI	Upper limit of confidence interval

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Author contributions
KJ contributed to the conceptual framework (literature review), design, as well as data analysis. CT contributed extensively to the data analysis section as well as the discussion of the practical and theoretical implications of the findings.

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Availability of data and materials
Data used for this study are not available in public spaces since they are responses confidentially solicited from human respondents. However, they can be made available on special requests for strictly research purposes.

Declarations

Competing interests
There is no evidence of competing interests between the authors of this article.

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