Research on the Management of Student Entrepreneurship Development in Higher Education

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Entrepreneurial opportunity identification has attracted much attention in the field of entrepreneurial development as an important factor in the future success of university students in entrepreneurship. Based on experiential learning theory, this study proposes a moderated mediation model to investigate the relationship between entrepreneurial learning (EL) and entrepreneurial opportunity identification, the mediating role of entrepreneurial alertness (EA) and the moderating role of the entrepreneurial environment (EE). A snowball sampling method was used to collect 1263 questionnaires, of which 1164 were valid. The findings revealed that (1) entrepreneurial learning has a positive and significant effect on entrepreneurial opportunity identification among university students; (2) entrepreneurial alertness plays a partially mediating role between entrepreneurial learning and entrepreneurial opportunity identification; (3) entrepreneurial environment plays a moderating role between entrepreneurial learning and entrepreneurial opportunity identification, Compared with a low-level entrepreneurial environment, a high-level entrepreneurial environment can promote the impact.

Keywords: entrepreneurial learning, entrepreneurial alertness, entrepreneurial environment, entrepreneurial opportunity identification

INTRODUCTION

Entrepreneurship is a major source of power driving social development and is seen by governments and think tanks in many countries around the world as a key approach to solving problems such as social inequality and poverty, ecological degradation, and inadequate education and healthcare systems to achieve sustainable development goals (Yang, 2021). Chen and Wang (2019) point out that university students are a valuable talent resource for the country and are the main force behind the "mass entrepreneurship and innovation" of the country. University students, with high knowledge and good professional skills, have a good innovation platform and have favorable conditions to become identification (Liu & Wu, 2017). Entrepreneurial opportunity identification (EOI) is the first step for entrepreneurs to carry out

entrepreneurial activities, and the EOI ability of university student entrepreneurs determines the success of their ventures (Wang & Yao, 2014). Entrepreneurial success is the ultimate goal of entrepreneurship, and the core of entrepreneurship is entrepreneurial opportunity, and whether entrepreneurs have a correct understanding, understanding and grasp of entrepreneurial opportunities determines whether the entrepreneurial success (Si. et al., 2016). In entrepreneurial practice, EOI is an important part of the entrepreneurial process (Shane & Venkataraman, 2000; Casson, 2005), a precursor for entrepreneurs to assess opportunities and other entrepreneurial behaviors such as developing opportunities (Baron & Shane, 2007; McMullen & Shepherd, 2006; Ozgen & Baron, 2007), and a resource for existing firms to generate sustained competitive advantage (Alvarez & Busenitz, 2001), Therefore, understanding the meaning and dimensions of EOI and the process of its development is important not only to improve the existing entrepreneurship theory, but also to guide entrepreneurial practice and education (Detienne & Chandler, 2004).

Entrepreneurship is a learning process (Minniti & Bygrave, 2001), and the competencies of entrepreneurs or start-ups are more a function of experience and knowledge developed later in life, in addition to some innate endowments, and learning is a particular mechanism for identifying entrepreneurs and start-ups (Zhou, 2015). entrepreneurial learning (EL) is the intermediate link between knowledge creation and knowledge application, and these unique EL build a distinctive knowledge information base for entrepreneurs, greatly reducing the uncertainty of entrepreneurial activities and improving their ability to identify entrepreneurial opportunities (Qi, 2017). Entrepreneurial alertness (EA) is a key factor in EOI (Kirzner, 1997), and Galio and Katz (2001) argue that entrepreneurs need to be alert and observant in opportunity identification, noting that individuals with relatively high levels of EA perform significantly better in opportunity identification. The entrepreneurial environment (EE) is changing and complex, and relying on prior experience and knowledge alone is not sufficient, so entrepreneurs need to continue to learn, acquire additional knowledge structures and cross-industry skills, keep up with the changing trends in the environment and strengthen their opportunity identification skills (Minniti & Bygrave, 2001). In identifying opportunities, entrepreneurs need to constantly interact with information in their environment (Venkatraman, 2003). A dynamic environment tends to bring more information to the entrepreneur and the rate at which information is updated increases. Shapero (1975) argues that personal traits are in constant contact with the external environment, and that increased connectedness is conducive to EA, while EA increases EOI (Holcomb et al., 2009). The EA also increases the likelihood of the entrepreneur's perception of opportunity.

Therefore, this study seeks to fill the gap by examining the mediating role of EA and the moderating role of the EE in the pathways of EL and EOI influence. The findings of this empirical study help to shed light on the key factors that influence EOI among university students, thereby improving our understanding of the potential association between EL and EOI among university students and the moderating role of the EE. The findings may provide new directions for educators to effectively enhance entrepreneurship among university students.

THEORIES AND HYPOTHESES

Experiential Learning Theory (ELT)

Kolb (1976,1984) proposed experiential learning theory (ELT) as a comprehensive study that combines the structures of previous knowledge, perception, cognition, and experience, and emphasizes that acquiring and transforming experience is central to the learning process. Experiential learning theory can explain why opportunity identification is formed. The theory describes how different people acquire and transform information in different ways, explains how people combine information with their existing knowledge base and why different behaviors lead to different abilities to recognize and exploit opportunities (Corbett, 2005). Therefore, in order to better understand the attributes of EOI, the process of acquiring the attributes and the links between entrepreneurial activities, this paper will explore the relationship between learning and opportunity identification in the context of experiential learning theory.

Entrepreneurial Learning and Entrepreneurial Opportunity Identification

Cooper et al. (1995) argued that EL contributes to the enhancement of opportunity identification ability. Entrepreneurship learning is an important means for entrepreneurs to constantly obtain knowledge and improve knowledge reserves. (Zhu et al., 2013). Persistent entrepreneurial knowledge accumulation and learning in the entrepreneurial process helps to improve the probability of EOI (Bhave, 1994). Continuous learning is an important way for entrepreneurs to improve their capabilities, which include the ability to identify opportunities (Zhang & Xu, 2017). Entrepreneurs' own experiences (successes or failures) cannot be directly translated into entrepreneurial knowledge; to successfully access the resources and information needed, they must go through an EL process, and the information and knowledge gained through learning plays an important role in their opportunity identification (Minniti & Bygrave, 2001). Identifying and developing entrepreneurial opportunities requires entrepreneurs to continuously learn to acquire information, accumulate knowledge and translate that knowledge (Corbett, 2005), and with the accumulation of experience and knowledge, entrepreneurs will actively pursue opportunities that have market potential and value (McGrath & Millan, 2000). The process of identifying and developing entrepreneurial opportunities is inextricably linked to the dynamic learning process of entrepreneurs (Ravasi & turati, 2005). Through EL, the entrepreneur's own entrepreneurial knowledge and opportunities identify ability is enriched. (Holcomb, 2009). Other scholars have suggested that differences in the efficiency of EOI may also occur when entrepreneurs adopt different learning styles (Yan & Liu, 2018). Yuan and Xia (2022) further verified that EL can enhance EOI by studying 350 applied undergraduate university students, who have a high level of education and learning ability, and that EL helps to enhance the ability to identify entrepreneurial opportunities. Therefore, the hypothesis of this study is as follows.

H1: *EL has a positive impact on EOI among Guangxi university students.*

The Mediating Role of Entrepreneurial Alertness

For most entrepreneurs, EA is one of the very important entrepreneurial competencies in the process of starting a business, but this sensitivity to opportunities is not something that a particular entrepreneur brings with him or her innately, but is acquired through continuous learning (Rasmussen et al., 2011). Thus, in a constantly changing environment, entrepreneurs need to continuously learn in order to improve their alertness to market changes (Zhang & Xu, 2017). The essence of entrepreneurship is the process of finding and exploiting business opportunities, in which individuals with higher EA tend to be more likely to explore business opportunities with value potential (Kirzner, 1973). The higher the EA, the higher the probability that entrepreneurs will identify entrepreneurial opportunities (Galio & Taub, 1992; Hills & Lumpkin, 1997).

EOI can be achieved through the pathway of "EL to EA to EOI," with EA playing a partially mediating role between EL and EOI (Zhang & Xu, 2017). EA plays a mediating role between EL and EOI (Wang & Sun, 2012). EA has a partially mediating role between EL and EOI among university students (Wang & Tang, 2020). Therefore, the following hypotheses are proposed in this study.

H2: *EA mediates between EL and EOI among Guangxi university students.*

The Moderating Role of the Entrepreneurial Environment

Singh (2000) argues that entrepreneurial opportunities are the result of the interaction between controllable factors (knowledge, education) and uncontrollable factors (external environment), and therefore EOI must take into account the influence of environmental factors and entrepreneurial characteristics and behaviours, such as entrepreneurial knowledge base and EL behaviour. EL can help entrepreneurs identify changing market needs and acquire effective knowledge in response to environmental changes, thus improving EOI in dynamic market environments (Yan and Liu, 2018). In a fast-changing environment, there are many fleeting windows of opportunity. Entrepreneurial learning can help entrepreneurs to better understand the changing needs of customers and related technological developments, and better identify the direction of market demand changes and changes in technology and

government policies, in order to identify windows of opportunity in the market and obtain favourable entrepreneurial opportunities (Reinertsen & Smith, 1991).

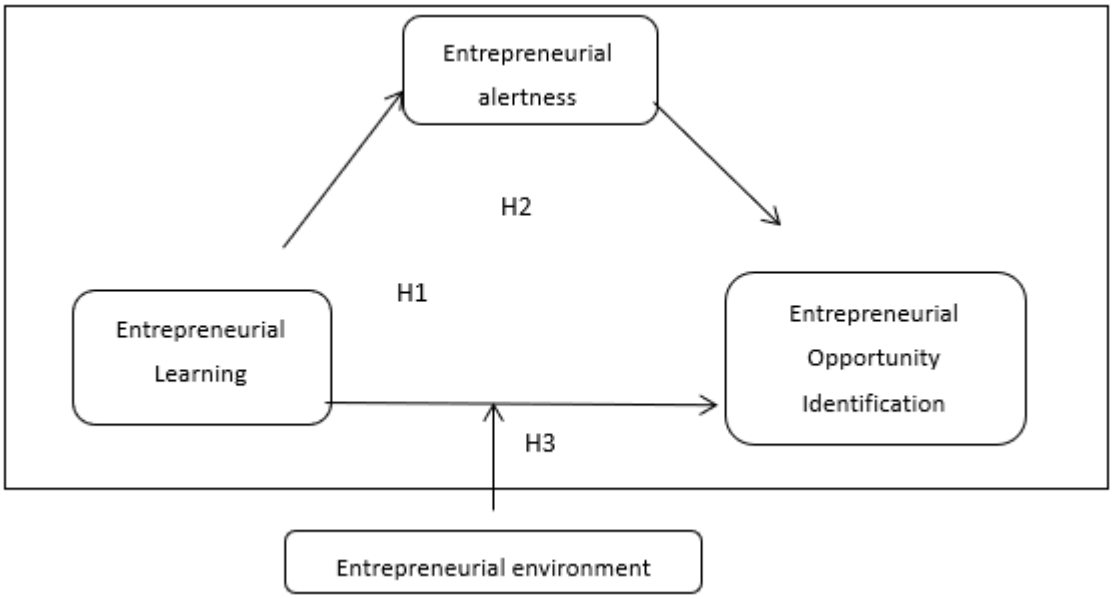
In summary, the pathway of entrepreneurial learning to EOI may be more pronounced with the addition of environmental factors, and therefore it is hypothesized that the EE has a moderating role in entrepreneurial learning and EOI.

H3: *The moderating role of the EE in Guangxi universities between entrepreneurial learning and EOI.*

Research Model

Based on the above hypothetical inferences and also incorporating experiential learning theory, a route framework diagram for this study was constructed (as shown in Figure 1.2) with the following research hypotheses: (1) entrepreneurial learning has a significant positive impact on EOI; (2) EA plays a mediating role in entrepreneurial learning and EOI; and (3) EE plays a moderating role in entrepreneurial learning and EOI.

FIGURE 1
RESEARCH FRAMEWORK DIAGRAM



RESEARCH METHOD

Participants and Procedure

A questionnaire was used to collect a sample of university students from four universities in Guangxi, China, using a snowball sampling method. All participants were voluntary and anonymous in their responses, in line with the Declaration of Helsinki ethical standards (Goodyear et al., 2007). In the survey, participants filled in information about their gender, year, major and rated the measures of EL, EA, EE and EOI. A total of 1263 students completed the questionnaire and after screening, 99 questionnaires were completed in too short a time and were considered invalid, resulting in 1164 valid questionnaires being retained with an effective rate of 92%. The demographic information is shown in Table 1.

TABLE 1
DEMOGRAPHIC INFORMATION TABLES (N=1164)

Background variables	Category	Number of people	Percentage
Gender	Male	431	37%
	Female	733	63%
Grade Level	Freshman year	526	45%
	Sophomore	417	36%
	Third Year	171	14%
	Senior year	50	5%
Specialities	Arts and Sciences	346	30%
	Science	818	70%

Measuring Tools

The Entrepreneurial Learning Scale

Liang and Shen (2020) developed the EL Scale for university students, which contains four dimensions: entrepreneurship education participation, network interaction, experience reflection and practical application, with a total of 19 questions. Using a five-level Likert scale scoring method, respondents yielded higher total score scores for the variables, indicating a higher degree of EL, with a scale Cronbach's α of 0.957.

Entrepreneurial Alertness Scale

The EA Scale developed by Boso et al. (2019) was used, which contains 3 dimensions: search and scan, association and connection, and assessment and judgement, for a total of 11 questions, and was scored using a five-level Likert scale, with respondents yielding higher total score scores for the variables indicating higher levels of EA, with a scale Cronbach's α was 0.906.

Entrepreneurial Opportunity Identification Scale

The opportunity identification scale developed by Puhakka (2006) contains five dimensions: acquisition of business knowledge, competitive scrutiny, prospective search, innovative behaviour, and collective behaviour, with a total of 14 questions, and was scored using a five-level Likert scale, with respondents yielding higher total score scores for the variables indicating higher levels of entrepreneurial identification, with a scale Cronbach's α was 0.93.

Entrepreneurial Environment Scale

Chen (2016) developed the EE Scale, which contains four dimensions: university entrepreneurship education, entrepreneurial influence, supportive environment, and cultural environment, with a total of 14 questions, using a five-level Likert scale scoring method, with respondents yielding higher total score scores for the variables, indicating a higher perception of the EE, with a scale Cronbach's α was 0.805.

STUDY RESULTS

Outer Model Evaluation

Research has indicated that validation of structural models is meaningful when external models have acceptable reliability and validity (Henseler et al., 2016), and therefore, structural model testing is premised on confirming the reliability and validity of external models (Ye, 2022). External model evaluation involves checking the internal consistency reliability of the variables, as well as the convergent and discriminant validity of the measures (Hair et al., 2012). The results of the external model evaluation in this study are as follows:

In order to test the internal consistency of the variables, the reliability of the scales was analysed using Cronbach's α. The study by Hair et al. (2010) concluded that a Cronbach's α value of 0.7 and above is an acceptable range. As shown in Table 2, the Cronbach's α for the EL scale in this study was 0.978, the Cronbach's α for the EA scale was 0.953, the Cronbach's α for the EOI scale was 0.960, and the Cronbach's α for the EE scale Cronbach's α was 0.966, and all scales met the threshold criteria, indicating that the scales had good reliability.

Hair et al. (2017) stated that the convergent validity of the variables can be examined by Average Variance Extracted (AVE) and Composite Reliability (CR), where AVE should be greater than 0.5 and CR value should be greater than 0.6. As shown in Table 2, the AVE of each variable ranged from 0.811-0.829 and CR value ranged from 0.983-0.987, thus EL, EA, EOI, and EE scales all have good convergent validity.

TABLE 2
SUMMARY TABLE OF CONVERGENT VALIDITY

	MEAN	SD	CRONBACH'S A	CR	AVE
REFERENCE VALUES	**--**	**--**	**＞0.70**	**＞0.60**	**＞0.50**
ENTREPRENEURIAL LEARNING	**2.743**	**0.909**	**0.957**	**0.987**	**0.811**
ENTREPRENEURIAL ALERTNESS	**3.140**	**0.820**	**0.906**	**0.975**	**0.815**
ENTREPRENEURIAL OPPORTUNITY IDENTIFICATION	**2.952**	**0.867**	**0.930**	**0.975**	**0.813**
ENTREPRENEURIAL ENVIRONMENT	**2.988**	**0.851**	**0.805**	**0.983**	**0.829**

Fornell and Larcker (1981) suggest that the number of constructs for which the square root of AVE is greater than the correlation coefficient of each construct must be at least 75% of the overall number of comparisons. The results in Table 3 show that the variables in this study have good discriminant validity.

TABLE 3
DISCRIMINANT VALIDITY CHECKLIST

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	0.831													
B	.824**	0.918												
C	.706**	.802**	0.913											
D	.753**	.813**	.884**	0.923										
E	.427**	.419**	.478**	.500**	0.870									
F	.595**	.618**	.636**	.674**	.703**	0.918								
G	.663**	.704**	.718**	.757**	.578**	.849**	0.917							
H	.709**	.775**	.762**	.800**	.486**	.743**	.856**	0.92						
I	.625**	.664**	.717**	.747**	.592**	.762**	.801**	.824**	0.897					
J	.549**	.563**	.641**	.660**	.627**	.714**	.708**	.696**	.846**	0.926				
K	.651**	.694**	.671**	.727**	.477**	.618**	.673**	.727**	.712**	.659**	0.911			
L	.607**	.701**	.662**	.705**	.369**	.565**	.667**	.730**	.642**	.557**	.803**	0.874		
M	.583**	.651**	.634**	.672**	.440**	.556**	.628**	.678**	.661**	.612**	.800**	.808**	0.93	
N	.493**	.525**	.529**	.577**	.487**	.510**	.529**	.552**	.596**	.591**	.683**	.643**	.776**	0.963

Note 1:* p<.05;** p<.01;*** p<.001

Note 2: Diagonal values are square roots of AVE

Note 3: A Entrepreneurship Education Engagement; B Network Interaction; C Experiential Reflection; D Practical Application; E Search and Scan; F Connect and Connect; G Assess and Judge; H Access to Business Knowledge; I Prospective Search; J Innovative Behaviour; K Entrepreneurship Education in Higher Education; L Entrepreneurial Influence; M Enabling Environment; N Cultural Environment.

Common Method Deviation Test

As all key variables in this study were generated by single subject self-reports, the relationships between variables are inevitably subject to common method bias (Podsakoff et al., 2003), and although this study used methods such as anonymous measurement and cross-listing of items to reduce the effect of common method bias (Lin & Cheng, 2016) in order to improve data reliability as much as possible, there is still a need to further examine the measurement data for However, further statistical tests for possible common method bias in measurement data are needed. In this study, we used CFA to compare the fit of the multi-factor model with the single-factor model, while comparing whether there is a significant difference between the two models, which can indicate that the common method bias is not serious.

The results of the common method deviation test for the study sample are shown in Table 4. The results of the analytical data for the validation factors showed that the multi-factor indicators (GFI=0.807, NFI=0.916, CFI=0.919, RFI=0.892, IFI=0.919) outperformed the single-factor indicators (GFI=0.632, NFI=0.790, CFI=0.794 RFI=0.752, IFI=0.794), in addition, the significance test of the chi-square values ($\Delta\chi2$=3153.911, ΔDF=6, $p<0.05$) showed a significant level, indicating a significant difference between the two models, again demonstrating that the common method bias problem in this study is not serious (Zhao. et al., 2021, Gong et al., 2022), i.e., the recall samples were also well represented.

TABLE 4
COMMON METHOD DEVIATION ANALYSIS TABLE - CFA MODEL COMPARISON

Statistical quantification	$\chi2$	DF	GFI	NFI	CFI	RFI	IFI	$\Delta\chi2$	$\triangle$DF	*P*
Standard values	--	--	＞.800	＞.800	＞.800	＞.800	＞.800			
Multi-factor indicators	1109.476	113	0.807	0.916	0.919	0.892	0.919	3153.911	6	<0.05
One-factor indicators	4263.387	119	0.632	0.790	0.794	0.752	0.794			

The Mediating Role of Entrepreneurial Alertness and the Moderating Role of the Entrepreneurial Environment

In research in the social sciences, structural equation modelling (SEM) is often used to help measure the effects of interactions between variables and the structural relationships of models (Hansen & Olsson, 2022; Ye, 2022), i.e., by using data to assess the validity of a theory or hypothesis (Phakiti, 2018). This study first used SEM to test the relationship between EL, EA, and EOI, and based on this model, the moderating effect of the EE was tested through a multi-cluster analysis. The experimental criteria and the complete results of the validation analysis are presented below.

Model Fit

The researchers concluded that the fit of the model can be judged by reference indicators such as RMR, SRMR, GFI, NFI, NNFI, CFI, IFI, RFI and PNFI, where the RMR and SRMR values should be less than 0.80 and the seven indicators of GFI, NFI, NNFI, CFI, IFI, RFI and PNFI should be greater than 0.80 (Hair et al., 2010; Abedi et al., 2015). In this study, when testing the mediating role of EA, a full sample model will be used; when testing the moderating role of EE, a high grouping model of EE and a low grouping model of EE will be developed. The goodness-of-fit indicators for the three models are shown in Table 5, and all three models have a good fit.

TABLE 5
MODEL FITTING VERIFICATION SUMMARY TABLE

Statistical quantification	Standard values	Full sample calibration values	Low sample check values	High sample calibration values
GFI	Greater than .800	0.817	0.847	0.817
RMR	Less than .080	0.037	0.047	0.031
SRMR	Less than .080	0.042	0.067	0.047
NFI	Greater than .800	0.915	0.888	0.9
NNFI	Greater than .800	0.883	0.861	0.863
CFI	Greater than .800	0.917	0.901	0.903
RFI	Greater than .800	0.88	0.842	0.859
IFI	Greater than .800	0.917	0.902	0.903
PNFI	Greater than .500	0.651	0.631	0.64

Direct and Indirect Effects

In this study, the sample data was analyzed through structural equation modelling and the effect between variables was verified by combining Bootstrap, where the Bootstrap method was repeated sampling 2000 times and 95% confidence intervals were calculated (Mackinnon & Fairchild, 2009). The results of the data are shown in Table 6 and in Figure 2.

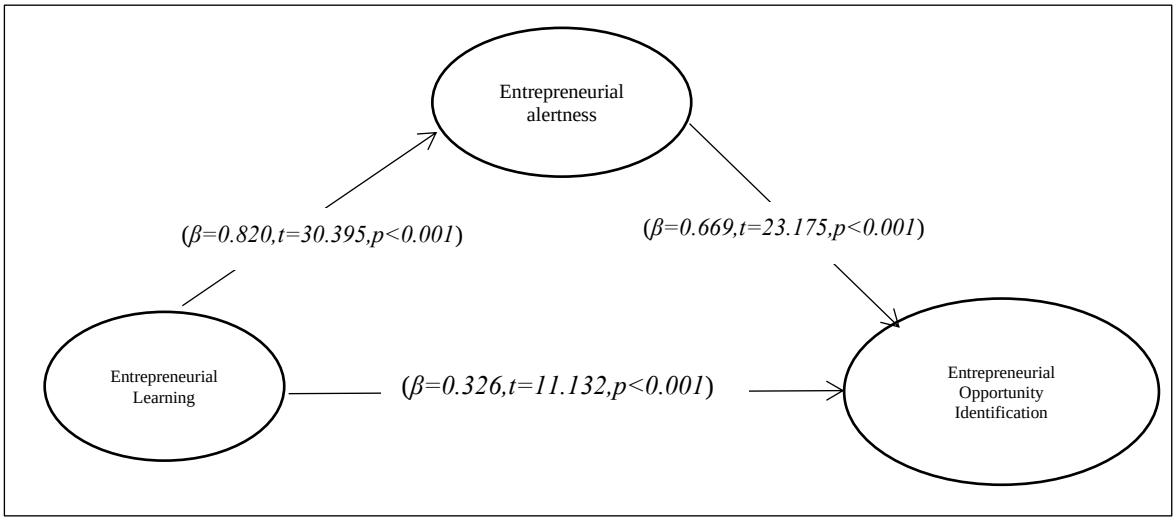
(1) A test of the direct role of entrepreneurial learning and entrepreneurial opportunity identification. The direct effect of EL on the identification of entrepreneurial opportunities was (β=0.326, t=11.132, p<0.001) with a 95% confidence interval between 0.238 and 0.411, excluding '0,' so the direct effect was significant. The data results indicate that the effect of EL on EOI is significant and positive, i.e., EL can positively and significantly influence EOI, therefore, hypothesis H1 is tested.

(2) The mediating role of entrepreneurial alertness test. The direct effect of EL on EA was (β=0.820, t=30.395, p<0.001) with a 95% confidence interval ranging from 0.783 to 0.853; the direct effect of EA on EOI was (β=0.669, t=23.175, p<0.001) with a 95% confidence interval ranging from 0.591 to 0.754; the indirect effect of EA in EL and EOI was 0.549 (p = 0.001), with 95% confidence intervals ranging from 0.480 to 0.628. The 95% confidence interval for each pathway did not contain a '0' and the data results suggest that the mediating effect of EA exists and is partially mediated (Cheung & Lau, 2008). The total effect of entrepreneurial learning on the identification of entrepreneurial opportunities in this model was 0.875 and the mediating effect accounted for 62.7% of the total effect. Therefore, hypothesis H2 was tested, and EA played a mediating role between entrepreneurial learning and EOI.

TABLE 6
MODEL PATH RELATIONSHIP CHECK SUMMARY TABLE (BOOTSTRAP)

Category	Paths	Standard effect	95% confidence interval (BC)		
			p value	Lower limit	Upper limit
Direct effect	Entrepreneurial Learning → Entrepreneurial Opportunity Identification	0.326	0.001	0.238	0.411
	Entrepreneurial Learning → Entrepreneurial Alertness	0.820	0.001	0.783	0.853
	Entrepreneurial alertness → Entrepreneurial opportunity identification	0.669	0.001	0.591	0.754
Indirect effects	Entrepreneurial learning → Entrepreneurial alertness → Entrepreneurial opportunity identification	0.549	0.001	0.480	0.628
Total effect of the path	Entrepreneurial Learning → Entrepreneurial Opportunity Identification	0.875	0.001	0.836	0.904

FIGURE 2
MODEL PATH RELATIONSHIP DIAGRAM



Moderation Tests of the Entrepreneurial Environment

Firstly, the entrepreneurial environment was classified into low and high groups by SPSS 22.0 software using K-means classification, where the sample size of the high group was 877 and the sample size of the low group was 287. The independent samples t-test confirmed that the two groups were significantly different ($p < 0.001$), i.e., Effective grouping (Chen, 2010).

The original model consisting of EL, EA and EOI is taken as the baseline model; on the basis of the baseline model, two groups are grouped according to low and high scores, where the low group model reads the low score samples of the EE and the high group model reads the high score samples of the EE. The coefficients of the effect of EL on EOI were set equal for the two groups of cases and used as the interference model. By building an unconstrained model (i.e., the baseline model) and a constrained model (i.e., the

interference model), the chi-square values and degrees of freedom of the two models are compared to obtain a difference chi-square value for both. If the test result of this difference chi-square value is statistically significant, then it can be inferred that the moderating effect is significant, and vice versa, there is no moderating effect (Chen, 2010). It can be seen from Table 7 that the chi-square value of model 1 (basic model) is 1080.346 (DF=64), and the chi-square value of model 2 (interference model) is 1084.325 (DF=65), and the difference between model 1 and model 2 is 1 degrees of freedom, while the chi-square value difference between model 1 and model 2 is 3.979, which is greater than the chi-square value of 3.84 (when α=0.05), which shows a significant difference in chi-square values. Since the gap between these two models is only restricted in Model 2 (low grouping = high grouping), so when the chi-square values of the two models differ significantly, it means that the restriction (the assumption that the path coefficients of the two groups are equal) is not established. Therefore, the estimated value of the path from EL → EOI is not equal between the high EE group and the low EE group, so it can be inferred that the moderating effect of EE is significant.

TABLE 7
MULTI-GROUP ANALYSIS-SINGLE PATH IDENTITY COEFFICIENT RESULT SUMMARY TABLE (ENTREPRENEURSHIP LEARNING→ENTREPRENEURSHIP OPPORTUNITY IDENTIFICATION)

Models	Description	*χ2*	*DF*	*Δχ2*	*ΔDF*	*p*
Model I	Basic model	1080.346	64	3.979	1	0.046*
Model 2	Adjustment models	1084.325	65			

Note: * p<.05; ** p<.01; *** p<.001

When further comparing the path coefficients of the high EE group and the low EE group, the results are shown in Table 8. On the path of entrepreneurship learning to identify entrepreneurial opportunities, the path coefficient in the model of the high EE group is 0.826, while that of the low EE group is 0.826. The path coefficient in the environment group model is 0.707, that is, the influence of EL on EOI is stronger in high EE than in low EE. In other words, the performance of higher EE will strengthen the impact of EL on EOI Impact. It can be verified that the EE plays an interfering role in the relationship between EL and EOI.

TABLE 8
MULTI-CLUSTER ANALYSIS - INTERFERENCE PATH COEFFICIENT ANALYSIS TABLE FOR HIGH AND LOW ENTREPRENEURIAL ENVIRONMENT GROUP MODELS (ENTREPRENEURIAL LEARNING → ENTREPRENEURIAL OPPORTUNITY IDENTIFICATION)

Paths	High Entrepreneurial Environment Group	Low Entrepreneurial Environment Group
	Estimated value	Estimated value
Entrepreneurial Learning → Entrepreneurial Opportunity Identification (Total Effect)	0.826***	0.707***

Note: * p<.05; ** p<.01; *** p<.001

DISCUSSION

The Direct Role of Entrepreneurial Learning in the Identification of Entrepreneurial Opportunities

Research has shown that EL has a positive and significant effect on EOI. In line with scholars Crossan et al. (2005), Corbett (2005) and Lumpkin and Lichtenstein (2005). Through EL, entrepreneurs' own

entrepreneurial knowledge is enriched and their opportunity identification skills improve (Xing, 2019). EL is the intermediate link between knowledge creation and knowledge application, and these unique EL build a distinctive knowledge information base for entrepreneurs, greatly reducing uncertainty in entrepreneurial activities and improving their ability to identify entrepreneurial opportunities (Qi, 2017). Therefore, EL is a very necessary component in the development of university student entrepreneurs.

The Mediating Role of Entrepreneurial Alertness

The study suggests that EA partially mediates the relationship between EL and EOI. In line with scholars Wang and Sun (2012), and Wang and Tang (2020). Through EL, entrepreneurs constantly pay attention to market dynamics and benchmark companies in their industry, and the entrepreneurial knowledge accumulated during learning also contributes to the improvement of entrepreneurs' cognitive abilities, which in turn promotes EA (Zhang & Xu, 2017). EA enables people to organize and interpret information from various knowledge domains relevant to the identification of new opportunities, and entrepreneurs with high levels of alertness show sharper market insight than others, always paying attention to and searching for market imbalances (Gaglio & Katz, 2001), where there are a large number of undiscovered opportunities and only entrepreneurs with high levels of EA are able to identify these profit opportunities (Kirzner , 1973). This suggests that EA is important for entrepreneurs, especially as they learn to be more aware of changes in their EA and actively use it to improve their effectiveness in identifying entrepreneurial opportunities.

The Moderating Role of the Entrepreneurial Environment

The study shows that a high EE strengthens the impact of EL on EOI compared with a low EE. Opportunity identification is influenced by many environmental factors, and when the environment changes, a large number of opportunities will be created, knowledge and information gaps, and changes in industries or markets will create other spaces (Kirzner, 1973; Timmons, 1999; McMullan & Long, 1990). As individuals become more aware of how their knowledge, skills, abilities, and other conditions interact with their environment, the potential to create new opportunities will be enhanced (Lanivich et al., 2022). At the same time, when entrepreneurs learn about entrepreneurship, their comprehensive capabilities such as knowledge and skills are improved, and they can capture more entrepreneurial opportunities in market changes (Lanivich et al., 2022). When the environment is at a high level of uncertainty, entrepreneurs will achieve more efficient learning in the interaction with the uncertain environment, and then identify more entrepreneurial opportunities (Xing , 2019).

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The research shows that EL has a positive predictive effect on the identification of entrepreneurial opportunities, and EA plays a partial mediating effect in it. In addition, the EE moderates the effect of EL on EOI. In particular, a high level of EE can increase the effect of EL on EOI compared with a lower level of EE.

University students' entrepreneurship has distinct practical characteristics. How to effectively guide universety students to consciously and scientifically carry out EL in education requires the construction of a highly operable educational practice plan. This study first explores the importance of university students' EOI in the process of entrepreneurial development from the perspective of sustainable development, and constructs an intermediary regulatory model, which not only provides a theoretical basis, but also provides a realistic path for educational practice programs. This will help to improve the university's entrepreneurial ability and improve the pertinence and effectiveness of educational practice activities.

Recommendations

The first is to explore the body of individual competencies required for EOI among university students. Based on experiential learning theory, it is concluded that in order to enhance EOI, one must prepare,

incubate, evaluate and plan for each stage of EL. Therefore, when universities offer entrepreneurship courses, they should offer targeted courses related to innovation and entrepreneurship for university students in stages, and moreover, they should create practical entrepreneurial activities and competitions at the right time.

Secondly, in the process of entrepreneurial practice, for students who have already participated in entrepreneurial activities, they should make good use of their existing experience in entrepreneurial competitions and industries to combine with the ever-changing entrepreneurial scenarios in order to acquire new entrepreneurial knowledge and abilities. Students who have the intention to start a business but have not yet started entrepreneurial activities should actively observe the behavior of successful entrepreneurs and read relevant entrepreneurial books and literature, so that they can form valuable knowledge and entrepreneurial skills for themselves through the cognitive processing of the information obtained.

Thirdly, in order to improve EOI, entrepreneurs need to choose different learning strategies depending on the environment. EL, as the main way to acquire entrepreneurial knowledge, must adapt to changes in the environment so as to improve the effectiveness of entrepreneurial knowledge. The government and universities should shape the EE of university students, increase innovation and entrepreneurship-related policies, support funds, incubation programs and entrepreneurial platforms, increase EL and practice opportunities for university students, and improve EOI skills.

RESEARCH LIMITATIONS AND FUTURE STUDY

(1) The limitations of the research conditions, only a cross-sectional study with a large sample was conducted on the selected topic, while EL itself has the characteristics of development and dynamic change, and the impact of EL on the identification of entrepreneurial opportunities also has stage characteristics. In the future, we should conduct a long-term follow-up study to dynamically examine the process of EL and how it affects the identification of entrepreneurial opportunities. In the future, we can follow up individuals who have received university education and started their own business after graduation, so as to reveal more profoundly the influence of EL on EOI.

(2) Limitations of the theoretical model. This study explored the mechanism of the role of EL on EOI, analysed the mediating effect of EA, and the impact of the moderation of the EE. Although this study endeavours to elucidate the mechanism underlying the role of EL and EOI, due to resource and research time constraints, this study does not introduce other mediating and moderating variables that could be incorporated into the model. Future research could expand the theoretical model in this study by considering other variables that could be incorporated from the richness of the model.

(3) Limitations of the research sample. However, whether the findings of this study can be applied to other universities in other regions needs further verification. Future research could also start by expanding the sample size to see if the findings of this study can be extended to a wider sample size.

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