Case Study on Assessing Factors on Participation of Academic Competition among Bachelor Students in Universities Baise Guangxi China

Tang Ying[1], Wu Zhaohui[2], Liu Hao[3]
College of Tourism, University Baise, China

ABSTRACT: Scientific and technological innovation has become an important symbol of national core competitiveness and high-quality talents play a decisive role on the innovation of science and technology or on the upgrading of traditional industries. At present, many universities try to encourage students to attend academic competition, since academic competition can inspire the innovative and practical ability of university students and cultivate them become high-quality talents. In order to promote more college students to participate in academic competition to improve their ability, this paper empirically analyzes the students' intention to attend academic competition from Baise University with underpinning the Theory of Planned Behavior (TPB). The results show that attitudes and perceived behavior control have positive effects on students' intention to participate in academic competitions.

Keywords: TPB, Academic Competition, Intention, University Students.

INTRODUCTION

The content of academic competition mainly focuses on the main knowledge in various majors. The forms of competitions will be different depending on the different types and the different subjects of competitions. The source of academic competition derives from practical problem; The students in the competition need to formulate solutions and design works according to the scenario and requirements set by the competition. Now academic competition has experienced more than 30 years of development in university (Zhang Daliang, 2019), and has trained university students' critical thinking ability and cultivate their hardworking spirit significantly (Li Guo Feng etc. 2013). Students' participating in academic competitions can improve their comprehensive quality and enhance their competitiveness in future career. The academic competition not only improves students' professional knowledge and skills, but also improves students' comprehensive abilities, such as innovation ability, practical ability, teamwork ability, and communication ability (Committee of Foreign Language Administration in College and University Ministry of Education China, 2023). Furthermore, the experts believe that those honors and awards in the academic competition rewarded to students will encourage the students study hard, and it may help them to prepare future career well (Committee of Foreign Language Administration in College and University Ministry of Education China, 2023).

As a competition instead of compulsory courses in education, participation on competition requires students to have the desire and intention of active learning. However, at present, the proportion of students participating is low (He Chunbao etc., 2020，Yang Qiong & Cai Sheng, 2022), so how to improve students' intention to participate in academic competition is extremely urgent. This paper will make an empirical analysis of students' intention to participate in academic competitions by using the theory of planned behavior and provide relevant suggestions.

2.0 Framework on Intention Towards Returning the used carton from Online Shopping

In developing an in-depth understanding of student's intention towards participation on academic competition, a framework (Figure 1) was built up based on previous research on the rational behavior. The core construct of the framework underpins the Theory of Planned Behavior (TPB) by Ajzen (1991). According to TPB, the intention was determined by three basic determinants: (a) attitude towards the behavior, (b) subjective norms and (c) perceived behavior control. Generally, people will have strong choices to perform a specific action when they evaluate that behavior positively (attitude effects) and when they believe that important others think they should perform that behavior (subjective norm effects) and when they believe that they have actual abilities to perform (perceived behavior control).
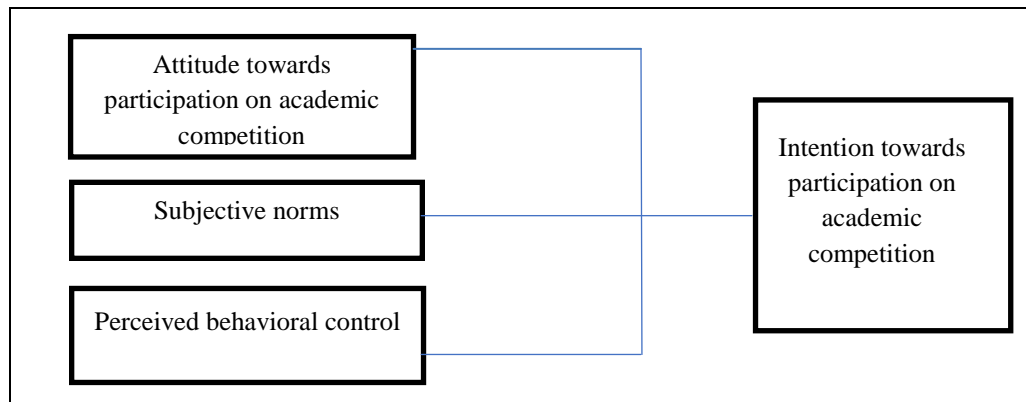
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┌──────────────────────────────────────────────────────────────────────────────┐
│  ┌────────────────────────────────┐                                            │
│  │ Attitude towards               │                    ┌──────────────────┐    │
│  │ participation on academic      │────────┐           │ Intention towards│    │
│  │ competition                    │        │           │ participation on │    │
│  └────────────────────────────────┘        │           │ academic         │    │
│  ┌────────────────────────────────┐        │           │ competition      │    │
│  │ Subjective norms               │────────┼───────────│                  │    │
│  └────────────────────────────────┘        │           └──────────────────┘    │
│  ┌────────────────────────────────┐        │                                   │
│  │ Perceived behavioral control   │────────┘                                   │
│  └────────────────────────────────┘                                            │
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Figure 1. Research Framework

Ajzen (1991) holds that The TPB is suggested to apply in different studies, in order to test whether the theory can explain the specific scenario and improve the accuracy of the prediction in the specific scenario. Many studies have been conducted by underpinning TPB in different contexts (Aini et al., 2002; Sidique, Lupi, & Joshi, 2010; Latif & Omar, 2012; Wan et al., 2012; Ramayah et al., 2012; Botetzagias et al., 2014; Echegaray & Hansstein, 2017;) Thus, it is worth that to apply the TPB to examine Student's intention towards participation on academic competition in this study.

2.1 Intention towards Participation on Academic Competition

According to Ajzen (1991), TPB is suitable to predict on the rational choice behavior. And the behaviors on participation on academic competition should be considered as self-interested behaviors and as rational choice behaviors. The reason is that the students can sharpen and improve their skill and related knowledge by those participation behavior in their benefits. Consequently, it is suitable to predict this behavior by underpinning TPB. In detail, TPB holds that intention is influenced by (1) individual attitude towards performing a particular behavior, (2) subjective norms the individual perceives, and (3) perceived behavioral control. The next paragraphs will discuss and test how these three factors will affect the intention towards participation on academic competition.

2.2 Attitude Towards Participation on Academic Competition

Attitude is referred as "good", "bad", "positive", "negative", "favorable" and "unfavorable" evaluation on consequences of performing the behavior (Chu and Chiu, 2013; Tang, Chen and Luo, 2011). Based on the literature reviews relating to rational behavior, there is evidence that positive attitude towards behavior may cause a positive intention towards the behavior in a high possibility level (Aini et al., 2002; Latif & Omar, 2012; Wan et al., 2012; Ramayah et al., 2012; Botetzagias et al., 2014; Echegaray & Hansstein, 2017；Tang et. al, 2024). Therefore, in this current study, if the individual has a positive attitude towards participation on academic competition, they are relatively to have the positive intention towards participation on academic competition. Thus, the hypothesis is:

H1: Attitude towards participation on academic competition has a significant relationship with intention towards participation on academic competition.

2.3 Subjective norms

According to Ajzen (1991), subjective norms relate to social factors and social norms, and refer to the perceived social pressure by the individual to perform the specific behavior or vice versa. In TPB, subjective norm also can be considered as an important predictor on the behavioral intention, and can affect the real behavior performed (Ajzen ,1991). Normally, an individual will intend to perform the specific behavior when perceives that important referent (which includes family, friends, and peers) hopes to perform the specific behavior. There are many previous studies conducted on subjective norm that support this statement (Conner & Armitage, 1998; Z. Tang et al., 2011; Moons & De Pelsmacker, 2015; Tang & Wu, 2023). Thus, the hypothesis can be set up as below:

H2: Subjective norm has a significant relationship with intention towards participation on academic competition.

2.4 Perceived Behavioral Control (PBC)

Perceived Behavioral Control (PBC) is an extended variable from TRA due to the issue of non-volitional control. In TPB, PBC, which is derived from control beliefs, reflects the actual non-volitional situation and condition in certain level

(Ajzen, 1991) [1], and the more accurately the individual can perceive on the actual situation, the more accurately the actual situation can reflect. Therefore, PBC can be considered as volitional power assessment on their non-volitional power (actual ability) to perform certain behavior. Ajzen (1991) holds that control beliefs, which is the antecedent of PBC, refers to the perceived probability on the situation which will may ease an individual on performing a particular behavior or vice versa. Besides control beliefs, Ajzen (1991) also hold that PBC will be determined by perceived power, which refers to the extent to which the control belief affects the behavior. Both "control beliefs" and "perceived power" collectively will positively affect the intention toward the behavior. Many empirical studies have proven that PBC has positive significant relationship with behavioral intention (Christina Knussen et al., 2004; Z. Tang et al., 2011; Latif and Omar, 2012). Thus, the hypothesis is:

H3: Perceived behavior control has a significant relationship with intention towards participation on academic competition.

RESEARCH METHODOLOGY

TThe survey explores the intention towards participation on academic competition. The questionnaires used in the survey towards the intention are adapted from different scholars (Nduneseokwu et al., 2017; Moons and De Pelsmacker, 2015; Khatimah, 2016). Meanwhile, the independent variables (attitude, subjective norms and PBC) are adapted from Chu and Chiu (2003). The main data collection technique applied in this research is questionnaires. A seven-point scale is used in this study to calculate the variables. Meanwhile all items of them are translated into Chinese. A total of 421 questionnaires were distributed from 23rd September 2022 until 11th July 2023 in University Baise in Guangxias the case study. In the end, a total of 411(97.62%) questionnaires were valid and accepted for the relative analyses.

4. Result
4.1 Reliability Analysis

Reliability analysis ensures the accuracy and the precision of a given measurement to meet standard (Thorndike, Cunningham, Thorndike & Hagen, 1991). Based on Nunnally (1970), each evaluation criterion has fulfilled the threshold (Coefficient Alpha>0.6) as shown in Table 1

Table 1: Summary of Reliability Test

No.	Variables	Cronbach's Alpha	No. of Items	Item Deleted
1	Attitude	0.915	3	Nil
2	Subjective Norms	0.938	5	Nil
3	PBC	0.900	7	Nil
4	Intention Towards Participation on Academic Competition	0.937	4	Nil

4.2 Convergent Validity

By convergent validity test, it can be proved that the constructs are strongly interrelated (Brown, 2006). In this section, the exploratory factor analysis (EFA) is used to assess this validity to determine whether the items converge is satisfactory or contrary.

Table 2: KMO and Bartlett's Test for All Variable

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.930
Bartlett's Test of Sphericity	Approx. Chi-Square	7179.602
	df	171
	Sig.	.000

Table 2 shows the KMO and Bartlett's Test for all variables. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is .930. Meanwhile, in the Bartlett's Test of Sphericity, the significant value is approximately zero. Since the Kaiser-Meyer-Olkin Measure of Sampling Adequacy is higher than a threshold, which is 0.5, the significant value for the Bartlett's Test of Sphericity is lower than 0.05. Thus, the data is suitable for process factor analysis.

Table 3: Rotated Component Matrix for All Variables
Rotated Component Matrix[a]

	Component			
	1	2	3	4
att1 I feel participation on academic competition is helpful for my study.	.034	.478	.370	.682
att2 I am willing to attend the academic competition in heart.	.246	.475	.381	.589
att3 I feel the academic competition is full of meaning.	.050	.536	.386	.620
sn4 The university has huge effects on me upon the participation of academic competition.	.221	.690	.284	.443
sn5 The students in neighbors have huge effects on me.	.211	.811	.273	.265
sn6 My roommates have huge effects on me.	.218	.847	.241	.090
sn7 The associate I attend has huge effects on me.	.301	.757	.161	.228
sn8 My friends have huge effects on me.	.241	.844	.278	.081
pbc9I have time to take part in academic competitions.	.578	.272	.328	.354
pbc10It doesn't take much effort to participate in academic competitions.	.714	.290	.107	-.297
pbc11 I understand the process of participating in academic competitions.	.804	.230	.188	.029
pbc12I have complete control over whether I enter a academic competitions.	.746	.121	.249	.172
pbc13I have relatively enough knowledge to participate in academic competitions.	.784	.160	.117	-.043
pbc14The school gives me enough funds to participate in the academic competitions.	.787	.124	.147	.134
pbc15The school gives me enough facilities to take part in academic competitions	.753	.126	.166	.361
Itt1 I have intention to participate the academic competitions.	.257	.247	.801	.263
Itt2 I want to attend the academic competition soon.	.345	.263	.756	.204
Itt3I would like to share the benefits of academic competition soon.	.211	.294	.865	.081
Itt4 I am willing to encourage the persuade other people to join in the academic competition.	.193	.270	.850	.209

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 7 iterations.

Table 3 shows that factor loading value on all items is higher than a threshold, which is 0.3 (Hair et al., 2006). Thus, all the loading factors are accepted. Meanwhile, all the loading factors are located at Component 1 to Component 4 separately, which means the data should be separated into four groups. It indicates that the data should present four different variables. Thus, it matches the construct of the current theory in this paper. Thus, the Convergent validity test is passed. Further data analysis can be continued.

4.3 Discriminant Validity

Table 4: Pearson correlation among the variables

Correlations

		ATT	SN	PBC	ITT
ATT	Pearson Correlation	1	.761**	.418**	.686**
	Sig. (2-tailed)		.000	.000	.000
	N	411	411	411	411
SN	Pearson Correlation	.761**	1	.549**	.634**
	Sig. (2-tailed)	.000		.000	.000
	N	411	411	411	411
PBC	Pearson Correlation	.418**	.549**	1	.552**
	Sig. (2-tailed)	.000	.000		.000
	N	411	411	411	411
ITT	Pearson Correlation	.686**	.634**	.552**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	411	411	411	411

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

According to Nunnally (1970), discriminant validity is able to indicate the extent to which the scale correlates positively with the measures of the same construct and is distinct from those that do not belong to what it is measuring. Discriminant validity reveals the extent to which each predictor differs from another (Byrne, 2010). In other words, discriminant validity is measuring each distinct construct in the theoretical model (Byrne, 2010). Thus, it can infer that the constructs should not interrelate (Compeau, Higgins & Huff, 1999). In order to find out the relation effect of each construct, the discriminant validity in this study is calculated through the Pearson correlation values. Mayer (1999) suggested that a moderately weak correlation of 0.2 to 0.8 or -0.8 to -0.2 can be accepted for any variables. Table 4 shows that all the Pearson Correlation Values are in the accepted area. Thus all the constructs have passed the discriminant validity test.

4.4 Regression Analysis

To determine whether the residuals are normally distributed, a normal Predicted Probability (P-P) plot was examined. Figure 1 shows the graph of Normal Predicted Probability (P-P) Plot of Regression Standardized Residual for IVs and DV. The graph can be seen conforming to the diagonal normality line indicated in the plot. Thus, the residuals are normally distributed.
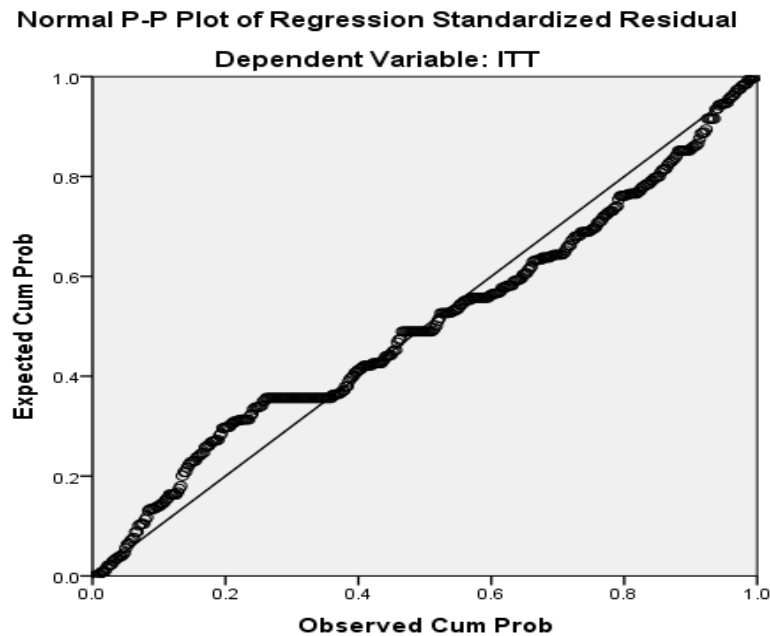
Figure 2. Normal Predicted Probability (P-P)Plot of Regression Standardized Residual for IVs and DV
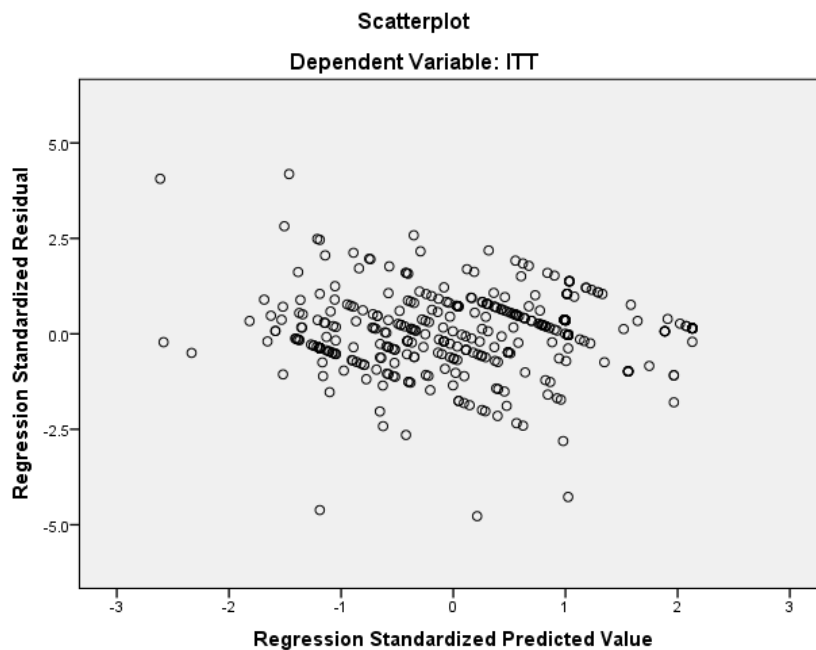
Figure 3. Scatterplot for IVs and DV

The test for homoscedasticity (scatter plot of ZPred on ZResid), would reveal any variance of errors in analysis across all the levels in the predictor variables (Hair et al., 2006). Figure 2 shows that there is no obvious pattern for the scatter plots in the regression standard scatterplot between IVs and DV. Thus, there is no heteroscedasticity.

Statistics Solutions (2020) stated that when the residuals are normally distributed and homoscedastic, linearity should be accepted. Statistics Solutions (2020) stated that if VIF values for each value are below 10, the assumption of no Collinearity is met. Thus, Non-Multi-collinearity in this current model also should be accepted, since the result in Table 5 indicates that VIF for all values are lower than 10.

Table 5: Coefficients[a] and collinearity for Hypotheses Test Among IVs and DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.743	.200		3.722	.000		
	ATT	.471	.049	.484	9.554	.000	.421	2.377
	SN	.103	.055	.104	1.895	.059	.356	2.807
	PBC	.305	.041	.293	7.442	.000	.699	1.431

a. Dependent Variable: ITT
b. Predictors: (Constant), PBC, ATT, SN

Table 6: ANOVAa Test for Hypotheses Test Among IVs and DV

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	258.674	3	86.225	172.701	.000[b]
	Residual	203.204	407	.499		
	Total	461.877	410			

a. Dependent Variable: ITT

Table 7: Model Summaryb for Hypotheses Test Among IVs and DV

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.748[a]	.560	.557	.70659	1.857

a. Predictors: (Constant), PBC, ATT, SN
b. Dependent Variable: ITT

Table 6 shows the ANOVA test for hypotheses test among IVs and DV. The result shows the p-value is 0.000, which is less than 0.05. This means at least one of the three predictor variables can be used to model itt (intention).

From table 5 above, the significant value for att (attitude) is 0.000, which is lower than 0.05; meanwhile, t-value is 9.554, which is higher than 1.96. Thus, attitude towards participation on academic competition has a significant positive relationship with intention towards participation on academic competition. Furthermore, since the Unstandardized Coefficients B is .471, thus for every unit increase in att (attitude), itt (intention) will go up by .471 units, provided that other variables remain unchanged. From the same table, the sn (subjective norms) shows that the significant value is 0.059, which is higher than 0.05; meanwhile, the T value is 1.895, which is much lower than 1.96. Thus, the Subjective norm has no significant positive relationship with intention towards participation on academic competition. Besides that, the table also shows that the significant value for PBC is 0.000, which is lower than 0.05; meanwhile, t-value is 7.442, which is higher than 1.96. Thus, PBC has a significant positive relationship with intention towards participation on academic competition; Furthermore, since the Unstandardized Coefficients B is .305, thus for every unit increase in PBC, itt (intention) will go up by .305 units, when other variables remain unchanged.

Table 7 shows the model summary for the hypothesis test among IVs and DV. The result shows that the R-square value is 0.560. This means 56.0% of the variation in itt (intention) can be explained by (or accounted for by) the variation in att (attitude) and PBC (Perceived Behavioral Control).

DISCUSSION

This research provides and tests a framework that may help scholars understand the psychological factors that will affect the intention towards participation on academic competition. This research tests three factors from TPB, which are attitude, subjective norms and perceived behavior control. Although TPB claims that all of three factors will have a positive effect to the intention toward behavior, some researchers have some inconsistent comments on attitude (Aini et al., 2002),subjective norms (Knussen et al., 2004) and PBC (Moons and De Pelsmacker, 2015). Those factors showed different effects on the intention toward rational behavior in different contexts. Thus, it is worth testing whether these three variables can increase

intention level participation on academic competition, aiming to improve the higher education performance among bachelor degree students in Guangxi, China.

In this study, hypothesis 1 is accepted that attitude towards participation on academic competition has a significant relationship with intention towards participation on academic competition. The result matches the TPB and many studies related to rational behavior(Sidique, Lupi, & Joshi, 2010; Latif & Omar, 2012; Wan et al., 2012; Ramayah et al., 2012; Botetzagias et al., 2014; Echegaray & Hansstein, 2017, Tang Ying, 2023). However hypothesis 2 is rejected which means that Subjective norms have no significant relationship with intention on towards participation on academic competition. It shows the inconsistence on TPB and inconsistence on previous study related to rational behavior (Christina Knussen et al., 2004). Besides that, hypothesis 3 is accepted that Perceived behavior control has a significant relationship with intention on towards participation on academic competition; the result matches the TPB and many studies related to rational behavior (Sidique, Lupi, & Joshi, 2010; Latif & Omar, 2012; Wan et al., 2012; Ramayah et al., 2012; Botetzagias et al., 2014; Echegaray & Hansstein, 2017, Tang Ying, 2020)

5.1 Implication

The result shows attitude towards participation on academic competition play a more important effects on intention towards participation on academic competition. Consequently, the authors suggested that all the lecturers in university must always encourage students to participate in academic competition by inculcating and repeating the benefits of academic competition. By repeated those actions, the students may directly link the benefits of academic competition with themselves, then the attitude towards participation on academic competition is formed up intrinsically in students' mind. Besides the attitude, PBC also affects the intention significantly. Thus, the authors suggested that the university should provide academic mechanism which can enhance the students' PBC; for example, the university can exempt relative exam to the students when they get the good competition result by attending the relative academic competition; In this way, the students may have more time and energy to prepare those academic competition.

5.2 Contribution

Su rui (2020) holds that talent people is the key force to promote scientific and technological innovation. Furthermore, the ability of scientific and technological innovation has become an important symbol of national core competitiveness (Porter, 1990). Meanwhile Porter (1990) believes that high-quality talents play a decisive role on the improvement of science and technology or on the upgrading of traditional industries.

This study has made huge practical contribution, since this studymay help increase the rate of participation on academic competition, and academic competition can be used to cultivate high level talent by trainning university students' practical ability and innovation ability (He Chunbao etc. 2020). Furthermore，this study has made a further theoretical and methodological contribution on the theory of planned behavior, since this article has studied public university students' participation on academic competition in Guangxi, China.

5.3 Limitation

As with any conceptual model, this model also has its limitations. Although the current framework is on a combination of results from many different studies relating to rational activities, there can always be other psychological factors, which can affect intention to perform relative activities, which are not included in the literature to date, or which is addressed in other literature studies. Thus, the number of psychological factors which were discussed in this study may also be limited. The second limitation of the current paper is that this framework is that the result only has been tested on university students in University Baise, China. This implies that caution should be taken in applying this finding to other groups of people.

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