
Research article

What determines logistics sub-degree students' decision to pursue a bachelor's degree?

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Abstract

With the growing importance of the logistics industry and the increasing demand for logistics professionals with a bachelor's degree qualification, the government and industry in China have long been looking for ways to attract more logistics sub-degree students to pursue higher education. This article aims to provide insights into the factors that determine logistics sub-degree students' intention to pursue a bachelor's degree. The study extended the theory of reasoned action (TRA) model to include four variables, namely perceived difficulty, job opportunities, job starting salary and genuine interest. The findings from the study involving 361 logistics sub-degree students from three institutions show that logistics sub-degree students' decision to pursue a bachelor's degree is determined by attitude, subjective norm, perceived difficulty, job opportunities, job starting salary and genuine interest. Genuine interest is identified as a new precursor of intention. The findings also show that there is a significant difference between students from different types of programmes. Based on the findings, this article proposes some

measures for the relevant parties to motivate and attract logistics sub-degree students to further their study at bachelor's degree level.

Keywords logistics education; bachelor's degree; theory of reasoned action; China

Introduction

The logistics industry is one of the leading industries driving the economic development of a nation (Doktoralina and Apollo, 2019). In 2020, the logistics industry accounted for between 7 and 22 per cent of gross domestic product (GDP) for countries (Armstrong and Associates Inc., 2021). Since the beginning of the twenty-first century that saw technological advancement and a shift in demand towards high-skilled labour, the education of logistics workers has become a priority in the logistics industry. Logistics firms and governments worldwide are now competing to attract logistics professionals with bachelor's degree qualifications to fill their logistics positions, in particular those at supervisory and managerial levels. As the world's logistics leader, China is facing a severe shortage of talent with university education and professional knowledge in its logistics industry (Zheng et al., 2021). The supply of logistics bachelor's degree graduates is far below industry demand in China. The main reason is that many logistics sub-degree students (that is, students of an undergraduate programme below the degree level, such as higher diploma or associate degree) choose not to further their study and articulate to a bachelor's degree (Lee, 2017; Xiao, 2020). It is important to understand the underlying factors that influence the logistics sub-degree students' decision-making process in order to increase their articulation rate, thereby increasing the supply of graduates with bachelor's degree qualifications. Despite the importance of this, there is no literature addressing this issue. This study fills the gap by exploring the intrinsic and extrinsic variables that influence the decisions of logistics students.

The objectives of this article are twofold: to examine what factors determine logistics sub-degree students' decision to pursue a bachelor's degree by extending the theory of reasoned action (TRA) model to include perceived difficulty, job opportunities, job starting salary and genuine interest as potential precursors of attitude and intention; and to propose measures to attract more logistics sub-degree students to pursue a bachelor's degree. This article investigates the study choice decisions of logistics students and examines the impact of genuine interest on intention. It also demonstrates the effect of programme type on students' decision-making process. In the following section, the logistics industry and its economic contribution to countries, in particular China, are examined. The TRA is described and its application in the education context is reviewed. The conceptual framework and research methodology of the study are then presented, and the results and findings of the study are discussed. Finally, a conclusion with discussion is presented.

Literature review

Logistics and the logistics industry

Logistics refers to 'the process of planning and implementing the flow of products, parts and services necessary for production and delivery' (Lasserre, 2004: 77). It is the function responsible for the movement of materials from suppliers into a firm, through the productions and operations within the firm, and then out to its customers (Panayides, 2006). Kovács and Kot (2016) point out that logistics aims to provide things or products in adequate quantity and quality at a given destination, from an appropriate origin, with appropriate equipment and method, in an appropriate time and at a minimal cost. It is an important business function that creates value for firms, suppliers, customers and society.

The logistics industry has experienced tremendous growth worldwide as a result of continuous outsourcing activities by producers, manufacturers, retailers and wholesalers from all industries (Caldwell and Koenig, 2016). It has become one of the most important industries driving the economy of the world. It is a major component of trade, and a main contributor to the economy and economic growth in most countries (Evangelista et al., 2017). Taking the USA as an example, the logistics industry contributed 8.0 per cent of the country's GDP in 2020 (Armstrong and Associates Inc., 2021). In Japan and the UK, the

logistics industry accounted for 8.5 per cent of GDP in the same year. Similarly, 8.1 per cent of the GDP in Germany in 2020 was contributed by the logistics industry. According to Armstrong and Associates Inc. (2021), global logistics costs reached US\$9 trillion in 2020, which accounted for 10.8 per cent of the world's GDP. The GDP, logistics costs and logistics costs as percentage of GDP of the top 10 countries in 2020 are shown in Table 1.

Table 1. The GDP, logistics costs and logistics costs as percentage of GDP of the top 10 countries in 2020 (Source: Authors, 2022)

Country	GDP (US\$ billions)	Logistics cost (US\$ billions)	Logistics cost (GDP %)
Grand total	84,574.8	9092.1	10.8
USA	20,932.8	1674.6	8.0
China	14,722.8	2134.8	14.5
Japan	5048.7	429.1	8.5
Germany	3803.0	308.5	8.1
UK	2711.0	230.2	8.5
India	2708.8	351.8	13.0
France	2598.9	228.2	8.8
Italy	1884.9	169.4	9.0
Canada	1643.4	147.9	9.0
South Korea	1630.9	146.7	9.0

According to the figures, China has been the world leader in logistics. Logistics costs in China reached US\$2.1 trillion in 2020, representing more than 14.5 per cent of the country's GDP. The logistics industry in China has become the largest in the world, as well as one of the most important economic engines in the world. The Chinese market has become very important to logistics professionals, as well as to logistics scholars.

The logistics industry in China

China relies heavily on the logistics industry, with it being one of the backbones of the Chinese economy in the past two decades. Accelerating the development of the logistics industry has long been one of the key policies of the Chinese government.

As a global manufacturing centre, China's booming economy, in particular its manufacturing sector, has greatly benefited from, and been driven by, its logistics industry. From 1992 to 2004, China's logistics industry experienced an average growth rate of 22.2 per cent, and it accounted for an average of 21.8 per cent of China's GDP during the period (Wang et al., 2006). In 2010, the logistics industry in China contributed about RMB 2.7 trillion of value added, and the total expenditure of logistics constituted close to 18 per cent of China's GDP in 2010 (Lai et al., 2013). The logistics industry has become the fastest growing industry in terms of employment in China. China has also become the global leader in logistics since 2017. In 2020, there were 400,000 logistics companies in China, with more than 50 million employees.

Given the rapid growth and the strategic importance of the logistics industry (in terms of GDP contribution and job opportunities) in China, there is a great demand for the workers in this field to build their ability and enhance their knowledge under formal education. Therefore, more and more logistics or logistics-related tertiary education programmes, ranging from sub-degree level (higher diploma or associate degree) to bachelor's degree level, have been launched to provide a stepping stone for students to become logistics professionals.

There are over 1,840 institutions offering logistics sub-degree programmes and 520 institutions offering logistics bachelor's degrees in China. As of 2017, there were over 500,000 tertiary students majoring in logistics in China, including 400,000 logistics sub-degree students and 100,000 logistics bachelor's degree students. Although there are a large number of logistics students graduating from institutions each year, the annual shortage of talent with bachelor's degrees in the logistics industry in

China is as high as 600,000 (Lu and Feng, 2021). This shortage could theoretically be met by articulating more sub-degree students to bachelor's degrees. Nevertheless, reports show that a significant number of student respondents choose not to do a bachelor's degree (Lee, 2017).

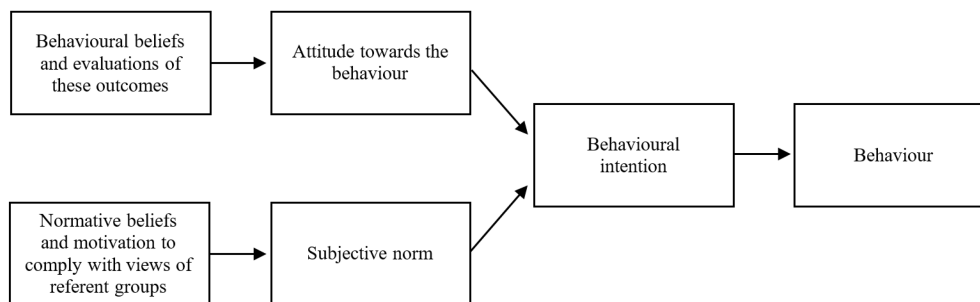
Due to the importance of the booming logistics industry, and the necessity of assuring sufficient bachelor's degree holders for the logistics industry, the government and industry in China have long been looking for ways to attract more logistics sub-degree students to further their bachelor's degree study. In order to do that, it is crucial to understand factors determining logistics sub-degree students' decision to pursue a bachelor's degree.

Theory of reasoned action

The TRA was introduced in 1980 (Ajzen and Fishbein, 1980). It is one of the most robust cognitive behavioural models developed for understanding and predicting human behaviour. The TRA assumes that humans are rational and make systematic use of surrounding information before performing their behaviour (Ajzen, 1988). It argues that human beings normally evaluate rationally the outcomes of their behaviour before they decide to carry it out or not to carry it out. Observing that most human behaviour can be controlled volitionally by the person themselves, the theory holds that behavioural intention is the direct determinant of the person's final behaviour (Zhang, 2007).

According to the TRA, a person's beliefs about the outcomes of a behaviour (so-called behavioural beliefs) and their evaluations of these outcomes determine their attitude towards the behaviour. The person's beliefs that their referent groups expect them to act or not to act a behaviour (so-called normative beliefs), and their motivation to comply with the referent groups' views, form the subjective norm. The attitude towards the behaviour together with the subjective norm then determine the person's intention (behavioural intention). The person's intention eventually determines their actual behaviour. The TRA presents a clear and simple framework of the interrelationship between beliefs, attitude, subjective norm, intention and behaviour (Ajzen and Fishbein, 1980). Figure 1 depicts the TRA in diagram form.

Figure 1. The theory of reasoned action (Source: Authors, 2022)



Since its introduction, the TRA has been widely adopted by researchers in studying human behaviour. Sheppard et al. (1988) performed a meta-analysis on the TRA and reviewed all studies employing the TRA published in top-tier journals, such as the *Journal of Marketing*, the *Journal of Marketing Research*, the *Journal of Consumer Research* and the *Journal of Social Psychology*. Their comprehensive analysis showed that the TRA has been well applied in a large variety of consumer research work, ranging from eating in restaurants and watching television programmes, to writing letters and going to parties. Vallerand et al. (1992) found that the TRA has also been well adopted in research dealing with issues such as voting, smoking, dental hygiene, contraceptive behaviour and seat-belt use. Montano and Kasprzyk (2008) noted that the TRA has been employed in studies on exercising, shopping and travelling. Many other recent empirical studies have also demonstrated that the TRA is robust and reliable in predicting human decision-making process and behaviour in different contexts (Doane et al., 2016; Karnowski et al., 2018; Mishra et al., 2014; Tuck and Riley, 2017).

The TRA is applicable to investigate the study choice of tertiary students, as this behaviour is apparently controlled volitionally by a tertiary student themselves. The application of the TRA in study

choice is also found in some recent studies. Zhang (2007) applied the TRA to study the intention of undergraduate students to select a major in information systems in the USA. Kuechler et al. (2009) adopted the TRA to investigate the factors influencing students in choosing a general major in their university study. Kumar and Kumar (2013) employed the TRA to understand what determines students' decisions to select a business major. Cheng and Yuen (2016) applied the TRA to investigate the study intention of business tertiary students. All these studies have proved that the theory is valid and sound for interpreting and predicting the behaviour of students in relation to their study choice.

Some researchers have criticised the TRA for failure to consider factors other than attitude and subjective norm (Ashing-Giwa, 1999; Kippax and Crawford, 1993). As such, there is a need to extend the model to cover extra factors when analysing the behaviour of logistics sub-degree students. In the following section, the key variables of the study are discussed and the hypotheses to be tested are presented.

Conceptual framework

Attitude, subjective norm and intention

Attitude is the learned predisposition to act in a consistently favourable or unfavourable manner in relation to a given object (Ajzen and Fishbein, 1980). Human behaviour has long been found to be related to, and affected by, attitude (Kaiser and Schultz, 2009). Subjective norm is the beliefs that referents think that a person should perform certain behaviour or not. It is a significant antecedent of behaviour (Yang and Jolly, 2009). Based on the TRA, attitude towards performing a behaviour and subjective norm determine the intention to perform the behaviour. How a logistics sub-degree student evaluates a bachelor's degree programme, and how those people close to the student think about doing the programme, may affect their intention to do the programme. Among all referent groups, past studies have found family members, friends and teachers to be the most influential on teenagers' decisions and behaviour (Agbola and Cheng, 2017; Strong and Eftychia, 2006). Based on the above discussion, the following hypotheses and sub-hypotheses are developed:

- Hypothesis 1 (H1): attitude towards doing a bachelor's degree programme affects intention to do a bachelor's degree programme.
- Hypothesis 2 (H2): subjective norm affects intention to do a bachelor's degree programme.
- Hypothesis 2₁ (H2₁): family members affect intention to do a bachelor's degree programme.
- Hypothesis 2₂ (H2₂): friends affect intention to do a bachelor's degree programme.
- Hypothesis 2₃ (H2₃): teachers affect intention to do a bachelor's degree programme.

Perceived difficulty

Perceived difficulty refers to the extent to which a behaviour is perceived as difficult or easy (Wauters et al., 2010). Difficulty is a critical factor in the decision-making process of individuals (Papulova and Gazova, 2016). Previous studies have found that difficulties determine students' attitude towards a behaviour or decision (Agbola and Cheng, 2017; Myotte et al., 2011). This is understandable as human beings in general prefer to do something easy and avoid something difficult, in particular if there is not a significant difference in the immediate rewards. When a logistics sub-degree student believes that the bachelor's degree programme and its courses are difficult for them, they may think that the programme is not a good choice for them. Based on the above discussion, the following hypothesis is developed:

- Hypothesis 3 (H3): perceived difficulty affects attitude towards doing a bachelor's degree programme.

Job opportunities

Job opportunities are the amount of job openings available to a person with a particular qualification and skill set (Kriesi et al., 2010). Opportunities are favourable situations for positive outcomes, which are the key drivers for human beings in decision making (Silvestre, 2016). Job opportunities have long been found to influence students' attitude towards a study choice (Kuechler et al., 2009). Previous studies showed that job opportunities are key reasons for logistics students choosing their study (Knemeyer and

Murphy, 2004). When a logistics sub-degree student knows that the bachelor's degree programme can increase their chance of getting a good job after graduation, they may think that it is wise to do the programme. On this basis, the following hypothesis is developed:

- Hypothesis 4 (H4): job opportunities affect attitude towards doing a bachelor's degree programme.

Job starting salary

Job starting salary refers to the initial pay a person receives from a job position (Goffnett et al., 2013). Salary is the payment, usually weekly or monthly, to an employee by their employer for all the services performed. Job starting salary is a key indicator of the performance of a degree programme. For many institutions, measuring and comparing job starting salaries of the fresh graduates of their programmes has become an important annual exercise. Job starting salary is a key determinant of students' attitude towards a study choice (Anderson et al., 2020; Felton et al., 1995). When a logistics sub-degree student thinks that the bachelor's degree programme can help them to get a higher job starting salary, they may think that it is wise to take it. Based on the above discussion, the following hypothesis is developed:

- Hypothesis 5 (H5): job starting salary affects attitude towards doing a bachelor's degree programme.

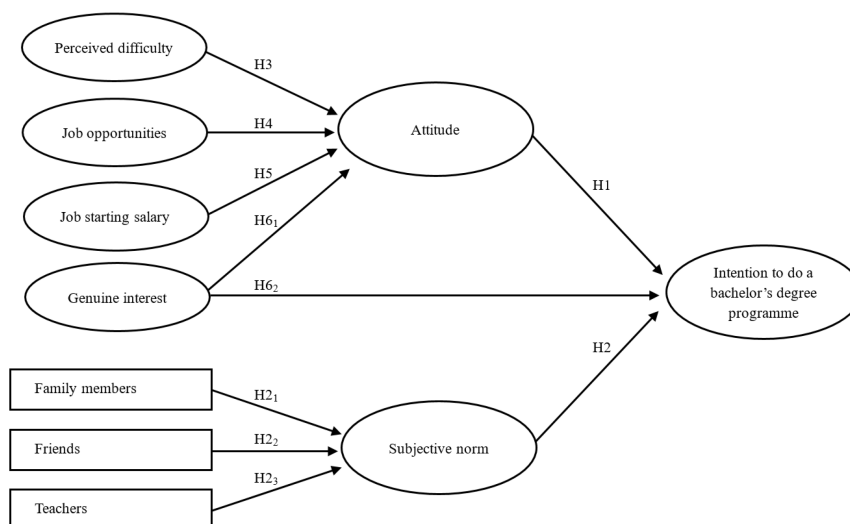
Genuine interest

Genuine interest is the degree to which a person really wants to learn more about something or to be involved with it. A high interest in an object or an activity induces a person to find out more about it and to pursue it. Interest is an important motivational variable in student education (Liebendörfer and Schukajlow, 2020). Zhang (2007) has found that genuine interest influences students' attitude towards choosing a major. If a logistics sub-degree student is interested in the bachelor's degree programme, they may think that the programme is more suitable for them to pursue. Interest has also been found to be related to intention. Past research has shown that interest directly affects people's adoption intention (Lim et al., 1991). When a logistics sub-degree student has high interest in the bachelor's degree programme, they are more likely to take it. Based on the above discussion, the following hypotheses are developed:

- Hypothesis 6₁ (H6₁): genuine interest affects attitude towards doing a bachelor's degree programme.
- Hypothesis 6₂ (H6₂): genuine interest affects intention to do a bachelor's degree programme.

The proposed conceptual framework of the study is depicted in Figure 2.

Figure 2. Conceptual framework for measuring factors which determine the intention of logistics sub-degree students to pursue a bachelor's degree (Source: Authors, 2022)



Methodology

Research design

A survey using anonymous self-administered questionnaires was used in the study. The questionnaire included two sections. Section A consisted of statements (measurement items) for measuring intention, attitude, subjective norm, perceived difficulty, job opportunities, job starting salary and genuine interest. A 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) was used for the measurement items. Section B consisted of questions for gathering demographic information about the respondents. The measurement items were modified from Agbola and Cheng (2017). Box 1 shows the measurement items used in the study.

Box 1. Measurement items used in the study (Source: Authors, 2022)

Intention to do a bachelor's degree programme:

- Intention1: I intend to do a bachelor's degree programme.
- Intention2: It is likely that I will do a bachelor's degree programme.

Attitude towards doing a bachelor's degree programme:

- Attitude1: Doing a bachelor's degree programme seems a good idea to me.
- Attitude2: It will be wise for me to do a bachelor's degree programme.

Subjective norm:

- FamilyM: My family members recommend me to do a bachelor's degree programme.
- Friends: My friends recommend me to do a bachelor's degree programme.
- Teachers: My teachers recommend me to do a bachelor's degree programme.

Perceived difficulty:

- PerceivedD1: I think courses in a bachelor's degree programme are intensive.
- PerceivedD2: I think courses in a bachelor's degree programme are challenging.
- PerceivedD3: I think a bachelor's degree programme would be difficult for me.

Job opportunities:

- JobOpp1: If I do a bachelor's degree programme, there will be jobs available for me after graduation.
- JobOpp2: If I do a bachelor's degree programme, there will be plenty of job opportunities for me after graduation.
- JobOpp3: If I do a bachelor's degree programme, there will always be great market demand for people like me after graduation.

Job starting salary:

- JobSS1: I can get a high-paying job if I graduate with a bachelor's degree programme.
- JobSS2: My starting salary will be satisfying if I graduate with a bachelor's degree programme.

Genuine interest:

- GInterest1: I will choose a bachelor's degree programme based on my interest.
- GInterest2: I will choose a bachelor's degree programme based on what I like.

Data collection and analysis

The survey was conducted in three institutions in China which offer different sub-degree and bachelor's degree programmes. Questionnaires were distributed to the logistics sub-degree students of the institutions through the programme leaders and subject lecturers. A total of 361 completed questionnaires were collected.

The data collected were first processed and analysed using SPSS 27 software. Then, partial least square structural equation modelling (PLS-SEM) analyses and reliability and validity tests were conducted using SmartPLS 3.3.5 software. SEM was used in the study as it is a powerful statistical analysis technique that allows a simultaneous modelling of relationship among different independent and dependent variables (Gefen and Straub, 2005). PLS was used as it is able to accommodate both reflective indicators and formative indicators and has minimal demands for sample size and distribution of sample data (Chin,

1998). In this study, all 361 observations were employed for analysis, which exceeds the minimum sample size of 247 required for a PLS-SEM (Cohen, 1992) and the minimum sample size of 90 based on the ten times rule (Barclay et al., 1995). The observed number is also larger than previous TRA studies using PLS analyses (Kuechler et al., 2009; Zhang, 2007).

Results

Respondents analysis

Among the 361 respondents, 49.9 per cent were male and 50.1 per cent were female. The age of the respondents ranged from 18 to 24 years old; 55.7 per cent of the respondents were aged 19, 24.9 per cent were aged 20, 14.1 per cent were aged 18, and the remaining (5.3 per cent) were aged 21 or above. Of the respondents, 273 respondents (75.6 per cent) were logistics associate degree students and 88 respondents (24.4 per cent) were logistics higher diploma students. Table 2 summarises the characteristics of the sample.

Table 2. Characteristics of the sample (Source: Authors, 2022)

Characteristics	n = 361 n	% = 100 %
Gender		
Male	180	49.9
Female	181	50.1
Age		
18	51	14.1
19	201	55.7
20	90	24.9
21	14	3.9
22	3	0.8
23	1	0.3
24	1	0.3
Type of programme		
Associate degree programme	273	75.6
Higher diploma programme	88	24.4

Table 3. Means and standard deviations of variables (Source: Authors, 2022)

Variable	All students n = 361		Associate degree students n = 273		Higher diploma students n = 88	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Attitude towards doing a bachelor's degree programme	4.05	1.39	3.89	1.35	4.57	1.37
Subjective norm towards doing a bachelor's degree programme	3.91	1.23	3.80	1.24	4.25	1.15
Intention to do a bachelor's degree programme	4.05	1.37	3.89	1.31	4.56	1.44

The means and standard deviations of attitude, subjective norm and intention were measured, and they are presented in Table 3. Overall, logistics sub-degree students had low attitude (mean = 4.05) and intention (mean = 4.05) to pursue a bachelor's degree programme. The referent groups did not strongly recommend the students to do a bachelor's degree programme (mean = 3.91). Comparing the two groups of students, associate degree students had lower attitude, subjective norm and intention than the higher diploma students.

Measurement model

The data were analysed using SmartPLS 3.3.5. In order to analyse the psychometric properties of the reflective measures in the model, the Cronbach's alpha (CA), composite reliability (ρ_c) and average variance extracted (AVE), as well as the outer loadings and cross-loadings of latent variables were examined using all respondents. The values of CA, ρ_c and AVE calculated by the software are presented in Table 4. The outer loadings and cross-loadings of latent variables are presented in Table 5. The model fit indices generated by the software are shown in Table 6.

To evaluate the construct reliability of the model, the CA and composite reliabilities were examined. Typically, CA should be at least 0.7 to ensure internal consistency and reliability. All CAs in this study were between 0.884 and 0.946, demonstrating good internal consistency reliability of the constructs. In addition, all composite reliabilities were above 0.9 (far higher than the generally acceptable level of 0.7), indicating good internal consistency and reliability of the constructs. To evaluate the construct validity of the model, the AVE values were examined. All AVE values in the study were between 0.833 and 0.948, and they were all above the threshold value of 0.5, suggesting good convergent validity of the constructs.

In order to analyse the reliability of individual items in the model, the outer loadings of items on associated variables were examined. As a rule of thumb, the outer loadings should be higher than 0.7. All outer loadings of items on associated variables in the study were between 0.859 and 0.974, demonstrating good reliability of the items. Besides, the cross-loadings of items of variables were also examined to assess the discriminant validity of variables. All items in this study loaded substantially higher on their own associated variables than other variables in the model, showing that there was a good discriminant validity of the variables in this study.

To examine the model fit of a path model, three indices were calculated and provided by SmartPLS (SRMR, Chi-Square and NFI). For the standardised root mean square residual (SRMR), a value below 0.10 indicates a well-fitting model. The SRMR of the estimated model in this study was 0.039, demonstrating a good model fit. Besides, for a model fit to be acceptable, the value of normed fit index (NFI) should be above 0.9. In this study, the NFI of the estimated model was 0.911, showing a good model fit. Chi-Square test is another measure of model-fit. For the estimated model, the Chi-Square value was 58.040. Given the degrees of freedom of 45, p value was 0.092. As the p value was insignificant, the null hypothesis that the predicted model and observed data are equal could not be rejected, indicating a good model fit.

Table 4. Cronbach's alpha, composite reliability and average variance extracted (Source: Authors, 2022)

	Cronbach's alpha	Composite reliability	Average variance extracted
Attitude towards doing a bachelor's degree programme	0.946	0.973	0.948
Genuine interest	0.902	0.953	0.910
Intention to do a bachelor's degree programme	0.884	0.945	0.896
Job opportunities	0.908	0.942	0.845
Job starting salary	0.891	0.948	0.902
Perceived difficulty	0.899	0.937	0.833

Table 5. Outer loadings and cross-loadings of latent variables (Source: Authors, 2022)

	Attitude	GInterest	Intention	JobOpp	JobSS	PerceivedD
Attitude1	0.974	0.495	0.868	0.740	0.755	0.575
Attitude2	0.974	0.520	0.840	0.800	0.758	0.570
GInterest1	0.501	0.956	0.578	0.520	0.483	0.497
GInterest2	0.494	0.952	0.543	0.567	0.516	0.606
Intention1	0.863	0.564	0.948	0.697	0.695	0.591
Intention2	0.796	0.548	0.945	0.683	0.671	0.522
JobOpp1	0.712	0.535	0.647	0.918	0.689	0.495
JobOpp2	0.723	0.508	0.652	0.941	0.764	0.510
JobOpp3	0.745	0.526	0.709	0.899	0.822	0.498
JobSS1	0.754	0.475	0.700	0.803	0.952	0.547
JobSS2	0.721	0.521	0.669	0.766	0.947	0.592
PerceivedD1	0.546	0.579	0.545	0.508	0.546	0.948
PerceivedD2	0.572	0.550	0.577	0.493	0.543	0.929
PerceivedD3	0.487	0.443	0.484	0.494	0.554	0.859

Note: Attitude = Attitude towards doing a bachelor's degree programme; GInterest = Genuine interest; Intention = Intention to do a bachelor's degree programme; JobOpp = Job opportunities; JobSS = Job starting salary; PerceivedD = Perceived difficulty

Table 6. Model fit indices (Source: Authors, 2022)

	Saturated model	Estimated model
SRMR	0.034	0.039
Chi-Square	55.681	58.040
NFI	0.914	0.911

PLS-SEM analysis

The PLS-SEM algorithm was run, per default, with the path weighting scheme, 300 maximum iterations, abort criterion of 1.0E-7 and initial weights of 1.0. Also, bootstrapping was run to retrieve significance values by running the algorithm with 361 cases and 5,000 randomly selected subsamples. The PLS-SEM structural model results with *p* values extracted from the bootstrapping results are shown in Figure 3.

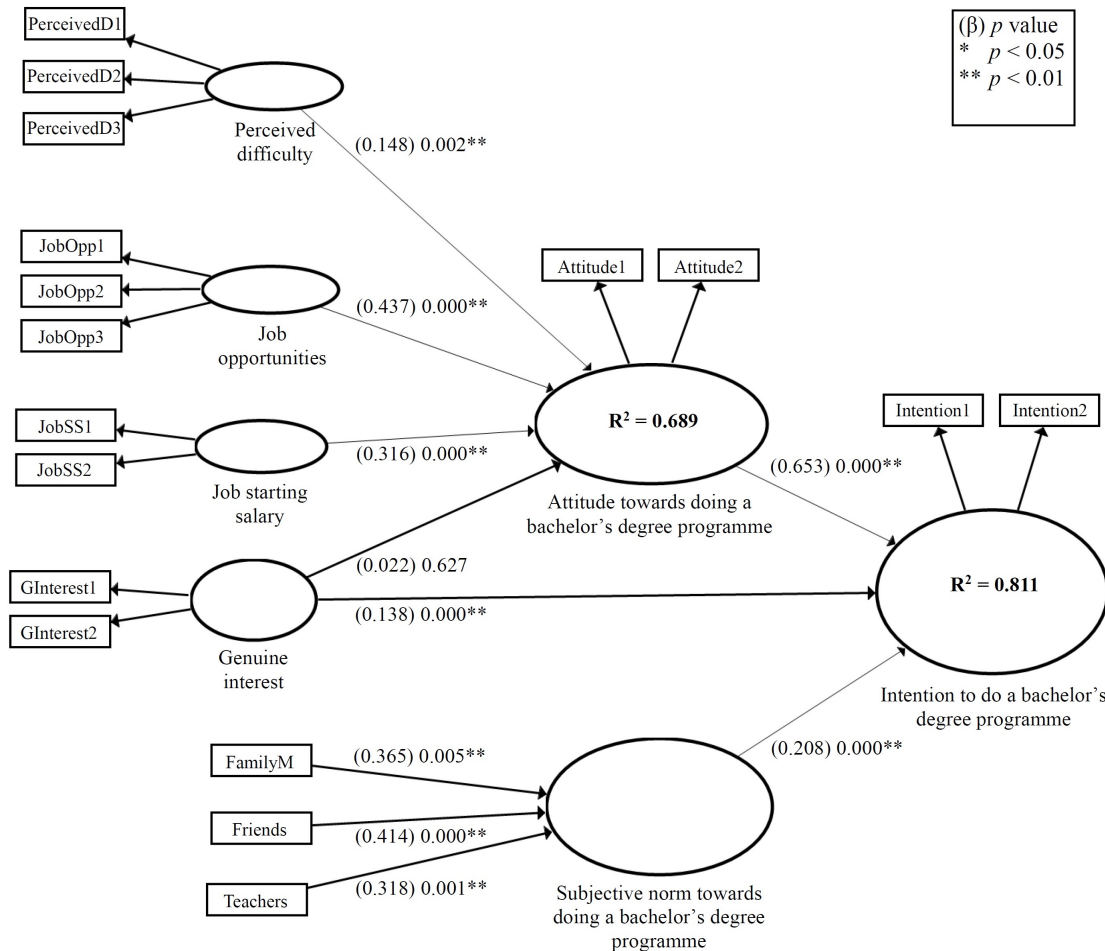
Overall, the structural path model accounted for over 81 per cent of variance in logistics sub-degree students' intention to do a bachelor's degree programme ($R^2 = 0.811$) and about 69 per cent of variance in their attitude towards doing a bachelor's degree programme ($R^2 = 0.689$). Both attitude (p value = 0.000) and subjective norm (p value = 0.000) were highly significant in the model and were found to influence intention. Therefore, both H1 and H2 were supported. The path coefficients for attitude to intention ($\beta = 0.653$) and subjective norm to intention ($\beta = 0.208$) were all positive values, indicating that both factors positively affected intention. Among them, attitude was more influential on intention than subjective norm.

With regard to referent groups, family members (p value = 0.005), friends (p value = 0.000) and teachers (p value = 0.001) were all found to influence the students when deciding to do a bachelor's degree programme. Therefore, H2₁, H2₂ and H2₃ were all supported. Friends ($\beta = 0.414$) were the most influential group for the students. Family members ($\beta = 0.365$) were the second most influential group, followed by teachers ($\beta = 0.318$).

Three out of the four behavioural beliefs, that is, perceived difficulty (p value = 0.002), job opportunities (p value = 0.000) and job starting salary (p value = 0.000), were found to be significant in influencing logistics sub-degree students' attitude towards doing a bachelor's degree programme. Thus, H3, H4 and H5 were all supported. The most influential factor on attitude was job opportunities ($\beta = 0.437$), followed by job starting salary ($\beta = 0.316$) and perceived difficulty ($\beta = 0.148$). Genuine interest

was found to have no impact on attitude (p value = 0.627), but to have a significant positive impact on intention (p value = 0.000, β = 0.138). Thus, $H6_1$ was rejected, but $H6_2$ was supported.

Figure 3. Structural equation modelling empirical results (Source: Authors, 2022)



Type of sub-degree programme and study choice

Sub-degree programmes in China are mainly divided into two types, namely, associate degree programmes and higher diploma programmes (also referred to as 'zhuan ke' programmes in some provinces in China). Although the duration of associate degree programmes and higher diploma programmes is the same (normally two years), the study focus is different (Wan, 2011). Logistics associate degree programmes aim at equipping students with generic knowledge and skills in logistics, while logistics higher diploma programmes provide students with practical and industry-specific skills in logistics and job training. Previous studies showed that programme type affects students in their critical thinking and decisions in their personal lives and careers (Clarke et al., 2010; Ogunde et al., 2017).

To assess how programme type affects logistics sub-degree students' study choice, the dataset was divided into two subsets based on the type of sub-degree programme (associate degree programme or higher diploma programme) the respondents were taking. Each subset was then analysed separately. Table 7 reports the results of the analysis.

The structural path model accounted for 78 per cent and 88 per cent of variance in intention, and around 66 per cent and 77 per cent of variance in attitude for logistics associate degree students and logistics higher diploma students respectively. Similar to the general group, both attitude and subjective norm were found to be highly significant in determining the intention of associate degree students, as well as the intention of higher diploma students. For associate degree students, perceived difficulty, job

opportunities and job starting salary were determinants of their attitude. Among the three factors, job opportunities ($\beta = 0.427$) was the most critical one for them, followed by perceived difficulty ($\beta = 0.245$) and job starting salary ($\beta = 0.228$). For higher diploma students, job opportunities and job starting salary were significant in determining their attitude, but perceived difficulty was not. Job starting salary ($\beta = 0.466$) was more influential on the logistics higher diploma students than job opportunities ($\beta = 0.403$). Like the general group, genuine interest had no impact on attitude, but it had a significant positive impact on intention of the two groups of students. With regard to the subjective norm, family members had a significant influence on associate degree students, but no influence on higher diploma students. Both friends and teachers were found to influence the two groups of students. For associate degree students, teachers ($\beta = 0.409$) were more influential than friends ($\beta = 0.298$), but higher diploma students were influenced more by their friends ($\beta = 0.650$) than their teachers ($\beta = 0.189$).

Table 7. Results of analysis of programme type differences (Source: Authors, 2022)

	Path coefficient (β)	
	Associate degree students n = 273	Higher diploma students n = 88
Attitude => Intention	0.640 **	0.629 **
Subjective norm => Intention	0.200 **	0.286 **
Family members => Subjective norm	0.394 *	0.240
Friends => Subjective norm	0.298 *	0.650 **
Teachers => Subjective norm	0.409 **	0.189 *
Perceived difficulty => Attitude	0.245 **	0.060
Job opportunities => Attitude	0.427 **	0.403 **
Job starting salary => Attitude	0.228 **	0.466 **
Genuine interest => Attitude	-0.001	0.040
Genuine interest => Intention	0.151 **	0.122 *
	R ² of Attitude = 0.659	R ² of Attitude = 0.769
	R ² of Intention = 0.782	R ² of Intention = 0.882

* $p < 0.05$, significant at 0.05, ** $p < 0.01$, significant at 0.01

Discussion and conclusion

This study aimed to investigate the factors determining logistics sub-degree students' decision to pursue a bachelor's degree in China. It extended the TRA model to include perceived difficulty, job opportunities, job starting salary and genuine interest as potential precursors of attitude and intention. By understanding the determining factors behind the choice of logistics sub-degree students, practical measures can be identified to encourage more logistics sub-degree students on to further studies and to become logistics professionals with bachelor's degree qualifications.

The study results showed that logistics sub-degree students, in general, did not have high attitude and intention to pursue a bachelor's degree programme. The referent groups of the students did not strongly recommend them to pursue a bachelor's degree programme. These findings corresponded with the report that many sub-degree students choose not to pursue a bachelor's degree in China (Lee, 2017; Xiao, 2020). Comparing the two groups of logistics sub-degree students, the associate degree students had lower attitude, subjective norm and intention to pursue a bachelor's degree programme than the logistics higher diploma students. This is probably due to the difference in the programme objectives and designs of the two types of sub-degree programmes (CSPE, 2017). Associate degree students and their referents believe that they should look for jobs immediately after graduation. For higher diploma students, they and their referents believe that it is more desirable to go on to further study after graduation.

The research model based on the TRA demonstrated high explanatory power, both for logistics sub-degree students overall, and for logistics associate degree students and logistics higher diploma students separately. As the TRA predicts, the decision of logistics sub-degree students to pursue a

bachelor's degree programme was jointly influenced by their attitude towards pursuing a bachelor's degree programme and the social pressure to pursue a bachelor's degree. This finding was consistent with previous studies supporting that attitude and subjective norm have positive impact on students' programme or study choice (Cheng and Yuen, 2016; Kuechler et al., 2009; Zhang, 2007). In addition to attitude and subjective norm, this study identified a new determinant of intention, namely, genuine interest. This finding matched with past reports that interest tends to affect people's behavioural intention (Lim et al., 1991). It was also in line with previous studies that attitude and subjective norm were not sufficient determinants of intention (Agbola and Cheng, 2017).

Three behavioural beliefs, namely, perceived difficulty, job opportunities and job starting salary, were found to significantly influence logistics sub-degree students' attitude towards pursuing a bachelor's degree programme. These results were in line with previous studies and supported with literature (Agbola and Cheng, 2017; Knemeyer and Murphy, 2004; Myotte et al., 2011; Zhang, 2007). For logistics sub-degree students, job opportunities was the most important factor influencing their decision to pursue a bachelor's degree. Students are only willing to spend more time to accomplish a bachelor's degree if there is a high market demand and a high number of jobs available for graduates of the degree. Job starting salary was the second most important factor for logistics sub-degree students who are likely to pursue a bachelor's degree if they believe that the starting salary is higher for bachelor's degree graduates. As Smitina (2010) argues, the decision-making for youth regarding education choice is determined by economic conditions, such as the possible salary of the occupation. Besides, logistics sub-degree students in general were concerned about the difficulty of the programme when making the decision to pursue a bachelor's degree. The intensity and challenge of the courses in the programme were all important to them.

As far as salient referents are concerned, family members, friends and teachers were significantly associated with logistics sub-degree students' decision to pursue a bachelor's degree programme. This result was consistent with previous studies (Agbola and Cheng, 2017; Kumar and Kumar, 2013). According to Ma et al. (2000), students rely heavily on their parents and teachers when making programme and study decisions. Parents are often the providers of funds for their schooling, while teachers are usually the models for their behaviours and values. Following advice from family and teachers is a common norm, in particular among Chinese students, as obedience is one of the Confucian values that many Chinese people preserve. Friends are people that the students socialise with. They have great impact on students' behaviours and decisions (Salvy et al., 2012). Students would consider their friends' advice when making a decision to pursue a bachelor's degree programme.

This study also revealed that programme type played an important and complicated role in determining logistics sub-degree students' decision to pursue a bachelor's degree programme. Although attitude, subjective norm and genuine interest were found to be direct predictors of intention of logistics associate degree students and logistics higher diploma students, these two groups of students were concerned about different factors, and were influenced by these factors in different ways and to different extents. Associate degree students were concerned about perceived difficulty, job opportunities and job starting salary. To them, job opportunities was the most important factor in deciding to do a bachelor's degree. This can be explained by the fact that bachelor's degree programmes are of higher academic level and usually involve more advanced subjects and courses that are difficult to complete. They are willing to pursue bachelor's degree programmes only if they see more benefits (that is, job opportunities) than costs. In contrast, higher diploma students were concerned about job starting salary more than job opportunities. They were not concerned about perceived difficulty. This is quite understandable, as studying a bachelor's degree incurs extra costs for the students, which seems to be worthwhile only if they believe that they can get higher salary jobs after finishing the bachelor's degree. Besides, as higher diploma programmes focus on practical and technical knowledge and training, their students would not perceive much difficulty if they are going to do a bachelor's degree. In relation to referent groups, family members, friends and teachers were all found to be influential on the associate degree students. For higher diploma students, only friends and teachers appeared to have impact on them. Parents had no impact on higher diploma students. This may be due to the fact that the practical training offered by higher diploma programmes helps to foster the students' independence, thereby reducing their reliance on parents when making a study decision.

Based on these findings, there are some measures proposed for the government, logistics industry and tertiary institutions in China to attract more logistics sub-degree students to further their study and do a bachelor's degree. First, the Chinese government and industry should try to create more

job opportunities and openings for logistics bachelor's degree holders, as job opportunities is the most critical factor determining the logistics sub-degree students' study decision. The government may consider creating new logistics-related jobs specialised for logistics bachelor's degree holders in various government departments and their sub-offices, for example, the Ministry of Commerce, the Ministry of Transport, the Ministry of Natural Resources, and the General Administration of Customs. The government may also consider providing wage subsidies or tax relief for business firms or logistics companies that hire logistics bachelor's degree holders, for instance, a RMB 1,000 wage subsidy for each full-time employee with a logistics bachelor's degree each month for a maximum of one year, or business or corporate income tax relief of up to 5 per cent for firms employing more than 100 logistics bachelor's degree holders. Furthermore, financial aid and support may be provided by the logistics industry to facilitate the set-up of new logistics firms in China, for example, entrepreneur funds, start-up grants, credit facilities, and equipment and facilities leasing. These new firms can create more new jobs for logistics bachelor's degree holders.

Second, the Chinese government and industry should increase the starting salary for logistics bachelor's degree holders, since job starting salary is the second most important factor affecting logistics sub-degree students' decision to pursue a bachelor's degree. One suggestion is that the Chinese government may consider setting an above-market minimum wage specially for logistics bachelor's degree holders. The minimum wage in China varies across provinces and cities, ranging from RMB 1,340 per month to RMB 2,590 per month in 2022. The minimum wage in its two special administration regions, Hong Kong and Macau, are HK\$37.5 per hour and MOP 6,656 per month respectively in 2022. The government may set the minimum wage for logistics bachelor's degree holders at 10 per cent higher than the average minimum wage in any province, city or region. Thus, the job starting salary for logistics bachelor's degree holders can be attractive enough. Furthermore, the logistics industry and firms may consider differentiating the starting salaries for employees with logistics bachelor's degree and without logistics bachelor's degree. For instance, employees with a logistics bachelor's degree may be paid a 30 per cent higher starting salary than employees without a logistics bachelor's degree.

Third, tertiary institutions offering bachelor's degree programmes in China should take actions to reduce logistics sub-degree students' perceived difficulty. One suggestion is to adjust the contents of their bachelor's degree courses, for instance, reducing the syllabus, reducing the number of assessment tasks and adopting open-book assessments. The learning outcomes of the courses need to be adjusted to become more attainable, flexible and industry-relevant. Besides, tertiary institutions may offer more elective courses, at different levels and with different natures, in their bachelor's degree programmes, and thus provide more flexibility to students in selecting courses based on their abilities and strengths. Furthermore, tertiary institutions may consider assigning mentors and academic advisers to logistics sub-degree students who are admitted to their bachelor's degree programmes. These mentors and academic advisers can provide academic advice to students and help them familiarise themselves with the institution, programme and courses, thereby easing their perceived difficulty.

Fourth, tertiary institutions offering bachelor's degree programmes in China should try to promote their bachelor's degree programmes directly to parents, friends and teachers of logistics sub-degree students. Tertiary institutions may consider placing advertisements for their programmes in popular newspapers (for example, *China Daily*, *The Economic Daily* and *The People's Daily*) and on top websites (for example, baidu.com, qq.com and taobao.com) to reach students' parents and friends. To reach students' teachers, tertiary institutions may consider sending programme leaflets to teachers by post, or visiting teachers to introduce the programme characteristics to them.

It is also important to note that tailored strategies should be used with logistics associate degree students and logistics higher diploma students when trying to motivate and attract them to further their study at bachelor's degree level. For associate degree students, it will be more useful to highlight the excellent job opportunities for bachelor's degree holders, and to use extra promotional efforts with their teachers. For higher diploma students, it will be more effective to emphasise the high job starting salary for bachelor's degree holders, and to focus promotional efforts on their friends.

There are two limitations of the current study. First, the extended model based on TRA considers only three factors (attitude, subjective norm and genuine interest) affecting behavioural intention. There may be other factors that can influence the study decision of logistics students, for example, perceived behavioural control (Ajzen, 1985, 1988), perceived value (Agbola and Cheng, 2017) and past behaviour (Ryu and Han, 2010). Second, the sample for the study was logistics sub-degree students from China only. This limits the generalisability of the study findings to logistics students in other countries.

Despite its limitations, this study contributes to the literature by formulating and validating the TRA to predict study choice behaviour of students. It extends the TRA model to include perceived difficulty, job opportunities, job starting salary and genuine interest. This study identifies a new determinant of intention, namely genuine interest. This is the first study of its kind to examine and understand factors influencing logistics sub-degree students to pursue a bachelor's degree. The study also contributes to the development of policies and measures by the government, logistics industry and tertiary institutions to attract more logistics sub-degree students to study a bachelor's degree and become logistics professionals with degree qualifications. Future research may wish to extend the analysis to examine factors affecting logistics students' decision to pursue other types of study programmes, for example, continuing professional development programmes, complementary programmes, language programmes, master's degree programmes and doctoral degree programmes.

Declarations and conflicts of interest

Research ethics statement

The authors conducted the research reported in this article in accordance with the standards of The Hong Kong Polytechnic University, where the authors are based.

Consent for publication statement

The authors declare that research participants' informed consent to publication of findings – including photos, videos and any personal or identifiable information – was secured prior to publication.

Conflicts of interest statement

The authors declare no conflicts of interest with this work. All efforts to sufficiently anonymise the authors during peer review of this article have been made. The authors declare no further conflicts with this article.

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