**Entrepreneurship education in China: evidence from a preliminary scoping study of enterprising tendency in Chinese university students**

**Abstract**

**Purpose:** The purpose of this study is to generate insight into the effects of entrepreneurship education in China by conducting a preliminary scoping study of the enterprising tendency of university students studying business.

**Design/methodology/approach:** This study used a self-administered questionnaire based on the General Measure of Enterprising Tendency v2 (GET2) test (Caird, 2013) to measure the enterprising tendency of a group of Chinese university students. Decision trees, using the Chi-square Automatic Interaction Detector (CHAID) approach, and multiple regression analyses were used to investigate the enterprising tendency of respondents.

**Findings:** The findings from this study indicate that the students have an overall medium level of enterprising tendency and strengths in some enterprising characteristics. The findings reveal that gender, family business, hometown and entrepreneurship education are significantly related to enterprising tendency but that age, household income, parents’ education and occupation are not.

**Research limitations/implications:** Although the study is based on a relatively small sample taken from just one university in Beijing, the findings suggest that the enterprising tendency of students can be encouraged by entrepreneurship education. Combined with evidence that entrepreneurship education is at a relatively early stage of development in China, this finding suggests considerable scope to increase student’s enterprising tendency by extending, creating a more favourable environment for, and improving the methods used to deliver entrepreneurship education. Enterprising tendency can be argued to naturally result in entrepreneurial intention; however, this extension is beyond the scope of this study, which is restricted to the analysis of enterprising tendency.

**Originality/value:** This study makes an original contribution to knowledge as it is one of the first studies to explore enterprising tendency among university students in China. It has value for government, policy makers and university program designers in that it provides direction for entrepreneurship education in China.

**Keywords:** Entrepreneurship in China; entrepreneurship education; enterprising tendency; General Measure of Enterprising Tendency v2 (GET2) test

**Paper type:** Research paper

**1. Introduction**

According to Frederick *et al*. (2018) entrepreneurship is now recognised as a vital component of the economic and social success of a nation as it drives economic expansion, productivity, innovation, and employment. As a consequence, Parker (2018) postulates that over the last three decades there has been a growing interest in promot­ing entrepreneurship worldwide and this is no less relevant in China than in any other country. Indeed, over the past three decades economic development in China has been truly remarkable, with the Chinese economy growing to become the second largest in the world (Zhang, 2019), and much of this growth can be attributed to entrepreneurship.

Although entrepreneurship has contributed to much of the economic development, China has an institutional and cultural background that renders the entrepreneurial context somewhat unique and, as a consequence, entrepreneurship education in China is somewhat different than in the West (Child *et al*., 2007; He *et al*.,2019a).

Although China is now a *“socialist market economy”* (Brown, 2018) there is still strong government oversight and planning. As a consequence, the institutional landscape in China is different from that in many Western countries (He *et al*.,2019b). Indeed, while the Western countries use a “bottom-up” approach to entrepreneurship education, with universities actively seeking funds from government and industry to create entrepreneurship programs according to their individual needs, time and situation, China uses a “top-down” approach where the government leads and allocates funds for entrepreneurship education (Yu, 2018; Cui *et al.*, 2019; Lin *et al*., 2019). However, one specific government policy that has a direct impact on entrepreneurship is that of China’s one-child policy, which Cameron *et al*. (2002) and Tu (2018) suggest produces individuals who are more self-centred, less sociable and trusting, and have reduced risk-taking and competitive tendencies, all of which are polar opposites to the typical characteristics of entrepreneurs. Such children, therefore, have fewer entrepreneurial characteristics and are less likely to be entrepreneurs when they grow up.

Chinese culture is closely associated with Confucian values and traditions but also embraces values derived from Guanxi (status and influence within a business or personal network), Mianzi (meaning respect for someone’s personal profile and status) and Renqing (exchange of favours) and, in terms of Hofstede's (2018) six cultural dimensions, Chinese people are more inclined to fall into the higher rankings of power distance, display high levels of collectivism, lean toward masculinity, score lowly on uncertainty avoidance, score highly on long-term orientation, and score low on indulgence. Unfortunately, however, these characteristics are not only different to Western value systems (Wang *et al*., 2016; Chen *et al.,* 2018; Liu *et al*., 2018) but they are also different and somewhat incongruent with those normally associated with successful entrepreneurship (Burt and Burzynska, 2017; Obschonka *et al*., 2018; Zhang, 2017) which include positive response to change, creativeness, internal locus of control, initiative and profit-orientation. Thus, the traditional cultural background may also reduce the Chinese students’ drive and determination to engage in entrepreneurship.

The aim of this study is, therefore, to generate insight into entrepreneurship education in China by conducting a study of enterprising tendency among university students. The following section provides an overview of entrepreneurship education in China and is followed by a research methodology section that discusses research design, sampling, data collection and data analysis. Subsequent sections present the findings of the research and a discussion that considers the implications of the findings. The final section is a conclusion that incorporates a brief summary, offers recommendations for the Chinese government, policy makers and university program designers, and provides direction for future research.

**2. Literature review**

According to Li (2015), China is currently still at a *nascent* stage in entrepreneurship education compared to developed countries. Initially, entrepreneurship education emerged from management education in the form of specialist Master of Business Administration (MBA) modules (Li *et al*., 2003). The first MBA program in a Chinese university was launched at Tsinghua University in 1991 but this was relatively late in a global context as the Harvard Graduate School of Business Administration established the first MBA program in 1908 (Pan, 2006). It was not until April 2002 that the Chinese Ministry of Education started to encourage entrepreneurship education but this was, again, somewhat late in the global context as the University of Michigan (U.S) offered the first entrepreneurship education in the form of modules on *Small Business Management,* *Family Business* and *New Enterprises* in 1927 (Zhou and Xu, 2012)*.*

Although entrepreneurship education in China had a relatively late start, it has undergone rapid development (Lin, 2019) in four distinct stages. Stage one promoted entrepreneurship education via extracurricular actives and commenced when Tsinghua University started the first business plan competition in China in 1998 (Tang *et al.*, 2014). Stage two took the form of the pilot entrepreneurship programs initiated by the Ministry of Education in China (Li *et al*., 2008) which were initially offered at Tsinghua University, Renmin University of China, Beijing Aeronautics and Astronautics University, Shanghai Jiangtong University, Nanjing University of Economics, Wuhan University, Xian Jiaotong University, Northwest University and Heilongjiang University in 2002. Stage three was based on a promotional campaign entitled *“Know About your Business”* and an entrepreneurship education programme launched by the International Labour Organisation. This initiative sought to raise entrepreneurial awareness and enhance entrepreneurial competence and capabilities amongst undergraduate students in China (Fernandez and Underwood, 2012). Stage four is based on the Chinese Ministry of Education making entrepreneurship education an essential requirement in higher education programs in 2012. According to this policy all colleges and universities in China are expected to offer courses on entrepreneurship education and make them part of their curriculum (OECD, 2019). Specifically, the Ministry of Education made it mandatory for universities to provide entrepreneurship courses lasting no less than 32 hours for two credits (Tang *et al*., 2014). Recently, China has entered what may ultimately be seen as a fifth stage of development with the launch of what is known as the *“Mass Entrepreneurship and Innovation”* campaign (Development Research Centre of the State Council, 2019). This campaign has seen the Chinese government invest heavily in universities to help them incorporate entrepreneurship education into their curriculum. This investment has been used to support a wide range of initiatives including innovation and entrepreneurship research, experimental centres, science and technology zones, university science parks, start-up incubator units, entrepreneurship demonstration centres, vocational school training bases, and various activities that provide students with an environment that fosters creativity (Li *et al*., 2016).

Currently, there are three main modes of entrepreneurship education in China. The first mode is classroom delivery involving entrepreneurship lectures, student business plan competitions, entrepreneurial projects, and social organization activities (Cui *et al*., 2019). The second mode is the establishment of experimental centres, university science parks, innovation and entrepreneurship incubator bases, and research centres (Zhao, 2019). The third mode is through occasional part-time work placements and work-related internships, which are designed to promote students' awareness of entrepreneurship, improve students' entrepreneurial knowledge and cultivate their entrepreneurial qualities and skills (Guo, 2019).

The current approach to entrepreneurship education and training in Chinese universities is certainly better than in the past, but Zhao *et al.* (2019) argue that it is still limited, with weaknesses in four key areas. Firstly, according to a recent survey on entrepreneurship and student start-ups conducted by Renmin University, China lacks a mature, independent, practical and systematic approach to entrepreneurship education (Xiao and Bao, 2019). He and Cheng (2019) suggest that most institutions have unclear goals with respect to innovation and entrepreneurship education due to the constraints of the traditional education system. In this context the requirements of the traditional education system take precedence, while entrepreneurship education takes place outside of the normal timetable so that it has not been properly integrated into the curriculum. Secondly, and as noted by Tang *et al.* (2014), the approach to entrepreneurship education currently adopted by many Chinese universities does not encourage the development of an entrepreneurial mind-set, entrepreneurial interests or entrepreneurial expectations in the students. As a consequence, Yao *et al.* (2019) believe that many Chinese students simply understand entrepreneurship to be something that a few well-known individuals engage in, rather than see it as something in which they might develop competences and interests that could then serve as a career option for them personally. Thirdly, Li *et al.* (2018) argue that many colleges and universities fail to deliver effective entrepreneurship education because of a lack of experienced lecturing staff. Most of the lecturing staff have followed an academic route into education and so do not have any experience of working in the commercial sector, let alone of being involved in entrepreneurship, and so entrepreneurship teaching comes straight from the textbooks and, rather than being practical, is highly theoretical. This issue is exacerbated by the fact that in many cases teaching of entrepreneurship in Chinese universities does not employ either *active learning* approaches (Ovenden-Hope and Blandford, 2017) or work-integrated learning approaches (Jackson, 2015). Fourthly, Tang *et al.* (2014) find that Chinese university entrepreneurship education does not fully address student needs. So Li *et al.* (2018) suggest that a student may have a good idea for a new product or service but the disparate nature of Chinese entrepreneurship education at present means that the student will find it difficult to associate the idea with the taught subjects, for instance marketing and finance, necessary in order to successfully start a business.

Good entrepreneurship education can bring entrepreneurial success, help promote an entrepreneurial culture, and facilitate entrepreneurship through training (Li and Li, 2015). However, currently there are weaknesses with entrepreneurship education in China and this study was conducted with a view to informing the debate by reporting the findings of a scoping study that measured the enterprising tendency of university students.

**3. Research methodology**

*3.1 Enterprising tendency and conceptual framework*

Enterprising tendency is one of the most important aspects of entrepreneurship (Gurol and Atsan, 2006) and can be defined as a collection of psychological characteristics associated with the tendency to set up and manage projects (Caird, 1991). Enterprising tendency is measured via the General Measure of Enterprising Tendency (GET) test originally developed by Caird (1989) and later refined to the General Measure of Enterprising Tendency version 2 (GET2) test by Caird (2013).

The GET2 test is based on a number of assumptions. First, entrepreneurship is considered to be an important, if not integral, aspect of enterprise. Second, entrepreneurs represent a significant sub-division of enterprising individuals. Third, the characteristics identified by the GET can be used to characterize entrepreneurs in general. Fourth, enterprising individuals show a high degree of enterprising tendency when defined as a high need for achievement, high need for autonomy, an internal locus of control, a creative tendency and calculated risk taking (Caird, 2013).

The GET and GET2 tests have been widely utilized in previous entrepreneurship studies such as those by Johnson and Fan (1995), Cromie and Callaghan (1997), Stormer *et al*.(1999), Cromie (2000), Wise *et al*. (2003), Henry *et al*. (2004), Kirby (2004), Bulsara *et al*. (2010), Ismail (2010), Nasrudin and Othman (2012), Zahari and Zamberi (2013), Katundu and Gabagambi (2014), Dada *et al.*(2015) and Morselli (2018). This popularity may well be down to the fact that the tests are considered to be comprehensive, accessible, easy to administer and straightforward to score, and that they have been extensively tested and found to be both reliable and internally consistent (Cromie, 2000 and 2006; Davis *et al.,* 2016).

According to Ahmad *et al.* (2014) enterprising tendency is influenced by various individual demographic and personality factors as well as by the entrepreneurial environment. Thus, in this study, enterprising tendency measured by the GET is the dependent variable, and a range of measures relating to individual demographic and personality factors, and the entrepreneurial environment, are used as independent variables. This conceptual framework is presented in Figure 1.

**Individuals Background**

Demographic factors:

* Age
* Gender
* Hometown
* Parents occupation
* Parents education level
* Household income
* Family business background

Personality factors:

* Need for achievement
* Need for autonomy
* Risk taking propensity
* Internal locus of control
* Creative tendency

Enterprising tendency (measured by the GET)

**Entrepreneurial Environment**

* Entrepreneurship education
* Culture

Figure 1. Proposed conceptual framework

*3.2 Research design*

The application of the GET2 test was central to this study and so a quantitative approach that made use of a questionnaire that could be applied as part of a survey was essential. Studies focusing on university students’ enterprising tendency are limited in number and very few have been conducted in developing countries like China (Eid *et al*., 2019) using quantitative scaling approaches like GET2 (Dou *et al*., 2019). Indeed, it appears that no quantitative study has been completed in China using GET2 to capture university students’ enterprising tendency. Thus, the exploratory use of the instrument in the Chinese context, and the fact that the findings reported in this paper are the initial findings of what will be a longitudinal study of enterprising tendency amongst university students in China, means that the study reported here is best thought of as a preliminary scoping study.

*3.3 Data collection*

The sample for this study comprises 64 third-year students who were studying a four-year degree course with a Business major at a university in Beijing. Authorization for the use of the GET2 test was obtained from the test designer (Caird, 2017) and ethical approval was obtained from the University Research Ethics Committee before the research was conducted. The survey was administered by a UK academic during a teaching visit to Beijing. The data was input into Microsoft Excel and exported into both SPSS Version 25 and Stata Version 15 for subsequent data management, statistical analysis, and presentation.

Piloting of the research instrument suggested that the students experienced difficulty in completing the original GET2 test because it was too long, while analysis of the data suggested that it lacked some detail. In response to these issues, the GET2 test was shortened by reducing the original 54 items to just the 25 key items. In order to gather data in greater detail, it was also decided that rather than use the simple dichotomous “agree” or “disagree” response to statements the questionnaire would employ a six-point scale – (i) strongly disagree, (ii) disagree, (iii) neither agree nor disagree, (iv) agree, (v) strongly agree and (vi) don’t know – to gain a deeper insight into the respondents’ views on those items. Some statements were reverse-coded and combined with other statements to minimize response set bias. The questionnaire was initially designed and written in English, but it was translated into Chinese and checked for inter-translator consistency before being used with the students.

The research instrument was tested for both content and face validity (Burns, 1996). The content validity was assured by the comprehensive literature review, and the face validity was assured through discussions with entrepreneurial experts and academics. The questionnaire design was investigated for its “fitness for purpose” through a further pilot with six Chinese students. Subsequently, the full survey responses were tested for reliability using Cronbach’s Alpha coefficient, which is the most commonly used check on the internal consistency of items in a scale (Gliem and Gliem, 2003). The scale in the questionnaire was found to have good internal consistency, with a Cronbach’s Alpha score above 0.7. Therefore, it can be said that the reliability level of the data is sufficient, and all the scales were reliable (Cronbach, 1951).

The individual's overall *enterprising tendency* score is calculated as the sum of all 25 items, with a maximum score of 125 points. After *visual binning* analysis in SPSS, using equal percentiles on all 64 scanned cases, a score of 84 to 125 points is rated as a high score, indicating that the individual was considered to have *high enterprising tendency*; a score of 43 to 83 points is a medium score, indicating that there is *some* *enterprising tendency*; and a score between 0 and 42 points indicates *low levels of enterprising tendency* (see Table 1 below). The scores for each key characteristic (need for achievement, need for autonomy, creative tendency, calculated risk-taking, internal locus of control) were also summed.

Table 1. Classification of GET2 test scores

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dimension | Maximum Score | Low Score | Medium Score | High Score |
| Need for achievement | 5 | 0-2 | 3-4 | 5 |
| Need for autonomy | 20 | 0-7 | 8-14 | 15-20 |
| Creative tendency | 55 | 0-18 | 19-36 | 37-55 |
| Calculated risk-taking | 30 | 0-10 | 11-20 | 21-30 |  |
| Internal locus of control | 15 | 0-5 | 6-10 | 11-15 |
| **Overall GET** | **125** | **0-42** | **43-83** | **84-125** |

*3.4 Data analysis*

The data were analysed using both descriptive statistics (i.e. mean, median, minimum, maximum and standard deviation) and inferential statistics (i.e. Chi-square tests, cross-tabulations, CHAID decision trees, and multiple regression analysis).

This study made use of both CHAID decision trees model analysis and multiple linear regression to generate a predictive model of *enterprising tendency*. The CHAID method is a form of multivariate analysis used for exploratory analysis, which identifies the factors (independent variables) that can be used as best predictors of *enterprising tendency* (the dependent variable). The Decision Tree approach is one of the most frequently used modes of data mining to uncover predictive relationships (Biggs *et al.,* 1991) and is particularly used in classification, prediction, estimation, data description, visualisation and dimensionality reduction. The result is graphically represented in the form of a tree potentially displaying the whole hierarchy, from strongest to weakest, of relationships between the independent variables and the dependent variable (Rokach and Maimon, 2008). This multivariate approach is generally most suitable for analysis of large samples and the identification of significant patterns (Kass, 1980).

In order to build a decision tree in the context of this study using a CHAID algorithm, the GET score as a continuous variable is defined as the dependent variable with the independent variables being *age*, *gender*, *hometown*, *household income*, *family business background*, *mother’s education level*, *father’s education level*, *mother’s occupation*, *father’s occupation* and *entrepreneurship education* (see Figure 2). Pearson’s Chi-square test was applied, and a common level of significance (α=0.05) selected for node splitting and the merging of independent variable categories, and significance values were adjusted for multiple testing from the same sample using the Bonferroni method.

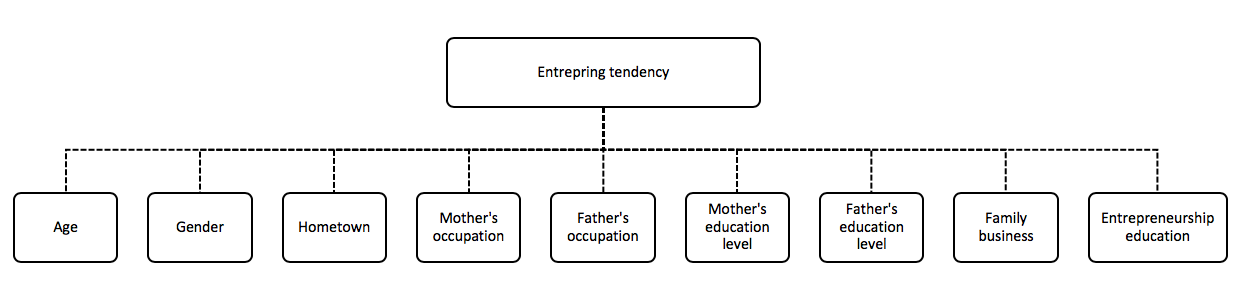


Figure 2. Key variable used in the CHAID decision tree analysis

In addition, this study also made use of regression analysis which is a parametric technique used to examine how effectively one or more (independent) variables can predict the value of another (dependent) variable (Edwards, 1985). Multiple linear regression was applied to quantify the extent to which, if any, the selected social-demographic and economic factors influence the students’ enterprising tendency.

The following multiple regression model was used in this study:

𝑦𝑖=𝛽0+ 𝛽1𝑥𝑖1+𝛽2𝑥𝑖2+ … 𝛽𝑝𝑥𝑖*p* + 𝓮 𝑖

where 𝑖 indexes the individual respondents (= 1,2,3 … 64); 𝑦 = the dependent variable (enterprising tendency); 𝑥1,2, …,*p* = *p* independent variables; *β*1,2, …,*p* = *p* unknown parameters to be estimated; and 𝓮 = the observation-specific error term. The regression constant or intercept term (𝛽0) controls for all systematic influences not included in the model, which include not only the type of university (because all of our students are from the same university, we cannot separately control for heterogeneities such as students in engineering universities having higher enterprising tendency than students in non-engineering background universities[[1]](#footnote-1)) but also national, regional and local cultural influences with similar effects on all respondents. Finally, the regression error term (𝓮 𝑖) reflects all the unobservable, idiosyncratic influences on the enterprising tendency of each individual respondent.

**4. Findings**

*4.1 Demographic characteristics*

The demographic profile of the respondents is presented in Table 2. In China there are more females in higher education, particularly on business programmes (Xinhuanet, 2017), than males. Accordingly, with 21 males (28%) and 43 females (72%), the sample does approximate to the profile of the broader population of business students in terms of gender. Further, with an average age of 21 and an average monthly household income of ¥10,001-¥15,000, the sample is also representative of the broader Beijing population (Chen *et al*., 2017). Thus, it may be assumed that the sample underpinning this study is reasonably representative of the broader population of Chinese students.

Table 2. Demographic characteristics of the respondents; and definition of variables used in CHAID and regression analysis

|  |  |  |
| --- | --- | --- |
| Demographic Characteristic | Frequency | Percentage |
| **Gender:** Binary variable (Female=1; Male=0) | | |
| Male | 21 | 28.3 |
| Female | 43 | 71.7 |
| **Age:** Continuous variable | | |
| 20 | 7 | 10.9 |
| 21 | 27 | 42.2 |
| 22 | 16 | 25 |
| 23 | 8 | 12.5 |
| 24 | 4 | 6.3 |
| 25 | 1 | 1.6 |
| 26 | 1 | 1.6 |
| **Hometown:** Binary variable (Beijing=1; Otherwise=0) | | |
| Beijing | 45 | 70.3 |
| Shanxi | 4 | 6.25 |
| Anhui | 3 | 4.70 |
| Yunnan | 2 | 3.13 |
| Other cities | 10 | 15.6 |
| **Family average income:** Categorical variable. Omitted category: ¥1-¥5,000; each category represented by a separate binary variable (e.g. ¥5,001-¥10,000 =1; otherwise=0) | | |
|
| ¥1-¥5,000 | 14 | 21.9 |
| ¥5,001-¥10,000 | 14 | 21.9 |
| ¥10,001-¥15,000 | 27 | 42.2 |
| ¥15,001-¥20,000 | 2 | 3.13 |
| ¥20,001-¥25,000 | 4 | 6.25 |
| ¥25,000 or more | 3 | 4.69 |
| **Mothers’ occupation:** reduced to a binary variable (Entrepreneurs=1; Otherwise=0) | | |
| Entrepreneurs | 8 | 12.5 |
| Manager | 1 | 1.6 |
| Employee | 37 | 57.8 |
| Unemployed | 18 | 28.2 |
| **Fathers’ occupation:** reduced to a binary variable (Entrepreneurs=1; Otherwise=0) | | |
| Entrepreneurs | 12 | 18.8 |
| Manager | 1 | 1.6 |
| Employee | 46 | 71.9 |
| Unemployed | 5 | 7.8 |
| **Mothers’ educational level:** Categorical variable. Omitted category “Less than high school degree”; each category represented by a separate binary variable (e.g. High school degree or equivalent=1; Otherwise=0) | | |
| Less than high school degree | 31 | 48.4 |
| High school degree or equivalent | 20 | 31.3 |
| Some college but no degree | 7 | 10.9 |
| Bachelor’s degree | 5 | 7.8 |
| Master’s degree | 1 | 1.6 |
| **Fathers’ educational level:** Categorical variable. Omitted category “Less than high school degree”; each category represented by a separate binary variable (e.g. High school degree or equivalent=1; Otherwise=0) | | |
| Less than high school degree | 26 | 40.6 |
| High school degree or equivalent | 18 | 28.1 |
| Some college but no degree | 8 | 12.5 |
| Bachelor’s degree | 12 | 18.8 |
| Master’s degree | 0 | 0 |

*4.2 Enterprising tendency of Chinese university students*

The GET2 test was used to measure the *enterprising tendency* of the students. Table 3 presents: (i) the number and percentage of respondents in each of the “low”, “medium” and “high” categories – as defined in Table 1 – of the overall GET score as well as its component dimensions; and (ii) the unconditional mean score for each dimension together with (iii) its interpretation according to the ranges presented in Table 1.

Table 3. Enterprising tendency scores of the respondents (n=64)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entrepreneurial Characteristics | Enterprising tendency score | | | | |
| Low | Medium | High | Mean | Interpretation of the mean |
| Need for achievement | 35  54.7% | 29  45.3% | 0  0 | 3.55 | Medium |
| Need for autonomy | 25  39.1% | 21  32.8% | 18  28.1% | 11.03 | Medium |
| Creative tendency | 25 | 18 | 21 | 33.97 | Medium |
| 39.1% | 28.1% | 32.8% |
| Calculated risk-taking | 26 | 21 | 17 | 20.09 | Medium |
| 40.6% | 32.8% | 26.6% |
| Internal locus of control | 40 | 14 | 10 | 8 | Medium |
| 62.5% | 21.9% | 15.6% |
| **Overall GET** | **27** | **19** | **18** | **74** | **Medium** |
| **42.2%** | **29.7%** | **28.1%** |

With a mean overall GET score of 74, the student respondents exhibit a medium level of *enterprising tendency* (see Table 1) which, according to Caird (1991), suggests that they have strengths in some enterprising characteristics and so may be enterprising in some contexts or environments. Indeed, according to the GET2 test interpretation, this score suggests that the students may be better deployed within an organization as an *intrapreneur* rather than setting up a new business (Caird, 1990).

It is also apparent, however, that the overall score is clearly based on a wide range of individual scores, which permits an alternative interpretation. Indeed, 28.1% of the students have high *enterprising tendency* while 29.7% scored medium and 42.2% low. It would appear, therefore, that some of the students are much more inclined to entrepreneurship than others.

In addition, the *enterprising tendency* scores of students who had studied entrepreneurship during their undergraduate programmes was calculated and compared to those who had not; the results are presented in Table 4. The results of this comparison revealed that students who had studied entrepreneurship had higher enterprising tendency than those who had not studied entrepreneurship. A subsequent Chi-square test for independence found a significant association between *enterprising tendency* and *entrepreneurship education* – 𝓧2(2, n=64) =2.34, p=0.03 – which confirmed a significant difference between those who had studied entrepreneurship and those who had not.

Table 4. Students’ enterprising tendency and entrepreneurship education

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Enterprising tendency | Low | Medium | High | Total |
| Studied entrepreneurship | 3 | 15 | 13 | 31 |
| 9.7% | 48.4% | 41.9% | 81.3% |
| Not studied entrepreneurship | 24 | 4 | 5 | 33 |
| 72.8% | 12.1% | 15.2% | 18.8% |

*4.3 Factors determining the GET score*

The first step in investigating the factors determining the GET score was exploratory by means of CHAID analysis. This approach *“let’s the data speak”* by applying an algorithm to detect statistically significant interactions in the data, which it presents in the form of an inverted “tree”. The results of the CHAID procedure are presented in Figure 3. The root of the decision tree is *enterprising tendency* which serves as the dependent variable and incorporates all the data provided by all of the respondents in the sample (n=64). The analysis then identifies two statistically significant fractures in the data: first by *gender*; and then by *women* who had and had not participated in *entrepreneurship education*. This finding confirmed that *gender* and *entrepreneurship education of women* impacted *enterprising tendency*. The CHAID analysis did not reveal statistically significant interaction effects, and thus splits in the data, for the other variables in the model.

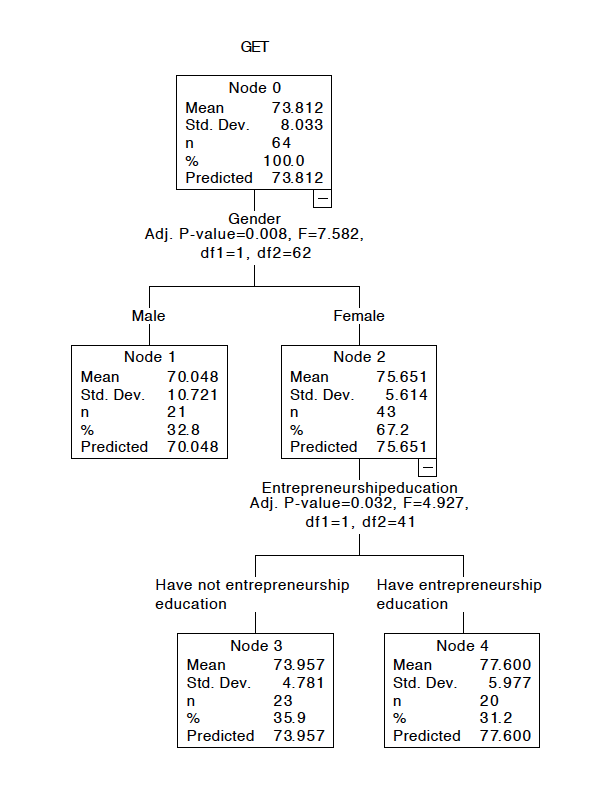


Figure 3. Determinates of enterprising tendency (GET scores) using the CHAID Decision Tree approach

The second step in investigating the factors determining the GET score involved regression analysis to identify the effects on individuals’ *enterprising tendency* (GET scores) of the variables suggested by the literature and thus included in this study. However, based on the findings of the CHAID analysis, the model used for the regression analysis was enhanced by allowing for interaction between *entrepreneurship education*, as the variable of interest, and *gender*.

According to Greene (2012, p.91): *"The finite-sample properties of the least squares estimator are independent of the sample size ... one of the relatively few settings in which definite statements can be made about the exact finite-sample properties of any estimator. In most cases, the only known properties are those that apply to large samples."* As long as the key statistical assumptions of Ordinary Least Squares (OLS) regression are supported by diagnostic tests, OLS estimates are unbiased and consistent, even in small samples (such as that used in this study). Accordingly, diagnostic analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. The diagnostic tests establish that each of these assumptions holds in our data: the residuals are normally distributed and display no evidence of heteroskedasticity (although this study prefers to be cautious and thus reports robust standard errors); the Ramsey RESET establishes that the assumption of a linear relationship amongst the variables is valid; and the mean VIF indicates that there is no problem with multicollinearity. Under these conditions, the estimates reported in this study can be regarded as valid in spite of the small sample.

We applied a standard testing-down procedure to move from a *“general”* regression model, which incorporates all theoretically plausible variables, to a *“specific”* model, which is smaller or “parsimonious” and excludes all redundant variables. We thus began with a full or general model that includes individual categories, except the omitted base categories, for *income*, *father’s education* and *mother’s Education*. (This general model is not reported for reasons of space, but is available on request.) The process of creating successively more *“specific”* models begins by removing the variable whose estimated effect has the smallest t-statistic (largest p-value) and proceeds to estimate the consequently reduced model. This procedure is repeated until only variables statistically significant at the 10 per cent level (or better) are retained in the model. These are considered the relevant variables. Of course, this criterion does not apply to the *gender-entrepreneurship education* interaction, because this cannot be separated from its two component variables. Testing down results in the parsimonious or *"specific model"* reported in Table 5. This parsimonious model is the platform for further post-estimation analysis (see Table 6).

Table 5. Determinates of enterprising tendency (GET): final parsimonious model with model diagnostics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent variable: GET | Coefficient | t-Statistic |  | P>|t| |
| Gender | 9.461 | 2.04 |  | 0.046\*\* |
| Entrepreneurship education (EE) | 9.427 | 1.80 |  | 0.077\* |
| Interaction: Gender & EE | -4.821 | -0.89 |  | 0.377 |
| Hometown | 2.940 | 1.82 |  | 0.074\* |
| Family business | 4.567 | 1.96 |  | 0.055\* |
| Regression constant (intercept) | 61.258 | 12.28 |  | 0.000\*\*\* |

|  |  |  |
| --- | --- | --- |
| Number of observations |  | 64 |
| R2 |  | 0.318 |
| F-test of joint significance | Ho: The estimated coefficients on the independent variables are jointly equal to zero | F(5, 58)=3.96 Prob>F=0.004 |
| Mean VIF |  | 2.41 |
| Ramsey RESET test using powers of the fitted values of GET | Ho: no omitted variables | F(3, 55)=1.45  Prob>F=0.24 |
| Cameron & Trivedi's decomposition of IM-test | Ho: no Heteroskedasticity | p=0.054 |
| Ho: no excess skewness (hence, consistent with normal distribution) | p=0.123 |
| Ho: no excess kurtosis (hence, consistent with normal distribution) | p=0.290 |

Notes: Estimated by Stata 15. \*indicates p≤0.1 (i.e. statistically significant at the 10% level); \*\*indicates p≤0.05 (significant at the 5% level); and \*\*\*indicates p≤0.01 (significant at the 1% level).

The result of the testing-down procedure was that, with only one exception (Category 5 – the highest – of *father’s education*), in the general model that includes the individual categories for *income*, *father’s education* and *mother’s education* none of the individual categories is a statistically significant influence on respondents’ *enterprising tendency*, even at the 10 per cent level. Moreover, Category 5 of *father’s education* includes only a single observation and thus is not necessarily informative about *income* effects on *enterprising tendency*; rather, this variable acts as an observation-specific fixed effect that captures all unobserved influences on the *enterprising tendency* of the particular individual who has a father with Category 5 education. Once this is taken into account and Category 5 of *father’s education* is excluded from group testing, each of the groups of categories for *income*, *father’s education* and *mother’s education* are jointly insignificant. The results of F-tests of the null hypothesis that all category effects on *enterprising tendency* are not significantly different from zero are as follows: *income* (categories 2-6) – p= 0.50; *father’s education* (categories 2-4) – p=0.72; and *mother’s education* (categories 2-4) – p=0.19. In addition, throughout the testing down procedure, the following variables are never estimated at or within the threshold 10 per cent significance level: *age*; *mother’s occupation*; and *father’s occupation*. The resulting parsimonious model is reported in Table 5.

In regression analysis, the R-squared value shows the percentage of the variation in the dependent variable that is explained by the variation of the independent variables. In addition, the Beta (*β*) coefficients, show the marginal effect of each independent variable within the model on the dependent variable, holding other variables constant. Finally, the significance levels (p) indicate whether the variable made a statistically significant contribution to the estimated model. According to Edwards (1985), if the significance level (p-value) is lower than 0.1 (10%), then the variable makes a significant contribution to the prediction of the dependent variable. Conversely, if it is higher than 0.1 then it can be concluded that it does not make a significant contribution to the prediction of the dependent variable. Arguably, the 10 per cent significance level is a particularly appropriate threshold level for small-sample studies, because in small samples it is difficult to separate *“signal”* from *“noise”* and thus achieve high levels of statistical significance.

Our final parsimonious model explains 32% of the overall variance (R-square) in *enterprising tendency*. The marginal influence of *hometown* and *family business* are directly estimated; on average, and other factors held constant: the *hometown* effect (i.e. being from Beijing) adds 2.94 points to respondents’ GET scores; while a *family business* adds 4.57 points. The marginal effects of *gender* and *entrepreneurship education* are not directly estimated; because of the interaction between these two variables included in the regression, the marginal effects of these must be computed by supplementary post-estimation calculations. Hence, in Table 6 the effects of *entrepreneurship education* conditional on respondents’ gender are reported.

Post-estimation contrasts between the marginal linear predictions of our estimated model indicate that for both *men* and for *women* we can reject the null hypothesis that *entrepreneurship education* makes no difference. Other factors held constant, we find that: for *men*, *entrepreneurship education* typically adds 9.43 points to their GET score; while for *women*, *entrepreneurship education* typically adds 4.61 points to their GET score. However, consistent with our CHAID findings, in terms of statistically significance the finding is much stronger for *women* (for men: p=0.077; for women: p=0.005).

Table 6. The effects of entrepreneurship education by gender: post-estimation contrasts of marginal linear predictions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| The effects of entrepreneurship education by gender | Null hypotheses | Contrast | t-statistic | P>|t| |
| Male with entrepreneurship education vs male with no entrepreneurship education | Ho: Entrepreneurship education makes no difference for men | 9.43 | 1.80 | 0.077 |
| Female with entrepreneurship education vs male with no entrepreneurship education | Ho: Entrepreneurship education makes no difference for women | 4.61 | 2.90 | 0.005 |

Note: Estimated by Stata 15.

The decision to undertake *entrepreneurship education* was made before the survey was conducted to measure the dependent variable (*enterprising tendency*). Accordingly, the possibility of simultaneity, whereby not only does *entrepreneurship education* influence *enterprising tendency* but *enterprising tendency* possibly feeds back onto the propensity to undertake *entrepreneurship education*, and hence, a possible source of bias on the estimate and inference, must be greatly attenuated if not eliminated altogether. Accordingly, we may have confidence that the estimated effect identifies a positive influence of *entrepreneurship education* on *enterprising tendency*. Given the inherent limitations of a small cross‑sectional sample, we cannot be certain that the influence of our variable of interest is identified completely separately from possible unobserved and/or unobservable influences absorbed by the observation error (ℯi). However, while not insisting on the precise size, the estimated effects of 4.61 additional points on the GET scores for *women* and 9.53 points for *men* do, at least, suggest a non‑negligible positive influence of exposure to *entrepreneurship education* (an average increase for *women* and *men* of around 6 and 13 per cent respectively of the mean overall GET score of 74).

To sum up, the CHAID approach is non-parametric and requires large samples, whereas the classical normal linear regression estimated by Ordinary Least Squares (OLS) is parametric with known and good finite (i.e. small) sample properties when certain statistical criteria are satisfied: namely, unbiasedness; consistency; and minimum variance. Because, for our model, standard diagnostics establish that the key assumptions of OLS estimation are supported by the data, preference is given to the regression results reported in Table 5. However, although the regression findings are consistent with the findings of the CHAID approach, the regression results are more informative in that they reveal a statistically significant response to *entrepreneurship education* not only by *women* but also by *men*. This reflects the greater ability of a parametric estimator with good small-sample characteristics to identify effects from small samples (very small, in the case of *men*) compared to a non-parametric large sample approach.

**5. Discussion**

In this study the GET2 test was used to measure the e*nterprising tendency* of a group of Chinese students. While some students did exhibit high levels of e*nterprising tendency* most did not. Also, while the results of the CHAID decision tree and multiple regression analyses failed to confirm expected relationships between *enterprising tendency* and *age* (Khyareh and Mazhari, 2016), *parent’s occupation* (Scott and Twomey, 1988), *parent’s educational level* (Decker *et al*., 2016), and *household income*, our quantitative analysis did confirm relationships between *enterprising tendency* and each of *gender*, *family business*, *hometown* and *entrepreneurship education*.

The unconditional mean GET score for *women* in the sample is 75.91 and for *men* 69.52 (a one-sided t-test allowing for unequal variance rejects the null hypothesis of no difference; p=0.008). This appears to be inconsistent with previous research, for example Davis *et al*. (2016) who noted *gender* differences in *enterprising tendency* and found that *female* university graduates are less likely than their *male* counterparts to start a new business. A possible explanation for this could be that there has been a recent change to the status of women in Chinese society. Indeed, GEM (2018) reported that China’s female/male ratio of Early-stage Entrepreneurial Activity is 0.82, which is clearly above the global average of 0.69. Further, out of the 57 countries examined, the Mastercard Index of Women Entrepreneurs (Mastercard, 2018) ranked China 29 in terms of female entrepreneurs’ ability to *“capitalize the opportunities granted through various supporting conditions within their local environment”*. The study also found that women own 30.9% of all businesses in China, many new businesses are started by women each year, and about 55% of new Internet businesses and tech startups in China are being founded by women. It is quite possible that increasing numbers of successful women entrepreneurs in China are becoming the role models for university graduates encouraging even more to consider entrepreneurship as a career choice in the future.

The findings of the regression analysis provide further evidence of a link between *enterprising tendency* and *family business*. Indeed, it would appear intuitively logical to expect that individuals who originate from a family who run their own business and have one or both parents who are entrepreneurs would have a higher *enterprising tendency,* because the children are more inclined to risk-taking, innovation and proactivity compared to children whose parents are not entrepreneurs (Lindquist *et al.,* 2015).

Another finding of this study was that *hometown* (coming from Beijing) is correlated with *enterprising tendency*. This result may be explained by the fact that there is a significant geographical concentration of startups within the 600 main cities in China (Liang, 2018). According to Pan and Yang (2019) the four first-tier cities of Beijing, Shanghai, Guangzhou and Shenzhen are the most developed urban metropolises in China with relatively better levels of entrepreneurship education, a policy environment that is more supportive of entrepreneurship, and higher levels of government support for entrepreneurship, which makes them the most important startup cities in China. Further, Beijing is considered the forerunner amongst the four first-tier cities for supporting mass entrepreneurship and innovation, because it is the capital city of China. Conversely, Liang (2018) reports that because the environment is different parents in second and third-tier cities are less willing to enroll their children in entrepreneurship education.

The most important finding of this study is that both the CHAID decision tree and multiple regression analyses confirmed a positive relationship between *enterprising tendency* and *entrepreneurship education*, with both *female* and *male* students with previous *entrepreneurship education* having higher *enterprising tendency* scores than those who had not studied entrepreneurship. These results are consistent with those of other studies using the GET2 test. For instance, Holienka *et al. (*2015) used the GET2 test to examine the entrepreneurial characteristics of 370 university students in four different disciplines. According to their study, students in different disciplines exhibit different levels of *enterprising tendency*, with students on entrepreneurship/business courses displaying the highest *enterprising tendency*. It would appear, therefore, that education plays an important role in raising the *enterprising tendency* of Chinese university students, thereby encouraging entrepreneurship in the Chinese economy.

**6. Implications of the research**

Societal well-being is dependent on economic development and, in turn, on enterprise and entrepreneurship (Westhead and Solesvik, 2016). However, China is not particularly entrepreneurial on a number of measures (GEM 2018). In particular, China still relatively lags in providing high quality entrepreneurship education and training (see also: Zhai *et al*., 2014; and Wei *et al*., 2019). The findings of this study provide some insight into the importance of entrepreneurship education and training and how these may be improved.

While the findings of this study relate *enterprising tendency* amongst university students to demographic factors that cannot directly be influenced by policy makers – i.e. *gender*, *family business*, and *hometown* – we identify *entrepreneurship education* within Chinese universities as a positive influence on *enterprising tendency* that can be influenced by policy makers. Indeed, the findings from this study have a number of important practical implications regarding entrepreneurial education for all the stakeholders but especially the government, policy makers and university program designers (Wu and Wu, 2008).

The finding that entrepreneurship education has a positive effect on students’ enterprising tendency may be interpreted in the context of entrepreneurship education still being at a relatively early stage of development in China. This very lack of development suggests that there is much scope for investment in entrepreneurship education before diminishing returns in terms of enterprising tendency set in; put more informally, for the foreseeable future, China has a great opportunity to gather “low-hanging fruit” from entrepreneurship education. Extended by this diminishing marginal returns hypothesis, our finding thus suggests that China enjoys considerable scope to increase student’s enterprising tendency by extending, creating a more favourable environment for, and improving the methods used to deliver entrepreneurship education.

At present the literature suggests that China still lacks mature, independent and systematic education programs in the entrepreneurship subject area (Zhai *et al*., 2014; Wei *et al*., 2019). To address this situation the Chinese government might wish to consider developing national policy on entrepreneurship in general and entrepreneurship education in particular so as to encourage all universities in China to consistently provide entrepreneurship education and to develop the enterprising tendency of their students. Moreover, policymakers should closely monitor how entrepreneurship education is implemented in the country, although it is vital for universities to customize their entrepreneurship education and, hence, to adopt a localized approach as China is so big and diversified.

It is essential that China, like all other countries, encourages traditional entrepreneurs who start their own businesses, but entrepreneurial skills bring broader benefits too. As Li *et al.* (2018) highlight in their study, entrepreneurship education should focus on supporting the formation of human capital by students, through nurturing their entrepreneurial spirit in combination with career experience and entrepreneurship knowledge and skills. Encouraging students to develop entrepreneurial skills – i.e. to be creative, innovative, to seek continuous improvement, to be open-minded, self-determined and disciplined – will help to develop more innovators, designers, intrapreneurs and voluntrapreneurs capable of creating innovative new products, services and processes throughout society. So there is a good case

for university policy makers to develop policies to implement the emphasis of recent Government policy documents (referenced in the Literature Review above) that entrepreneurship education should not to be limited to university business schools, and to the periphery of other courses, but should be included as a central component in all programs and courses in all subject areas, irrespective of the students’ major.

In providing entrepreneurship education to their students, Chinese universities face a number of challenges due to the somewhat idiosyncratic demand and supply aspects of entrepreneurship education in China. On the demand side, it is well documented that entrepreneurs are often atypical individuals who often have challenging educational needs (e.g. dyslexia) and who, as a consequence, struggle in traditional education. However, on the supply side, the education system in many Chinese universities is typically a very traditional teacher-centered chalk-and-talk system focused on memorization of theory and concepts (Li *et al*., 2016), which is unsuited to many potential entrepreneurs and inimical to the development of entrepreneurial skills. Moreover, problems on the supply-side of entrepreneurship education are compounded by a shortage of qualified teachers (Kong, 2018) who are often limited to providing only a theoretical perspective rather than having any real-life experience of entrepreneurship. To improve the current situation, policy makers will need a clear goal with both bottom-up and top-down approaches to equip universities with the funding, infrastructure and staff to create an innovative and transformational system of entrepreneurship education, including university-industry links.

It would appear, therefore, that there are some very substantive challenges to developing entrepreneurship education across the university system in China. However, the situation may well also be seen as an excellent opportunity to develop the system via the introduction of modern Western approaches to teaching. Indeed, as entrepreneurship education may well be a new subject to many Chinese universities, but an established educational subject in the West, then the Chinese universities could do worse than to consider partnering with a Western university in order to gain access to modern programmes of delivery. Such programmes would be contextualized and based on a learning-by-doing philosophy but may embrace interactive methods of delivery, collaboration with local business start-ups, involve the university alumni, make use of successful entrepreneurs to deliver workshops and seminars, use business simulations focused on enterprise, and be supplemented with optional short courses for those wishing to learn more about a specific aspect of entrepreneurship (e.g. finance, marketing etc.).

In addition, it could be argued that a policy of embedding integrated entrepreneurship education across all levels of learning – i.e. including schools – may prove beneficial to the long-term economic success of the nation (Lackeus, 2015).

**7. Conclusion**

This paper reports a study on the enterprising tendency of university students in China, considers the implications for entrepreneurship education in China, and develops recommendations for the government, policy makers and university program designers. Despite limitations relating to a small sample based solely in Beijing, the study has produced findings that provide insights into the enterprising tendency of Chinese students and these have implications for the government, policy makers and universities who are responsible for entrepreneurship education in China. The findings suggest that enterprising tendency varies across Chinese university students, with some exhibiting high enterprising tendency but most exhibiting low levels of enterprising tendency. It appears, therefore, that while some may well go on to start-up their own businesses most will seek employment working in organizations owned by others.

Our most important finding suggests that there are already substantial returns to entrepreneurship education in terms of enterprising attitudes. In addition, further improvements in entrepreneurship education should yield further improvements in the entrepreneurial knowledge and skills of Chinese students. The government is recommended to develop national policy on entrepreneurship in general and entrepreneurship education in particular, policy makers are encouraged to introduce entrepreneurship education into all programs and courses in all subject areas irrespective of the students’ major, and the universities are advised to adopt modern Western approaches to entrepreneurship education.

Finally, it would seem apposite to consider further research: (i) with a larger sample of students taken from across China in order to check the robustness of these findings; (ii) to undertake a separate study to validate the GET2 research instrument in the Chinese context (to identify supplemental constructs as well as to check the validity of the existing constructs); (iii) to conduct qualitative research to investigate the cause and effect relationship between entrepreneurship education and enterprising tendency; and (iv) to take into account related research on the link between entrepreneurship education and entrepreneurial intentions (Mustafa *et al*., 2016; Kim and Park, 2019) to clarify the relationships between entrepreneurship education, enterprising tendency and entrepreneurial intentions.

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