

## Article

# Entrepreneurship and Sustainable Development Goals: A Multigroup Analysis of the Moderating Effects of Entrepreneurship Education on Entrepreneurial Intention

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**Abstract:** The role of entrepreneurs in attaining Sustainable Development Goals (SDGs) is paramount. Entrepreneurs with strong awareness and commitment to sustainable development help to attain almost all SDGs, as they create businesses that will help employment, eliminate poverty, provide decent work and economic growth, help to reduce hunger, assist in attaining good health and wellbeing, help to achieve affordable and clean energy, and enhance their industries. Realizing the importance of entrepreneurs and entrepreneurship, the government of Malaysia has taken proactive actions to develop and inculcate the entrepreneurial mindset through entrepreneurship education at higher education. This study aims to apply the Theory of Planned Behavior (TPB) to analyze the effect of an entrepreneurship course on entrepreneurial intentions of the engineering students at Universiti Teknologi Petronas, as entrepreneurial intention is effective in predicting behavior. A quantitative technique and descriptive cross-sectional study have been employed to collect data. The result of this study indicates that the TPB explains and predicts the entrepreneurial intention. However, the Multigroup Analysis (MGA) results show that attending the entrepreneurship course does not increase the strength of the relationship between the exogenous and endogenous construct compared to those who do not attend the course. The results of this study raise a positive implication toward the improvement of the course curriculum and the teaching pedagogy. An in-depth qualitative study to understand the issue will help to improve the curriculum and pedagogy of entrepreneurship education, and eventually enable a realization of the government's aspirations.

**Keywords:** entrepreneurship education; entrepreneurial intention; Theory of Planned Behavior; multigroup analysis; Sustainable Development Goals



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## 1. Introduction

The paradigm of education is shifting from traditional towards entrepreneurial university due to the importance of education as one of the main promoters of Sustainable Development (SD) [1,2]. The importance of entrepreneurs and entrepreneurship to influence the overall wellbeing of humans has attracted the attention of governments, and they have taken proactive actions to develop and inculcate entrepreneurial thought, particularly through education [3,4]. The interest is evident in the rapid development of entrepreneurship curricula and education programs since the early 80s [5]. In the case of Malaysia, which is the focus of this study, the government has included in its 2015–2025 Malaysia Education Blueprint a requirement for academic programs in higher institutions to include an entrepreneurship course or education as part of the curriculum. The intention is to produce graduates who can create jobs, instead of graduates who can only search for jobs [6,7].

Since Entrepreneurship Education (EE) was introduced into higher education in Malaysia, many studies have been done to measure the effectiveness of the entrepreneurship programs. Although the themes of most studies are on the effectiveness of the EE, the scopes and the emphases are different. They emphasize different aspects, such as the effects of demographics [8] or specific students' characteristics (need for achievement, locus of control, propensity to take risk, self-confidence, tolerance of ambiguity and uncertainty, and leadership) [9]; emotional intelligence dynamics [9]; risk thinking and self-efficacy [10,11]; and proactive personality [10,11]. There are also previous studies on the effect of EE on entrepreneurial intention [12–17]. However, there is a fundamental issue that has not been very much discussed in the literature related to entrepreneurial education which is the effect of entrepreneurial knowledge on the development of the entrepreneurial behavior of the students. Does knowledge influence behavior? Studies by researchers, including Krueger [18], Piperopoulos and Dimov [19], and Sabah [20], on the effect of knowledge on behavior in studies related to the "Theory of Planned Behavior" (TPB) find that knowledge does not influence the behavior [18,20]. Ajzen [21,22] developed the TPB, and it has been broadly used in multiple academic perspectives for predicting and understanding human behavior [22,23].

The fundamental question raised is significant since it will determine the right approach to the teaching of entrepreneurship courses in universities. Shall the course syllabus focus on imparting the entrepreneurial knowledge only, or shall it use other approaches that will enhance the development of the entrepreneurial behavior? These questions motivate this study to analyze the effect of the entrepreneurship course on entrepreneurial behavior. Since behavior is not something that can be observed immediately, this study focusses on the development of entrepreneurial intention among the students. Intention has been shown to consistently be able to predict behavior [22,23]. The performance of a behavior is determined by the individual's intention to engage in it [22,23].

The effectiveness of the entrepreneurship course is measured through the intention of the students to be an entrepreneur or to be self-employed. This is in alignment with the aspiration of the government to produce graduates that can create job opportunities. In doing so, this study employs the TPB model to investigate the influence of the entrepreneurship course towards the entrepreneurial intention. The entrepreneurship course acts as a moderator in this study, since, according to the TPB, the external variable does not influence directly, except through the attitudinal variables—the entrepreneurial attitude, the subjective norm, and the perceived behavior control [5,24]. Therefore, the current study has employed the TPB to the effect of the entrepreneurial course towards the entrepreneurial intention. Multigroup analysis (MGA) has been employed to analyze the effects of the moderator on the entrepreneurial intention. MGA is suggested by Hair et al. [24] for the categorical moderators that influence the relationship of all the independent variables and the dependent variable simultaneously.

The study is conducted on the students that have taken the entrepreneurship course at Universiti Teknologi Petronas, Malaysia. Universiti Teknologi Petronas is one of the universities in Malaysia that has introduced the entrepreneurship course as a compulsory course in its academic curriculum. The introduction is in alignment with the government aspiration. Since the introduction of the course in this university, there has not been any study performed to analyze the effectiveness of the course in enhancing students' inclination or intention to set-up a business or to venture into a business upon their graduations.

This study, with its focus on the role of entrepreneurial knowledge, contributes to the enrichment of knowledge in the study of the effectiveness of entrepreneurship education. The outline of the remaining paper is as follows: the proceeding section explains the literature review, which includes the theoretical framework and hypotheses development, and the conceptual framework of this study. The following section explains the methodology part, followed by the results and discussion. Furthermore, the last part shows the conclusions, significance of this study, and future recommendations.

## 2. Literature Review

### 2.1. Previous Studies on Entrepreneurship Education in Higher Education in Malaysia

Malaysia, like other developed and developing nations, realized the importance of entrepreneurship education, and started to introduce entrepreneurship courses in the middle of the 1990s. Serious initiatives have been taken to foster entrepreneurship at all levels of education. Malaysian higher education institutions offer entrepreneurship as a course, as a specialization under the undergraduate business program, or as a degree program. There is a growing trend in Malaysia to blend or amalgamate different programs [24,25]. Entrepreneurship is one of the key engines of economic growth, as described in the Malaysia Plans and the New Economic Model Strategy. This focus on entrepreneurship as a core factor of development has contributed to a rising in entrepreneurship study. Cheng et al. [16] state that despite growing interest in entrepreneurship decisions to become entrepreneurs, motives for establishing a new venture are very low in students after graduation, and there is a need to study the effectiveness of the subject and teaching methods [24,25].

There have been many studies performed in this country to analyze the effectiveness of entrepreneurship education in higher education. Although the theme of the studies is the effectiveness of entrepreneurship education, the scope and focus of most of the studies vary. The scope of the studies is mostly confined to a university or group of universities. For example, researchers Din et al. [13] performed a study on Malaysian students in Universiti Utara Malaysia to gauge the effectiveness of entrepreneurship education programs. They examined the effectiveness of the study concerning business planning, risk thinking, and self-efficacy [25–27]. Similarly, Cheng et al. [16] measured effectiveness as an intention to start a business. Similarly Othman et al. [12] examined the perception of public university students towards entrepreneurship education. Understanding the role of entrepreneurship towards entrepreneurship intention is crucial for universities and policy-makers, as entrepreneurship intention is the best predictor of entrepreneurial behavior [27,28]. Table 1 below lists past literature related to the study of the effectiveness of EE.

Worldwide, many studies have employed using the TPB to study entrepreneurial intention in students in different fields. The TPB has been used to study entrepreneurial intention in nursing students in South Korea [28]. Similarly, another study has been performed in Greek universities to study the entrepreneurial intention among business students [28,29]. The current study has also employed the TPB to study entrepreneurial intention among students at University Technology PETRONAS, Malaysia. The following section has discussed the theoretical foundation of the current study.

### 2.2. Theoretical Framework

#### Theory of Planned Behavior (TPB)

Ajzen [21,29] developed the “Theory of Planned Behavior” (TPB), and, since then, it has been used broadly in multiple academic perspectives for predicting and understanding human behavior [23,29]. For example, marketing researchers and social psychologists have effectively utilized TPB-based models for practical applications and fundamental studies [7,29]. According to the theory, human behavior is determined by intentions. Intentions, in turn, are influenced by three attitudinal constructs: “Attitude”, “Subjective Norm”, and “Perceived Behavioral Control” [21,29].

Instead of the actual rate of venture creation, which is the more accurate measure of the effectiveness of the EE, intentions have been used widely to measure the effectiveness [5,29]. This is because, first, it is not practical to measure the actual rate of venture creation, since a long timelapse between the students graduating and becoming entrepreneurs could weaken the reliability of the study. Many other factors could affect the decision, and, in the end, weaken the relationship between education and entrepreneurial behavior [5,29]. Second, the entrepreneurship course affects intentions, as well as behavior, even implicitly, through attitude changes [21,29]. The TPB provides a complete model of the relationship of the attitudinal constructs to intention. Thus, through the TPB, the effect of entrepreneurship education on intention could be determined.

**Table 1.** Summary of previous studies on the effectiveness of entrepreneurship education in Malaysia.

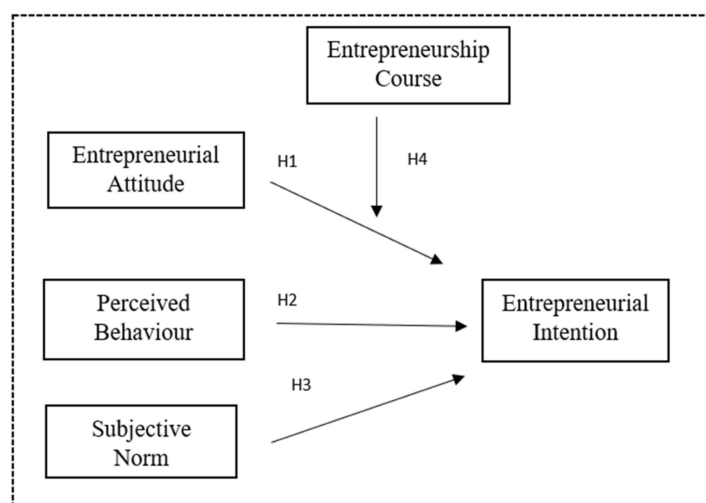
Authors	Summary
Jumaatbin Mahajar [7]	This study explores the inclination towards entrepreneurship among university Pendidikan Sultan Idris students. It studies the relationship of two demographic factors—qualification and program of study, and their relationship with the inclination towards entrepreneurship.
Keat [8]	This study examines the relationship between entrepreneurship education and inclination towards entrepreneurship. The influence of demographic characteristics and family business background on university students' inclination towards entrepreneurship is also examined. The study is on three public universities.
Mohamed [9]	This paper evaluates the effectiveness of the Basic Student Entrepreneurial Program (BSEP) among local university graduates who have undergone the training program in entrepreneurship development. Three variables under the study are the origin of the participant, the presence of family members already involved in entrepreneurial activities, and educational background. The students are from all over Malaysia.
Othman [11]	This study focuses on the emotional intelligence dynamics that foresee the choice of entrepreneurship as a career. Entrepreneurs with high emotional intelligence typically manage their emotions efficiently, and make decisions and implement actions wisely. The samples are from 21 Public Universities in Selangor.
Din [12]	The study evaluates the effectiveness of entrepreneurship education programs on Malaysian university students. It stresses on the importance of risk thinking and self-efficacy. The sample is from a public university in Malaysia.
Mustafa [13]	The study analyses the effects of students' proactive personality, and the university support environment (education support, concept development support, and business development support) on entrepreneurial intentions. The population is a private university in Malaysia.
Ambad [14]	This study uses the TPB to analyze the relationships of perceived educational support, perceived relational support, perceived structural support, personal attitude, and perceived behavioral control with entrepreneurial intention. The sample is a public university.
Che Embi [17]	The study explores the effects of students' entrepreneurial characteristics (need for achievement, locus of control, propensity to take risk, self-confidence, tolerance of ambiguity and uncertainty, and leadership) on their propensity to become entrepreneurs in Malaysia. The samples are students from the International Islamic University of Malaysia (IIUM).
Mohd Ariff [18]	This study analyzes the relationship of entrepreneurial attitudes with the entrepreneurial intention through the TPB.

In this study, entrepreneurial attitude refers to the personal desirability in becoming an entrepreneur [5,29]. It is manifested in the high expectations and beliefs towards self-employment. Generally, the intention to perform a behavior depends on the personal attitude towards that behavior [20,30]. On the other hand, the subjective norm is the belief that is based on the perception of whether people will approve or disapprove of a behavior. Specifically, it is an individual's perception of what most people of importance think of them performing the behavior [30,31]. Perceived behavior control is the belief of the ease or difficulty of performing the behavior of interest. This reflects the perceived feasibility of performing the behavior. The belief is based on the perceptions of the ability to have

the required resources, opportunities, and skills to perform the behavior. The effects of entrepreneurial attitude, subjective norm, and perceived behavior lead to the formation of intention. In this study, the entrepreneurial intention is defined as a cognitive condition that will direct individual attention and action towards self-employment [31–35].

### 3. Conceptual Model and Hypotheses

The whole discussion of the TPB, as well as the relationship between the entrepreneurship course and entrepreneurial intention can be summarized into the theoretical framework seen in Figure 1. The entrepreneurship course is an exogenous variable that acts as a moderator. It influences entrepreneurial intention through the three attitudinal variables: entrepreneurial attitude, subjective norm, and perceived behavior.



**Figure 1.** The theoretical framework.

Since the entrepreneurship course affects the intention only indirectly through the three attitudes (attitude towards self-employment, subjective norm, and perceived behavioral control), it is essential and fundamental to confirm or to establish the relationship of the said constructs in the TPB model and theory. Hence, the following hypotheses are suggested for this purpose:

**Hypothesis 1 (H1).** *Students' high attitude towards self-employment positively influences their entrepreneurial intention.*

**Hypothesis 2 (H2).** *Students' high subjective norm towards self-employment positively influences their entrepreneurial intention.*

**Hypothesis 3 (H3).** *Students' high perceived control towards self-employment positively influences their entrepreneurial intention.*

**Hypothesis 4 (H4).** *The effect of entrepreneurship education on attitude, subjective norm, and perceived behavioral control is stronger for the group of students that have attended the entrepreneurship course than for those who have not attended.*

### 4. Methodology

A descriptive cross-sectional study has been employed to collect data to answer the research questions, as well as to fulfill the purpose of the study. The quantitative technique has been chosen for this study to collect data and to analyze them, and to explain the phenomena of this study (e.g., descriptive, correlation, and inferential statistics) [36]. This study focused on UTP students that have taken the entrepreneurship course, and those



who have not taken the course. Most of the students (83%) are from various fields of engineering. The remaining are information science, management and humanities, and geoscience undergraduate students. They must take the entrepreneurship course as a compulsory university course. This study employs a purposive sampling technique, since it fits the purpose of this research, to determine the effect of the entrepreneurship course on entrepreneurial intention. GPower is used to calculate the minimum sample size needed, and the test suggested a minimum sample size of 111 to achieve the power of 0.95. The same minimum sample size also applies to the two groups for the Multigroup Analysis (MGA). The survey has been administrated online, including e-mail and WhatsApp. The respondents have been informed about the purpose of the research. They have been given informed consent prior to their responses. Many students haven't shown interest to fill their response. This approach ensures the method is less sensitive to biases, as no interviewers are involved in the process, and it gives a sense of privacy and flexible time to the respondents [33,34,36]. The data analysis process has been done using SMART-PLS 3.0 software, and interpreted with descriptive and correlative statistics. In this study, the total sample size is 230 (after removal of the outliers). For the Multigroup Analysis (MGA), the total number of respondents that have attended the entrepreneurship course is 111, and 121 respondents have not attended the course. All these numbers equal and surpass the suggested minimum sample size. There are more male students (60%) compared to female students (40%). This, however, reflects the population of the university, which has more male students compared to female students [37,38]. For the students' academic programs, the highest percentage of the respondents come from mechanical engineering (23%) and chemical engineering (22%). They are followed by electrical and electronic engineering (16%), civil engineering (14%), computer and information science (12%), and petroleum engineering (8%). The lowest percentages are from geoscience (1%), and management and humanities (4%). These distributions of the respondents also reflect the actual composition of the number of students for each program. Management and humanities has just started its undergraduate degree program, and the total number of students are less than 30 students. Meanwhile, geoscience has the fewest undergraduate students among the established undergraduate program in UTP.

#### *Questionnaire and Measure of the Constructs*

The questions for entrepreneurial attitude are adopted from Heuer and Kolvereid [5], which consists of four items, measured by a seven-point Likert-type scale ranging from 1 = completely disagree, to 7 = totally agree. Subjective norm questions are adopted from Heuer and Kolvereid [5], which consists of six items, measured by a seven-point Likert-type scale ranging from 1 = completely disagree, to 7 = totally agree. The items for perceived behavioral control and entrepreneurial intention have been adopted from Heuer and Kolvereid [5], which consists of a seven-point Likert-type scale and a five-point Likert-type scale, respectively, ranging from 1 = completely disagree, to 7 = totally agree. Entrepreneurship course construct is a categorical variable that asks the question of "yes" or "no". The categorical question allows the construct to test its effect on all the attitudinal variables at once to understand its indirect effect on the entrepreneurial intention. Relevant demographics of the respondents are asked to reflect the characteristics of the UTP students, such as the respondent's gender, race, age, the discipline of study, and marital status, along with several control questions, such as whether the respondents have parents as entrepreneurs, the respondents' experience as entrepreneurs, and their close relatives as entrepreneurs.

#### **5. Analysis, Findings, and Discussion**

This section deals with the analysis of the measurement and the structural model. The measurement model deals with the indicators and their relationship with the latent variables [39–42]. The discussion then proceeds with the findings of the structural model as-

assessment. The structural model assessment examines the relationship of the inner model or, in other words, the relationship of the exogenous variables and the endogenous variables.

### 5.1. Measurement Model

The measurement model deals with the indicators and their relationship with the latent variables. The fundamental purpose of this stage is to evaluate the assumptions related to reliability and validity. Reliability is measured through internal consistency or reliability (Cronbach's Alpha (CA) and Composite Reliability (CR)). The convergent validity is measured through the Average of Variance Extracted (AVE). Table 2 below summarized the results of the assessment of all the above measurements. According to the results in Table 2, all the factor loadings, AVE, CR, and CA, for the complete model, and the groups "Attend Class" and "Did not Attend Class", are above the threshold values. "Attend Class" refers to the respondents that have attended the entrepreneurship course, and "Did not Attend Class" refers to respondents who have not attended the class. The cross-loadings indicate that all the items load more strongly on their constructs in the model (refer to Table 2).

**Table 2.** Construct reliability and validity.

Construct	Items	Full Sample (230)				Attend Class (109)				Did Not Attend Class (122)			
		Loadings	AVE	CR	CA	Loadings	AVE	CR	CA	Loadings	AVE	CR	CA
Entrepreneurial Attitude	EA1	0.867				0.891				0.823			
	EA2	0.895				0.911				0.869			
	EA3	0.884	0.77	0.93	0.90	0.882	0.74	0.92	0.88	0.885	0.79	0.94	0.91
	EA4	0.858				0.867				0.852			
Entrepreneurial Intention	EI1	0.891				0.902				0.884			
	EI2	0.935	0.85	0.95	0.91	0.942	0.84	0.94	0.91	0.925	0.85	0.95	0.91
	EI3	0.934				0.925				0.943			
Perceived Behavior Control	BC1	0.923				0.935				0.899			
	BC2	0.911	0.81	0.93	0.88	0.918	0.76	0.91	0.84	0.889	0.83	0.94	0.90
	BC3	0.86				0.876				0.825			
Subjective Norm	SN1	0.912				0.941				0.865			
	SN2	0.928				0.932				0.915			
	SN3	0.937				0.944				0.93			
	SN4	0.879	0.82	0.97	0.96	0.927	0.74	0.94	0.93	0.789	0.87	0.98	0.97
	SN5	0.888				0.914				0.834			
	SN6	0.891				0.934				0.803			

### 5.2. Structural Model and Hypothesis Testing

The structural model, or the inner model, is based on the relationship between the latent variables in the form of exogenous and endogenous variables. The structural model path coefficients for the direct model have been assessed to determine the strength and the significance of the relationship of the exogenous and endogenous variables. Estimated path coefficients close to +1 or −1 indicate strong positive or negative relationships accordingly. Results for this study indicate that all the relationships are significant, and variable attitude has the largest positive relationship with the endogenous variable, intention, followed by behavioral control, and finally by the subjective norm. Hence, H1, H2, and H3 are all supported. The path coefficients with the *p*-values are as in Table 3.

**Table 3.** Structural model path coefficients for the complete model.

Hypotheses		Std Beta	STDEV	t-Value	Decision
H1	Attitude -> Intention	0.447	0.071	6.291	Accept
H2	Behavioral Control -> Intention	0.301	0.065	4.643	Accept
H3	Subjective Norm -> Intention	0.189	0.071	2.661	Accept

### 5.3. The Multigroup Analysis for the Moderator Effects

Multigroup analysis (MGA) has been performed to analyze the path coefficient between the groups, and, eventually, in testing the hypothesis. MGA is suggested by Hair et al. [43] for the categorical moderators that influence the relationship of all the independent variables and the dependent variables simultaneously. However, before MGA can be employed, the Measurement Invariance of Composites (MICOM) test needs to be run first. This is because group comparisons can be inaccurate unless researchers establish the invariance of their measures. The variations in the structural relationships between latent variables could be because of different interpretations or understandings of a phenomenon being measured by different groups rather than due to differences in structural relationships [44]. The following sections discuss the procedures of MICOM and MGA.

#### Measurement Invariance of Composites (MICOM)

The MICOM procedure consists of three step-by-step tests. They are the configural invariance assessment, compositional invariance assessment, and the assessment of equal mean value and variance across groups. If the configural invariance cannot be established in step one, then step two cannot be proceeded. Similarly, if, in step two, the compositional invariance assessment cannot be established, then step three cannot be proceeded.

##### Step 1: Configural Invariance

Configural invariance involves qualitative assessment of the composites' specification across all the groups. The objectives are to ensure identical indicators per measurement model, identical data treatment, and identical algorithm settings or optimization criteria. In this study, similar measurement model indicators have been employed to each group ("Attend Class" and "Did not Attend Class"), as can be observed in the above discussion of the measurement model. Identical data treatment has been observed, as data for both groups have been treated similarly. The coding process, and data handling, such as the treatment of the missing value and the determination of the outliers, have been treated similarly for each group. Finally, identical algorithm settings or optimization criteria has been observed, since both groups are going through similar path model estimation methods and similar structural assessment methods as have been discussed in the previous sections. As a result of MICOM's Step 1, it can be concluded that configural invariance has been established.

##### Step 2: Compositional Invariance

The next step is to assess the compositional invariance, which focuses on analyzing whether a composite is formed equally across the groups. In Step 2, a permutation test has been performed. The result of the 5000 permutations is in the table below. Compositional invariance exists if the original correlation is greater than or equal to five (5) percent quantiles. In this case, as shown in Table 4 below, the compositional invariance has been established, since all original correlations are greater or equal to 5% quantiles.

##### Step 3: Assessment of the Equality of Composite Mean Values and Variances.

In Step 3, the composites' equality of mean values and variances across groups has been assessed. There are two conditions that need to be met. The first is the mean original difference must fall between 5% boundaries and 95% boundaries. The second is the variance original difference must fall between the 5% and 95% boundaries. If each condition is met, then there is a full invariance. However, if only one of the above conditions is met, then there is a partial invariance. Finally, if none of the conditions above are met, then there is no invariance. Results of Step 3 show that the above conditions have not been met. The



results, shown in Table 5 below, do not support the invariance condition. Hence, MGA will be run to analyze the path coefficient between the two groups.

**Table 4.** Compositional invariance.

	Original Correlation	Correlation Permutation Mean	5.00%	Permutation <i>p</i> -Values
Attitude	1	1	0.999	0.172
Behavioral Control	1	1	0.998	0.535
Intention	1	1	1	0.974
Subjective Norm	1	1	0.999	0.614

**Table 5.** Composites' equality of mean values and variance.

	Mean Original Difference (Attend Course (1.0)–Did Not Attend (0.0))	Mean Permutation Mean Difference (Attend Course (1.0)–Did Not Attend (0.0))	5.00%	95.00%	Permutation <i>p</i> -Values	Variance Original Difference (Attend Course (1.0) Did Not Attend (0.0))	Variance Permutation Mean Difference (Attend Course (1.0) Did Not Attend (0.0))	5.00%	95.00%	Permutation <i>p</i> -Values
Attitude	0.178	0.001	−0.215	0.215	0.086	−0.32	−0.003	−0.291	0.29	0.033
Behavioural Control	0.371	0.001	−0.22	0.214	0.002	−0.509	−0.001	−0.282	0.28	0.001
Intention	0.307	0	−0.221	0.219	0.01	−0.178	−0.004	−0.266	0.243	0.131
Subjective Norm	0.418	0	−0.215	0.214	0	−0.441	0.001	−0.28	0.288	0.005

Finally, Multigroup Analysis (MGA) has been performed to analyze the path coefficient between the groups, and, eventually, in testing the hypothesis. The results are shown in Table 6 below.

**Table 6.** Multigroup analysis.

Hypotheses	Path Coefficients-Diff (Attend Course (1.0)–Did Not Attend (0.0))	<i>p</i> -Value Original 1-Tailed (Attend Course (1.0) vs. Did Not Attend (0.0))	<i>p</i> -Value New (Attend Course (1.0) vs. Did Not Attend (0.0))	Decisions
Attitude -> Intention	−0.308	0.981	0.038	Rejected
Behavioral Control -> Intention	0.112	0.193	0.385	
Subjective Norm -> Intention	0.158	0.165	0.33	

From the results, it can be concluded, in general, that attending the entrepreneurship course (“Attend Course”) does not increase the magnitude of the positive relationship of the independent variables on dependent variables. In the first relationship of entrepreneurial attitude towards entrepreneurial intention, the path coefficient difference between the two groups (“Attend Course” and “Did Not Attend Course”) is negative (−0.308) and significant (*p*-value = 0.038). For the second relationship between behavioral control and intention, the path difference is positive (0.112), but not significant (*p*-value = 0.385). In

the last relationship between subjective norm and intention, the path coefficient difference between the two groups is also not significant ( $p$ -value = 0.33). Thus, H4 is rejected.

## 6. Conclusions

This research aims to analyze the effect of an entrepreneurship course on entrepreneurial intention through exogenous attitudinal constructs. The respondents are generally second year students, and the majority of them are engineering undergraduate students. This is a quantitative study that employs structural equation modeling (SEM) to analyze the results. Based on the results of the analysis, a few conclusions can be drawn. Firstly, consistent with many other studies from various disciplines, the results of this study also show that the Theory of Planned Behavior (TPB) explains and predicts entrepreneurial intention. The results of the effects of entrepreneurial attitude, perceived behavior control, and subjective norms on entrepreneurial intention are also consistent with most of the previous studies [43–47]. All the variables have significant direct effects on the intention. Based on the results, personal attitude is the main factor affecting entrepreneurial intention, followed by behavior control, and the least influential is the subjective norms, and this is consistent with previous studies [47,48]. Similarly, subjective norms, in general, show small or insignificant effects, and provide inconsistent results.

Secondly, the MGA results show that attending the entrepreneurship course does not increase the strength of the relationship between the exogenous and endogenous construct compared to those who do not attend the course. In other words, the entrepreneurship course does not moderate the relationship between the exogenous and endogenous constructs. Furthermore, the group that has not attended the class (“Did Not Attend Course”) shows a stronger positive relationship between attitude and entrepreneurial intention compared to the group that has attended the course (“Attend Course”). The findings of the current study are consistent with a study published in Sweden by Gabriel Linton and Markus Klinton [48]. They stated that an entrepreneurship course in a structured classroom environment cannot inculcate entrepreneurial behavior in students. Further, they argued that the entrepreneurship process is nonlinear, and can not be inculcated through a structured process. The current study also states that entrepreneurship behavior can not be inculcated by traditional entrepreneurship courses. Similarly, Santhosh and Dinesh [49] have also stated that despite taking entrepreneurship courses, students in India are not willing to opt into startups. Students who graduated from Indian institutions have claimed that they lack the required set of skills to start their own business. They have shown dissatisfaction towards entrepreneurial education and entrepreneurial courses. They feel that the entrepreneurship course taught during their degree program is not enough to inculcate entrepreneurship behavior in Indian youth. Hence, it can be concluded from the current study and the available literature that entrepreneurship is a creative and nonlinear process which requires more than a formal entrepreneurship course.

A study by Ismail et al. [50] shows that different teaching pedagogy results in different effects of the entrepreneurship education. The didactic or teacher-centric approach (e.g., relying on learning materials, such as PowerPoint slides, notes, textbooks, or online learning platforms) is effective in enhancing students’ understanding of certain topics. However, this approach has been criticized for its ineffectiveness in developing entrepreneurial behavior, knowledge, and skills [46,48]. Ismail et al. [50] also found that the student-centric approach in teaching the entrepreneurial course is more effective in the development of entrepreneurial behaviors among students. A student-centric or experiential learning model is a learning process by which knowledge is created through the transformation of experience [49,50]. The entrepreneurship course in UTP, although it does have experiential learning aspects (such as developing their business ideas, and testing the ideas through a feasibility study), still focuses on the didactic approach to ensure the students obtain the understanding and knowledge. The result of this study manifests this approach. Additionally, the teaching method should be tailored towards the engineering-based product or

service that is related to the students' field of study. This will help to make them appreciate the course, and not feel that the course is only for the business degree students.

The result of the study implicates the improvement of the curriculum and teaching pedagogy of the course. Besides the practical contribution, this study also contributes to the methodology in terms of the application of MGA in the field of entrepreneurship education. The MGA helps this study to analyze whether different estimates occur for each group. The effect of the entrepreneurship course on the intention could falsely be understood without understanding the heterogeneity of the data. The application of the MGA allows the understanding of group-specific effects that facilitate obtaining further differentiated findings [50]. Several constraints need to be addressed and considered in this study. Although the quantitative approach has achieved its objectives, a qualitative approach will enhance our understanding on various interactions among students, and between them and their lecturers to further understand this phenomenon. Further study on the relationship of the education on intention, focusing on the engineering students in Malaysia, could help to uncover more information that will help to improve the effectiveness of this course or program. Besides, it is suggested for the future researchers in this area in the university to take up qualitative research to provide a deeper understanding of the issue of the effectiveness of the course. This understanding will help the further enhancement of the teaching of this course.

### *Limitations*

The current study, like other studies, is no exception to limitations. One of the limitations is the cross-sectional nature of the study. Usually, cross-sectional studies look for data from the population at a specific time, whereas the current study employed the Theory of Planned Behavior (TPB) to analyze the effect of an entrepreneurship course on entrepreneurial intention and behavior of the students. It is difficult to measure the behavior or intention at a specific period. Ideally, longitudinal studies can better explain intention and behavior, as change in behavior is a long process that can be influenced by specific incidents. Additionally, this research is purposive, and is meant to study the behavior of engineering students towards entrepreneurial education, so the current study is not generalizable to the entire student population.

The current study has included data from engineering students, as Universiti Teknologi Petronas (UTP) mostly offer engineering courses, and the number of students taking engineering courses is more than other disciplines. Therefore, the results of this study cannot be generalized, and do not represent the entire population, or the entire UTP student population.

UTP offers entrepreneurship courses to all undergraduate second year students, and the average age of second-year students is 22 years. The student sample is homogenous, with slight variation in their gender. Therefore, mean and standard deviation are not taken into account for the current study. However, the current study has used PLS, which has the capability to handle non-normal data. Despite the ability of PLS to handle non-normal data, the current study has skewness or kurtosis, and all are within  $-1$  and  $1$  (means distribution is normal). Furthermore, UTP has more male students enrolled in comparison to female students. This unequal proportion of males and females is another limitation of the current study.

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## References

1. Del Carmen Pegalajar-Palomino, M.; Burgos-García, A.; Martínez-Valdivia, E. What does education for sustainable development offer in initial teacher training? A systematic review. *J. Teach. Educ. Sustain.* **2021**, *23*, 99–114.
2. UNESCO. *Progress on Education for Sustainable Development and Global*; UNESCO: Paris, France, 2018.
3. Rae, D.; Carswell, M. Towards a conceptual understanding of entrepreneurial learning. *Dev. J. Small Bus. Enterp.* **2001**, *8*, 150–158. [\[CrossRef\]](#)
4. Politis, D. The Process of Entrepreneurial Learning: A Conceptual Framework. *Entrep. Theory Pract.* **2005**, *29*, 399–424. [\[CrossRef\]](#)
5. Ministry of Education Malaysia. *Malaysia Education Blueprint 2015–2025*; Kementerian Pendidikan Malaysia: Putrajaya, Malaysia, 2015.
6. Krueger, A.L.; Reilly, N.F.; Carsrud, M.D. Competing models of entrepreneurial intentions. *J. Bus. Ventur.* **2000**, *15*, 411–443. [\[CrossRef\]](#)
7. Jumaatbin Mahajar, J.; Yunus Mohd binti, A. Inclination Towards Entrepreneurship Among Universiti Pendidikan Sultan Idris Students. *J. Glob. Bus. Manag.* **2012**, *8*, 248–256.
8. Keat, D.; Selvarajah, O.Y.; Meyer, C. Inclination towards entrepreneurship among university students: An empirical study of Malaysian university students. *Int. J. Bus. Soc. Sci.* **2015**, *2*, 206–220.
9. Mohamad, N.; Lim, H.E.; Yusof, N.; Soon, J.J. Estimating the effect of entrepreneur education on graduates' intention to be entrepreneurs. *Educ. Train.* **2015**, *57*, 874–889. [\[CrossRef\]](#)
10. Embi, N.A.C.; Jaiyeoba, H.B.; Yusof, S.A. The effects of students' entrepreneurial characteristics on their propensity to become entrepreneurs in Malaysi. *Educ. Train.* **2019**, *61*, 1020–1037. [\[CrossRef\]](#)
11. Othman, N.; Muda, T.N.A.A.T. Emotional intelligence towards entrepreneurial career choice behaviours. *Educ. Train.* **2018**, *60*, 953–970. [\[CrossRef\]](#)
12. Din, B.H.; Anuar, A.R.; Usman, M. The Effectiveness of the Entrepreneurship Education Program in Upgrading Entrepreneurial Skills among Public University Students. *Procedia-Soc. Behav. Sci.* **2014**, *224*, 117–124. [\[CrossRef\]](#)
13. Mustafa, M.J.; Hernandez, E.; Mahon, C.; Chee, L.K. Entrepreneurial intentions of university students in an emerging economy: The influence of university support and proactive personality on students' entrepreneurial intention. *J. Entrep. Emerg. Econ.* **2016**, *8*, 162–179. [\[CrossRef\]](#)
14. Ambad, S.N.A.; Damit, D.H.D.A. Determinants of Entrepreneurial Intention Among Undergraduate Students in Malaysia. *Procedia Econ. Financ.* **2016**, *37*, 108–114. [\[CrossRef\]](#)
15. Cheng, M.Y.; Chan, W.S.; Mahmood, A. The effectiveness of entrepreneurship education in Malaysia. *Educ. Train.* **2009**, *51*, 555–566. [\[CrossRef\]](#)
16. Ariff, A.H.M.; Bidin, Z.; Sharif, Z.; Ahmad, A. Predicting entrepreneurship intention among Malay University Accounting students in Malaysia. *UNITAR E J.* **2010**, *6*, 1–10.
17. Krueger, N.F. The cognitive infrastructure of opportunity emergence. *Entrep. Theory Pract.* **2000**, *24*, 5–22. [\[CrossRef\]](#)
18. Piperopoulos, D.; Dimov, P. Burst bubbles or build steam? Entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intentions. *J. Small Bus. Manag.* **2015**, *53*, 970–985. [\[CrossRef\]](#)
19. Sabah, S. Entrepreneurial Intention: Theory of Planned Behaviour and the Moderation Effect of Start-Up Experience. In *Entrepreneurship-Practice-Oriented Perspectives*; InTechOpen: London, UK, 2016.
20. Ajzen, I. The theory of planned behavior. *Organizational Behav. Hum. Decis. Processes* **1991**, *50*, 179–211. [\[CrossRef\]](#)
21. Ajzen, I.; Czasch, C.; Flood, M.G. From intentions to behavior: Implementation intention, commitment, and conscientiousness. *J. Appl. Soc. Psychol.* **2009**, *39*, 1356–1372. [\[CrossRef\]](#)
22. Armitage, M.; Conner, C.J. Efficacy of the theory of planned behaviour: A meta-analytic review. *Br. J. Soc. Psychol.* **2001**, *40*, 471–499. [\[CrossRef\]](#)
23. Mason, C. Entrepreneurship Education and Research: Emerging Trends and Concerns Entrepreneurship Education and Research: Emerging Trends and Concerns International School of Entrepreneurship. *J. Glob.* **2011**, *1*, 13–22.
24. Othman, N.; Othman, S.H. The Perceptions of Public University Students of Entrepreneurship Education in Malaysia. *Int. Bus. Manag.* **2017**, *11*, 865–873.
25. Shah, I.A.; Amjed, S.; Jaboo, S. The moderating role of entrepreneurship education in shaping entrepreneurial intentions. *J. Econ. Struct.* **2020**, *9*, 2–15. [\[CrossRef\]](#)
26. Kim, J. Predictors of Entrepreneurial Intention of Nursing Students Based on Theory of Planned Behavior. *J. Multidiscip. Healthc.* **2021**, *14*, 533–543.
27. Tsordia, C. The Role of Theory of Planned Behavior on Entrepreneurial Intention of Greek Business Students. *Int. J. Synerg. Res.* **2015**, *4*, 1–23. [\[CrossRef\]](#)
28. Tornikoski, E.; Maalaoui, A. Critical reflections—The Theory of Planned Behaviour: An interview with Icek Ajzen with implications for entrepreneurship research. *Int. Small Bus. J.* **2019**, *37*, 536–550. [\[CrossRef\]](#)
29. Bird, B. Implementing Entrepreneurial Ideas: The Case for Intention. *Acad. Manag. Rev.* **1988**, *13*, 442–453. [\[CrossRef\]](#)

30. Creswell, J.W.; Creswell, J.D. *Research Design: Qualitative, Quantitative, and Mixed Methods Approach*; Sage Publications: Thousand Oaks, CA, USA, 2013.
31. Abdul-Latif, S.A.; Abdul-Talib, A.N. Consumer racism: A scale modification. *Asia Pacific J. Mark. Logist.* **2016**, *29*, 616–633. [\[CrossRef\]](#)
32. Sekaran, U.; Bougie, R. *Research Method for Business A Skill Building Approach*, 4th ed.; John Wiley & Sons: New York, NY, USA, 2017.
33. Abu Bakar, A.R.; Abdul Talib, A.N.; Hashim, F. Restoring service quality, satisfaction and loyalty in higher education institutions through market orientation. *J. Glob. Bus. Adv.* **2014**, *7*, 88–108. [\[CrossRef\]](#)
34. Heuer, A.; Kolvereid, L. Education in entrepreneurship and the theory of planned behaviour. *Eur. J. Train. Dev.* **2014**, *38*, 506–523. [\[CrossRef\]](#)
35. Ashari, H.; Yusof, Y.; Mohd Zamani, S.N.; Abdul Talib, A.N. A study of the effect of market orientation on Malaysian automotive industry supply chain performance. *Int. J. Technol.* **2018**, *9*, 1651–1657. [\[CrossRef\]](#)
36. Zamani, S.N.M.; Abdul-Talib, A.N.; Ashari, H. Strategic orientations and new product success: The mediating impact of innovation speed. *Int. Inf. Inst. (Tokyo) Inf.* **2016**, *19*, 2785–2790.
37. Hair, M.; Hult, J.; Ringle, G.T.M.; Sarstedt, C.M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*; Sage Publications: Thousand Oaks, CA, USA, 2014.
38. Hair, J.F., Jr.; Sarstedt, M.; Ringle, C.M.; Gudergan, S.P. *Advanced Issues in Partial Least Squares Structural Equation Modeling*; Sage: Thousand Oaks, CA, USA, 2017.
39. Utami, W.C. Attitude, Subjective Norms, Perceived Behavior, Entrepreneurship Education and Self-efficacy toward Entrepreneurial Intention University Student in Indonesia. *Eur. Res. Stud. J.* **2017**, *20*, 475–495.
40. Dinc, M.S.; Budic, S. The Impact of Personal Attitude, Subjective Norm, and Perceived Behavioural Control on Entrepreneurial Intentions of Women. *Eurasian J. Bus. Econ.* **2016**, *9*, 23–35. [\[CrossRef\]](#)
41. Mohammed, B.S.; Fethi, A.; Djaoued, O.B. The Influence of Attitude, Subjective Norms and Perceived Behavior Control on Entrepreneurial Intentions: Case of Algerian Students. *Am. J. Econ.* **2017**, *7*, 274–282. [\[CrossRef\]](#)
42. Mawardi, M.K.; Baihaqi, A.I. Impact of Attitudes Towards Entrepreneurship, Subjective Norms and Perceived Behavioral Control in Creating Entrepreneurial Intention. In Proceedings of the 2nd Annual International Conference on Business and Public Administration (AICoBPA 2019), Malang, Indonesia, 23–24 October 2019; pp. 53–56.
43. Al-Jubari, I. College Students' Entrepreneurial Intention: Testing an Integrated Model of SDT and TPB. *SAGE Open* **2019**, *9*, 1–15. [\[CrossRef\]](#)
44. Alam, M.; Kousar, S.; Rehman, C.A. Role of entrepreneurial motivation on entrepreneurial intentions and behaviour: Theory of planned behaviour extension on engineering students in Pakistan. *J. Glob. Entrepr. Res.* **2019**, *9*, 50. [\[CrossRef\]](#)
45. Helweg-Larsen, M.; Collins, B.E. A Social Psychological Perspective on the Role of Knowledge About AIDS in AIDS Prevention. *Curr. Dir. Psychol. Sci.* **1997**, *6*, 23–25. [\[CrossRef\]](#)
46. Linton, G.; Clinton, M. University entrepreneurship education: A design thinking approach to learning. *J. Innov. Entrep.* **2019**, *8*, 3. [\[CrossRef\]](#)
47. Kumar Santhosh, A.V.; Dinesh, N. Inculcating Entrepreneurial Spirit in Students Through Entrepreneurship Education. *Indian J. Appl. Res.* **2019**, *9*, 54–56. [\[CrossRef\]](#)
48. Ismail, A.B.; Sawang, S.; Zolin, R. Entrepreneurship education pedagogy: Teacher-student-centred paradox. *Educ. Train.* **2018**, *60*, 168–184. [\[CrossRef\]](#)
49. Kolb, A.Y. *The Kolb Learning Style Inventory–Version 3*; Hay Resources Direct: Boston MA, USA, 2015; Volume 200, pp. 166–171.
50. Mustapha, M.; Selvaraju, M. Personal attributes, family influences, entrepreneurship education and entrepreneurship inclination among university students. *Kaji. Malays. J. Malays. Stud.* **2016**, *33*, 155–172.