

Influence of Innovation and Entrepreneurship Course on Entrepreneurial Motivation, Entrepreneurial Self-Efficacy, Entrepreneurial Intention and Entrepreneurial Behavior of Students in Technological Colleges and Universities

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Abstract— The purpose of this study was to conduct a questionnaire survey of 490 students taking innovative entrepreneurship courses at four technological colleges and universities in Taiwan. Structural equation modeling (SEM) was adopted to explore the correlation between entrepreneurial motivation, entrepreneurial self-efficacy, entrepreneurial intention and entrepreneurial behavior. The research findings show that: entrepreneurial motivation significantly and positively affected entrepreneurial behavior; entrepreneurial efficacy significantly and positively affected entrepreneurial behavior; entrepreneurial self-efficacy sufficiently and positively affected entrepreneurial intention; entrepreneurial intention significantly and positively affected entrepreneurial behavior; entrepreneurial motivation did not sufficiently affect entrepreneurial intention. In particular, entrepreneurial self-efficacy had a far greater impact on entrepreneurial behavior compared to the impact of entrepreneurial intention on entrepreneurial behavior. This finding differs from the Ajzen's theory emphasizing behaviors are greatly affected by intention.

Keywords- *entrepreneurial motivation; entrepreneurial self-efficacy; entrepreneurial intention; entrepreneurial behavior; entrepreneurial education*

I. INTRODUCTION

The changing global economy has led to an inadequacy of technical education alone as far as technological and vocational college graduates are concerned. Whether choosing to seek employment or start a business, they all need to have an

entrepreneurial spirit in order to contribute under the context of commercial market pressure, while creating economic and social value from technical knowledge [1]. Entrepreneurship not only takes personal or corporate profits into account, but also creates employment opportunities for the general public, which are of immense importance to national economic development. However, a start-up is a painstaking process. If entrepreneurship education can be imparted to students through innovative entrepreneurship, entrepreneurs' business management ability can be enhanced, the start-up risks can be reduced, and survival after the start-up can be enhanced, which are all considerably beneficial to entrepreneurs [2]. Although many young people dream of starting their own business, most lack start-up and innovative knowledge and the entrepreneurial spirit. The entrepreneurs feel intimidated by the many competitors that come along after the start up, resulting in the failure to get through the start-up stage (four months). Therefore, innovative entrepreneurship courses have their existential necessity [3]. In recent years, entrepreneurship education has received attention and emphasis from countries around the world; it is popularly discussed topic in Taiwan's academia and industries; it is also one of the important development trends of higher education. In order to cultivate university students' entrepreneurial ability, most universities and colleges in Taiwan have commenced innovative entrepreneurship courses [4].

According to the 2020/2021 Global Entrepreneurship Monitor, GEM, starting a business relies on the assistance of

many interested parties, either directly from suppliers and banks or indirectly from relatives and friends. In particular, getting to know entrepreneurs is one of the major observation indicators, as it creates the paragon effect and arouses entrepreneurial motivation. Taiwan lags in this category. This is because the ratio of respondents from Taiwan who believe they have adequate knowledge and skills is barely satisfactory. Fear of failure on the other hand tops the chart. The entrepreneurial motivations of the world's early entrepreneurial groups included: "job scarcity; scraping a meager living", "carrying on the family tradition", "changing the world", and "generating more wealth". As for Taiwan, the early entrepreneurial motivations were mostly "generating wealth and changing the world".

Students' entrepreneurial ability can be cultivated through university courses. Compared to regular students, in general, students taking part in entrepreneurial education courses demonstrate better overall entrepreneurial traits, more personal control, higher self-esteem, and greater innovativeness. Entrepreneurship covers two processes: affective and cognitive. Entrepreneurial education itself is a cognitive process, and learning results are affected by affective factors. That is, the affective and cognitive mechanisms can be identified through entrepreneurial education. Among the affective factors, passion is the core factor of entrepreneurship, which represents the positive emotion of personal entrepreneurship. Passion brought about by education can enhance entrepreneurial self-efficacy, leading to the generation of entrepreneurial actions [5].

In the cognitive theory, an attitude is the subjective will stimulated and influenced by the environment. This attitude can be interpreted as an important factor contributing to the intention. An entrepreneurial attitude includes various abilities demonstrated and responded during the entrepreneurial process, which are influenced by the external environment, such as course arrangement. Through an appropriate course arrangement, the acquisition of relevant skills can be enhanced, giving students a higher entrepreneurial attitude (i.e. higher entrepreneurial intention) [6]. Entrepreneurial intention is an important predictor of entrepreneurial behavior, which is developed based on expectations for entrepreneurial behavior and perception towards entrepreneurial viability. That is, uncertain or dangerous situations exert an effect on entrepreneurial intention. Entrepreneurial courses can provide the consciousness and ability required for individuals to develop entrepreneurial roles, thereby enhancing entrepreneurial intention [7].

The study [8] said that entrepreneurial intention is an important indicator for entrepreneurial behavior. Compared to students without entrepreneurial intention, students with entrepreneurial intention during the study period have a 30% higher probability to start their own business. Moreover, entrepreneurial intention plays a crucial role in the decision to start a business [9]. The study [10] believe that the higher the entrepreneurial education received by students, the higher the entrepreneurial self-efficacy in the future, which in turn affects their entrepreneurial intention. The study [11] pointed out that

entrepreneurial intention enhances an individual's entrepreneurial behavior, which further reflects the individual's degree of entrepreneurial efforts. That said, from the perspective of entrepreneurship, entrepreneurial behavior and entrepreneurial intention are inseparable. However, entrepreneurial intention is only the basic process of entrepreneurship, and not every entrepreneur can convert intention into behavior. Although intention is not necessarily acted upon, the primary condition is for an individual to have entrepreneurial intentions.

In view of the above, this study combined the research model of four dimensions: entrepreneurial motivation, entrepreneurial self-efficacy, entrepreneurial intention, and entrepreneurial behavior to establish the innovative entrepreneurship course model. Students taking innovative entrepreneurship courses at four technological colleges and universities were adopted as the research participants. Online questionnaires were distributed. Finally, through SEM used to show the causal relationships between the dimensions or path analysis, the discussions and practical implications were proposed.

II. LITERATURE REVIEW

A. *The relationship between EM and EB*

Entrepreneurial motivation (EM) consists of two types of driving factors: external and internal. The external factors include self-regulation or emotional structure (achievement need, risk propensity, or entrepreneurial passion); the external factors include performance objectives or financial rewards [12]. The study [13] said that entrepreneurship is an action-oriented phenomenon; entrepreneurial motivation is the key precondition of entrepreneurial behavior, the key predictor of an individual's participation in entrepreneurship. Regions or universities with more concentrated entrepreneurial resources may develop or establish non-entrepreneur entrepreneurial motivation by improving resource commitment and educational efforts, thereby activating entrepreneur behavior. The study [1] believe entrepreneurial motivation is a psychological structure, which is the reason and aspiration for people to become entrepreneurs. The study [14] emphasize that converting ideas into action is important for the entire process of realizing entrepreneurship. The connection between intention-action is generated by motivation, motivation is an instinct, and the objective that drives motivation becomes a part of converting intention into action. Therefore, based on the above discussion, the following hypotheses are proposed:

H₁: Entrepreneurial motivation significantly and positively affect entrepreneurial behavior.

H₂: Entrepreneurial motivation significantly and positively affect entrepreneurial intention.

B. *The relationship between ESE and EB*

Entrepreneurial self-efficacy (ESE) is based on Bandura's social cognition theory. When executing certain tasks, there is a connection between the self-cognition of personal skills and

career decisions. These cognitions are usually known as entrepreneurial self-efficacy. Students may enhance their entrepreneurial self-efficacy by viewing or discussing the stories of successful entrepreneurs and via group interactions during the entrepreneurship courses. Cognitive entrepreneurship is an attainable goal. That is, entrepreneurial education positively affects students' entrepreneurial self-efficacy [15]. Many studies on entrepreneurial self-efficacy results are inclined toward explaining the generation of entrepreneurial intention through the social cognition theory and planned behavior theory. According to the planned behavior theory, entrepreneurial self-efficacy captures the degree of an individual's perceived behavioral control, which is the key determinant for planning to engage in a particular behavior. Based on this theory, entrepreneurial self-efficacy promotes entrepreneurial behavior by enhancing and individual's entrepreneurial intention [16]. Therefore, based on the above discussion, the following hypotheses are proposed:

H₃: Entrepreneurial self-efficacy significantly and positively affect entrepreneurial intention.

H₄: Entrepreneurial self-efficacy significantly and positively affect entrepreneurial behavior.

C. The relationship between EI and EB

Entrepreneurial intention (EI) is an individual's expectation to become an entrepreneur in the future, including the precursors of behavior, attitude, and entrepreneurial activities, career directions, and career aspirations. The two main theories of entrepreneurial intention are Ajzen's planned behavioral theory and Shapero-Krueger's entrepreneurial event model (EEM). They regard the perceived entrepreneurial self-efficacy as an important contributor of entrepreneurial intention. That is, entrepreneurial self-efficacy and entrepreneurial intention show a positive correlation [15]. The study [17] said that personality traits, entrepreneurial self-efficacy, and entrepreneurial attitude are important factors for predicting entrepreneurial intention. The study [18] shows that entrepreneurial education procedures a significantly positive impact on entrepreneurial intention. The study [19] believe that entrepreneurial education has a significant impact on entrepreneurial attitude, while entrepreneurial attitude and entrepreneurial self-efficacy produces a significantly positive impact on entrepreneurial intention.

Entrepreneurial behavior (EB) is defined as "The conscious creation, introduction, and application of new ideas in a team or organization in order to enhance team or organization performance for their own benefit" [20]. The study [21] believe that entrepreneurial behavior involves an employee's generating and implementing new and useful ideas through their innovative ability at work. This is especially important for the organization's innovation and continuous competitive advantage. In most organizations, employees are an important source of innovation, while the key drive of entrepreneurial behavior is entrepreneurial self-efficacy. The study [22] shows that entrepreneurial self-efficacy and entrepreneurial behavior have a positive correlation, entrepreneurial behavior and

entrepreneurial intention are positively correlated, and entrepreneurial behavior exerts an intermediating effect on entrepreneurial self-efficacy and entrepreneurial intention. Therefore, based on the above discussion, the following hypotheses are proposed:

H₅: Entrepreneurial intention significantly and positively affect entrepreneurial behavior.

III. METHODOLOGY

A. Research Framework

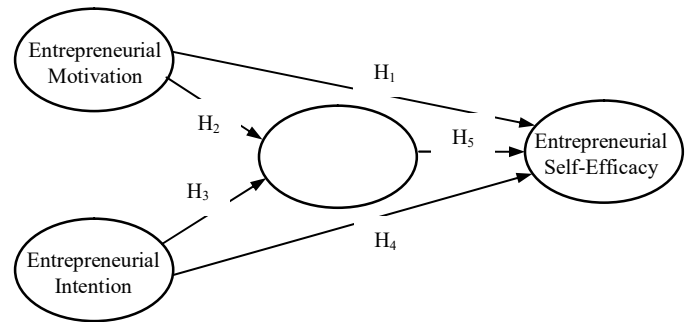


Figure 1. Conceptual model

Figure 1 is the conceptual model in this study. This study mainly explores the impact of entrepreneurial motivation and entrepreneurial self-efficacy on university students' entrepreneurial intention, the impact of entrepreneurial intention on entrepreneurial behavior, the impact of entrepreneurial motivation on entrepreneurial behavior, and the entrepreneurial self-efficacy on entrepreneurial behavior.

B. Participants

The questionnaire survey method was adopted in this study. Targeting students taking innovative entrepreneurship courses at 4 technological colleges and universities (2 national colleges and 2 private colleges) from 2021 to 2022, "A Survey on Innovative Entrepreneurship Courses at Technological Colleges and Universities", an online questionnaire (Google Form) was administered. The questionnaires were recovered and compiled. After eliminating the invalid questionnaire, 490 effective samples were recovered. The effective questionnaire copies were employed to verify and analyze the model fit in this study through structural equation modeling (SEM) using AMOS.

C. Instrument

In addition to the background data, this study contains four dimensions, namely, "entrepreneurial motivation", "entrepreneurial self-efficacy", "entrepreneurial intention", and "entrepreneurial behavior".

The entrepreneurial motivation scale compiled using the study [23] was adopted for the "entrepreneurial motivation" questionnaire. The scale Cronbach's α is 0.82, a total of 11 questions. The "ESE scale" compiled by the study of [24] was

adopted for the “entrepreneurial self-efficacy” questionnaire. The scale Cronbach’s α is 0.79 (middle/high school) ~0.82 (MBA), a total of 6 questions.

The entrepreneurial intention scale compiled by the study [25] was adopted for the entrepreneurial intention questionnaire. The scale Cronbach’s α is 0.943, a total of 6 questions.

The entrepreneurial behavior scale compiled by the study [26] was adopted for the entrepreneurial behavior questionnaire. The scale Cronbach’s α is 0.95(self-rated) ~0.96(leader-rated), a total of 9 questions.

IV. RESULTS

The student respondents classified by gender include 306 males (62.4%) and 184 (37.6%); the students classified by school include 119 students from national colleges (24.3%) and 371 from private colleges (75.7%).

First, first-order confirmatory factor analysis was employed to eliminate nonconforming questions. according to the suggestion of [27], χ^2/df should not exceed 5; RMSEA (root mean square error of approximation) should not exceed 0.1; GFI (goodness of fit index) and AGFI (adjusted goodness of fit index) should not be lower than 0.08; the factor loading, (FL) should not be lower than 0.5. Questions that do not meet the recommended standardbred may be eliminated from the questionnaire. The results are as shown in Table I. Thus, 5 questions were eliminated from the entrepreneurial motivation scale; 2 questions were deleted from the entrepreneurial self-efficacy scale; 2 questions were deleted from the entrepreneurial intention scale; 2 questions were deleted from the entrepreneurial behavior scale.

TABLE I. First-order confirmatory factor analysis

Construct	χ^2	df	χ^2/df	RMSEA	GFI	AGFI
value	---	---	< 5	< 0.1	> 0.80	> 0.80
EM	31.371	9	3.486	0.072	0.977	0.947
ESE	9.436	2	4.718	0.087	0.990	0.952
EI	8.774	2	4.387	0.083	0.991	0.956
IB	50.353	14	3.597	0.073	0.971	0.941

In order to ensure reliability and based on the suggestion of [28], the indicator Cronbach’s α should not be less than 0.7. After making sure the Cronbach’s α meets the recommended value, composite reliability, CR will be reverified. It is suggested that the CR value should not be less than 0.7. When both indicators meet the standard, this study is said to demonstrate sufficient reliability. The study results show that the Cronbach’s α is 0.746~0.880, and the CR value is 0.749~0.883, as shown in Table II.

On the other hand, convergent reliability is constructed based on the FL value and the averaging variance extracted, (AVE). According to the recommended indicator of [29], and the FL value must not be lower than 0.50, the AVE value must

not be lower than 0.50. If the recommended indicator is not reached, the question should be deleted. The study results show that the FL value is 0.500~0.918, and the AVE value is 0.527~0.656, as shown in Table II.

TABLE II. Reliability and validity analysis

Construct	M	SD	α	CR	AVE	FL
value	---	---	>0.70	>0.70	> 0.50	>0.50
EM	4.252	0.552	0.869	0.876	0.549	0.500~0.844
ESE	3.790	0.595	0.746	0.749	0.527	0.606~0.676
EI	3.722	0.725	0.877	0.882	0.656	0.637~0.918
IB	3.847	0.543	0.880	0.883	0.522	0.513~0.802

The indicators of construct discriminant validity are based on the AVE root not to be lower than the absolute value of product-moment correlation [30]. On the other hand, the absolute value of product-moment correlation must not exceed 0.85. If the value is exceeded, it means excessive relevance between the dimensions exists [31]. The results in this study show that the variables show independence and convergence effects, as shown in Table III.

TABLE III. Discriminant Validity

Construct	EM	ESE	EI	IB
EM	(0.741)			
ESE	0.437	(0.653)		
EI	0.320	0.474	(0.810)	
IB	0.537	0.599	0.475	(0.722)

In this study, the model fit was verified using AMOS. The various indicators all meet the scholars’ suggestion that indicator χ^2/df should not be higher than 5, RMSEA should be higher than 0.10, PNFI (parsimony normed fit index) and PGFI (parsimony goodness fit index) should not be lower than 0.80 [27], and GFI, AGFI, NFI (normed fit index), NNFI (non-normed fit index), CFI(comparative fit index), IFI(incremental fit index), and RFI (relative fit index) should not be lower than 0.80 [32]. The indicator values formulated in this study are: $\chi^2 = 534.334$, $df = 183$, $\chi^2/df = 2.920$, $RMSEA = 0.063$, $GFI = 0.908$, $AGFI = 0.884$, $NFI = 0.902$, $NNFI = 0.926$, $CFI = 0.933$, $IFI = 0.933$, $RFI = 0.888$, $PNFI = 0.786$, and $PGFI = 0.719$, which all meet the values recommended by the scholars. This means the study demonstrates excellent fit.

Figure 2 shows the direct, indirect, and total effects of structural equation modeling (SEM) standardization. The results show that entrepreneurial motivation positively and significantly affects entrepreneurial behavior ($\beta = 0.288^{***}$).

Therefore, H₁ is supported; entrepreneurial motivation does not significantly affect entrepreneurial intention ($\beta = 0.030$). Therefore, H₂ is not supported; entrepreneurial self-efficacy positively and significantly affects entrepreneurial intention ($\beta = 0.527^{***}$). Therefore, H₃ is supported; entrepreneurial self-efficacy positively and significantly affects entrepreneurial behavior ($\beta = 0.525^{***}$). Therefore, H₄ is supported; entrepreneurial intention positively and significantly affects entrepreneurial behavior ($\beta = 0.113^*$). Therefore, H₅ is supported.

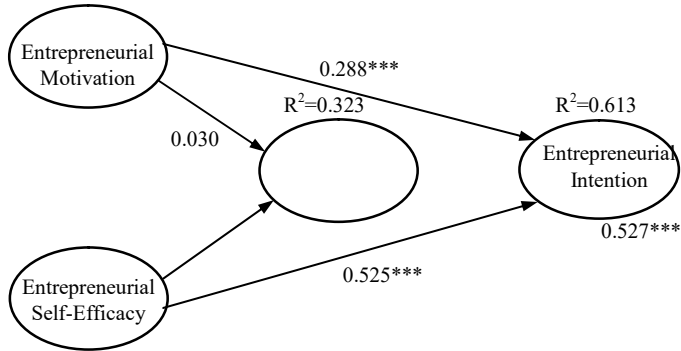


Figure 2. Final tested model

V. DISCUSSION

The results of this study clearly show that clearly indicate that entrepreneurial motivation produces a significantly positive impact on entrepreneurial behavior. This finding coincides with the viewpoints in related studies [14]. Secondly, entrepreneurial self-efficacy produced a significantly positive impact on entrepreneurial intention. The study [5] said that entrepreneurial self-efficacy is an individual's sensibility to achieve entrepreneurship goals through skills. The results also support the positive correlation between entrepreneurial self-efficacy and entrepreneurial intention. Related studies also show that entrepreneurial self-efficacy is an important factor for predicting entrepreneurial intention. Entrepreneurial self-efficacy and entrepreneurial intention show a positive correlation [15] [17] [18], which coincides with the finding in this study. Additionally, the study results also show that entrepreneurial self-efficacy produces a significantly positive impact on entrepreneurial behavior. Related studies also show that entrepreneurial self-efficacy can promote entrepreneurial behavior [16] [21], which coincides with the results in this study. Furthermore, some research results also show that entrepreneurial intention produces a significantly positive impact on entrepreneurial behavior. The study [16] believes that entrepreneurial self-efficacy promotes entrepreneurial behavior by enhancing entrepreneurial intention. The study [22] also supports the positive correlation between entrepreneurial intention and entrepreneurial behavior.

Finally, the research results show that entrepreneurial motivation produces no significantly positive impact on

entrepreneurial intention. The research limitations (such as differed research participants) may have led to this result.

VI. CONCLUSION AND LIMITATIONS

A. Conclusions

Targeting 490 students taking innovative entrepreneurship courses at four technological colleges and universities in Taiwan, a questionnaire survey was administered in this study. The structural equation modeling (SEM) was adopted to explore the correlations among entrepreneurial motivation, entrepreneurial self-efficacy, entrepreneurial intention, and entrepreneurial behavior. The conclusions drawn are as follows:

1. Entrepreneurial motivation significantly and positively affect entrepreneurial behavior. The study [34] have found in their study that the well-being or self-realization achieved by entrepreneurs during the entrepreneurial process can strengthen entrepreneurs' entrepreneurial motivation. Under such an entrepreneurial motivation, entrepreneurs still express positive emotion and persist on entrepreneurial behaviors even in the face of obstacles or plights are encountered during the entrepreneurial process. The study [35] said that entrepreneurial motivation contributes to entrepreneurs' passionate, creative, innovative, and adventurous spirit toward making a profit, which are important factors contributing to the success of entrepreneurial behaviors;
2. Entrepreneurial motivation has no significant impact on entrepreneurial intention. The study [8] shows that entrepreneurial motivation positively affects entrepreneurial intention. This finding is different from the conclusions of this study. The study [14] shows that entrepreneurial motivation produces no significant impact on entrepreneurial intention. This finding coincides with the conclusions in this study;
3. Entrepreneurial self-efficacy significantly and positively affects entrepreneurial intention. The study shows that entrepreneurial self-efficacy positively affects entrepreneurial intention [15] [16] [17]. The higher the entrepreneur's self-efficacy, the higher the creative and innovative spirit and the entrepreneur's full of confidence about entrepreneurship, the higher the success rate of entrepreneurial behavior;
4. Entrepreneurial self-efficacy significantly and positively affects interpleural behavior. Entrepreneurial education can enhance students' entrepreneurial self-efficacy, while perceived entrepreneurship is the goal to be accomplished. Therefore, entrepreneurial self-efficacy positively affects innovative behaviors [15] [22];
5. Entrepreneurial intention significantly and positively affects entrepreneurial behavior. According to the planned behavioral theory, the extent of personal perceived behavioral control captured by entrepreneurial self-efficacy is an important key factor of entrepreneurial behavior. Hence, emphasizing entrepreneurial intention can promote entrepreneurial behavior [16];
6. The impact of entrepreneurial self-efficacy on entrepreneurial behaviors is far greater than that of entrepreneurial intention on entrepreneurial behavior. The planned behavioral theory of [37] emphasizes on the importance of the positive impact of entrepreneurial intention

on entrepreneurial behavior. However, this study has found that the impact of entrepreneurial self-efficacy on entrepreneurial behavior (0.525***) is far greater than that of entrepreneurial intention on entrepreneurial behavior (0.113*). Compared to the research results generated with Ajzen's planned behavior theory as the reference, the results in this study obviously are different. The results are worthy of further relevant research by follow-up researchers.

B. Limitations

Despite this study's contribution to literatures on entrepreneurial intention and entrepreneurial behavior, there are certain limitations. First, the research participants investigated in this study only include four technological Colleges and universities with better performance in innovative entrepreneurship education. Different research results may be obtained by expanding the survey scope and by incorporating data of students from other technological Colleges and universities. Secondly, the research participants are students taking innovative entrepreneurship courses. However, the consistency of the innovative entrepreneurship courses is not defined in this study. Whether the teaching results of colleges adopting different innovative entrepreneurship course materials led to disparities in research results are pending discussion in follow-up studies.

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