Factors Related to Entrepreneurial Intention Among Engineering and Technology Undergraduates in Thailand: A Confirmatory Factor Analysis

Piyanan Wongtaweelat, King Mongkut's University of Technology Thonburi, Thailand
Tanes Tanitteerapan, King Mongkut's University of Technology Thonburi, Thailand
Mongkhon Narmluk, King Mongkut's University of Technology Thonburi, Thailand
Sirimonpak Suwannakhun, King Mongkut's University of Technology Thonburi, Thailand

The Asian Conference on Education 2024
Official Conference Proceedings

Abstract
The purpose of this research paper is to explore the factors related to entrepreneurial intention of undergraduate engineering and technology students in Thailand. The sample group consisted of 420 valid questionnaires from final-year bachelor's degree students in engineering and technology from 7 public and private universities. The research tool was a questionnaire on students' opinions regarding various factors, including attitudes, self-efficacy, social norms, entrepreneurial network relations, and entrepreneurship policies that promote entrepreneurial intention to become entrepreneurs. The conceptual framework was based on the Theory of Planned Behavior (Ajzen, 1991). Data analysis used first- and second-order Confirmatory Factor Analysis. The results showed that all five factors positively and significantly affect students' entrepreneurial intentions at a good level, with CFI=1.00, NFI=0.99, and GFI=0.97. Component weights were statistically significant at the .01 level in all aspects, ranging from .84 to .95, indicating that all 5 components are statistically significant. Factors related to entrepreneurial intention, from most to least influential, are self-efficacy (0.95), entrepreneurial network relationships (0.90), social norms (0.85), and entrepreneurship policy and attitude, both equally at (0.84). The research found that students tend to view various situations as good opportunities to start their own new businesses and are confident that they have sufficient knowledge to start their own new businesses. As a result, this research can be used to revise university curricula and serve as a guide to develop and promote entrepreneurship for engineering students after graduation.

Keywords: Entrepreneurial Intention, Engineering and Technology Undergraduates, Confirmatory Factor Analysis (CFA)

Introduction

The world is facing many business crises. This situation made many external factors effected to Thailand. Such as: The COVID-19 pandemic, the ongoing Russia-Ukraine conflict, the Israel-Hamas war, and the escalating US-China trade tensions. These interconnected events have precipitated significant market disruptions, characterized by product oversupply and monetary inflation. The World Bank Group (2024) reports a marginal decline in global GDP, reducing projections from 2.6% to 2.4% in 2024, underscoring the pervasive economic uncertainty. At the same time, many internal factors also affect in Thailand, such as: Data from the Department of Industrial Works (2024) reports that in 2023, 1,377 factories closed (averaging 111 closures per month), and in the first five months of 2024, over 567 closures have been recorded (averaging 113 per month). Additionally, the National Statistical Office (2024) reports that in the first quarter of 2024, the unemployment rate among recent graduates reached 1.67%, or approximately 410,000 individuals, reflecting a mismatch between graduate skills and labor market demands. In this context, promoting entrepreneurship, particularly among undergraduate students in engineering and technology fields, becomes a crucial strategy for economic recovery and growth, as this group has high potential for creating innovations and new technology businesses (Maresch et al., 2016). This aligns with the recommendations of the National Higher Education, Science, Research and Innovation Policy Council (2021), which identifies entrepreneurship promotion as a key strategy for driving the country's economy.

In Thailand, studying in factors affecting entrepreneurial intentions among engineering and technology students remains limited (Luekitinun et al., 2023; Meechai & Chantuk, 2022). Most research has focused on students across all disciplines, particularly business administration, with fewer studies on engineering students (Viyaporn & Thongprasert, 2022). Previous research has found that engineering students typically possess strong technical knowledge but lack entrepreneurial skills and intentions, largely due to an education system that emphasizes academics over business creativity and inspiration (Asawapiboon & Toart, 2019; Piperopoulos & Dimov, 2015). However, the effectiveness of curriculum programs in fostering entrepreneurial intentions, especially among engineering and technology students, remains unclear (Setiawan, 2022). There is also a lack of empirical data that can be used for appropriate policymaking and curriculum design (Wongsupachat et al., 2018). The Office of the Education Council (ONEC, 2021) reports that the evaluation of approaches to promote entrepreneurial intentions among undergraduate students is not yet systematic. Research on entrepreneurial motivation among engineering students in Asia, compared to other fields, shows that only 15-20% of engineering students are likely to become entrepreneurs (Pan et al., 2024). Furthermore, a research study conducted by the Enterprise Incubation Center at King Mongkut's University of Technology Thonburi in 2022 found that more than 70 percent of engineering students participating in the technology business incubation program felt they lacked confidence in applying their engineering knowledge to business creation (Enterprise Incubation Center, King Mongkut's University of Technology Thonburi, 2022).

This research is significant in several dimensions. The findings will enhance understanding of factors influencing Thai students' entrepreneurial intentions, particularly in the context of engineering and technology fields, which have unique characteristics different from other disciplines (Barba-Sánchez & Atienza-Sahuquillo, 2018). The research findings will benefit educational institutions in developing effective entrepreneurship promotion curricula and activities (Nabi et al., 2017) and assist government agencies establish policies and support measures that align with these students' needs and motivations (Souitaris et al., 2007).

Furthermore, the research can align with government policies promoting young entrepreneurs, as evidenced in Thailand's Startup Promotion Plan 2016-2021 (National Innovation Agency, 2016), which focuses on developing the country's startup ecosystem. Additionally, the research also aligns with the National Strategy 2018-2037 in promoting student entrepreneurs, particularly in engineering and technology, to increase the number of tech startups, which are crucial mechanisms for creating innovation and driving economic growth (Office of the National Economic and Social Development Council, 2023).

Related Work

This research uses Ajzen's Theory of Planned Behavior (TPB) from 1991 as its theoretical foundation. It is a theory that explores the connection between attitudes and behaviors, aiming to predict how individuals might engage in specific behaviors by measuring beliefs, attitudes, and intentions. The theory was developed from the Theory of Reasoned Action (TRA) and builds upon entrepreneurial intention research by Liñán, Chen, Ajzen, Krueger, Reilly, and Carsrud. The study examines various factors that influence entrepreneurial intentions among engineering students, including: 1. Attitudes, 2. Self-Efficacy, 3. Social norms, 4. Entrepreneurial network relationships and 5 Entrepreneurship policies. This theoretical framework draws from multiple scholarly sources, including works by Ajzen (1991), Liñán and Chen (2009), Schlaegel and Koenig (2014), Krittakorn Sahakijpicharn (2017), Luo Xiaojing and Huang Xuefei (2018), Barba-Sánchez, V., & Atienza-Sahuquillo, C. (2018), Zhang and colleagues (2022), Nie Yifan (2023), Pan and colleagues (2024), and Asee (2024).

Conceptual Framework

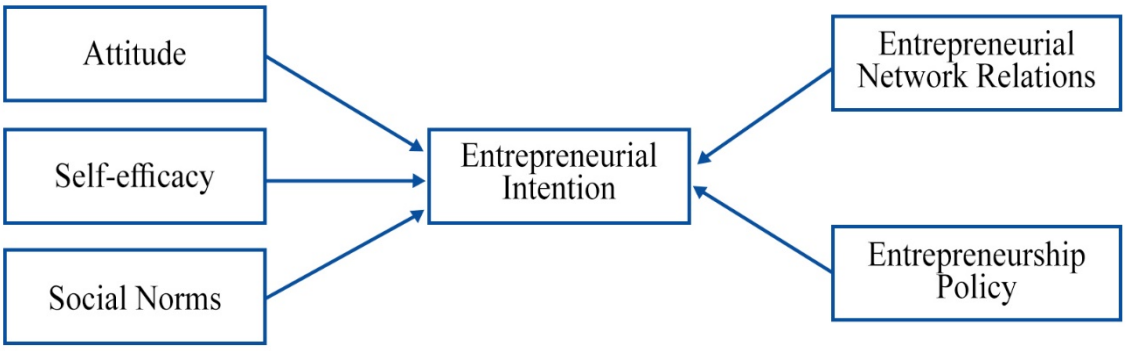

Figure 1: The Factors Related to Entrepreneur Intention as Adapted From Ajzen (1991), Liñán and Chen (2009), Krittakorn Sahakijpicharn (2017), and Nie Yifan (2023)

Figure 1 illustrates the research framework, which is based on the Theory of Planned Behavior (TPB) established by Ajzen (1991). A review of the literature reveals that TPB is widely accepted for studying students' entrepreneurial intentions, demonstrating superior predictive accuracy compared to the Theory of Reasoned Action (Basu, 2010; Chowdhury et al., 2012; Solesvik, 2013; Zapkau et al., 2015; Nie, 2023). The theory has been successfully applied in diverse contexts, including both developed and developing countries, such as Thailand (Iakovleva et al., 2011; Poolsawat, 2020). Moreover, previous research highlights that business network relationships and entrepreneurship policies play a significant role in shaping students' entrepreneurial intentions (Cui, 2022; Sahakijpicharn, 2017; Zaefarian et

al., 2017). Therefore, this study adopts Ajzen's (1991) TPB as the primary conceptual framework, focusing on the influences of attitudes, self-efficacy, social norms, entrepreneurial network relationships, and entrepreneurship policies on the entrepreneurial intentions of engineering students (Liñán & Chen, 2009; Nie, 2023; Sahakijpicharn, 2017).

Research Objectives

a. The objective of this study is to examine the factors influencing attitudes, self-efficacy, social norms, entrepreneurial network relations, and entrepreneurship policy related to entrepreneurial intention among engineering and technology undergraduates in Thailand.
b. It aims to explore the correlation between behaviors and the intention to foster entrepreneurship among these students, utilizing Confirmatory Factor Analysis.

Research Methodology

The Research Methodology Design

This study used quantitative research and conducted a structural validity analysis using Confirmatory Factor Analysis (CFA), including First and Second-Order CFA, to validate the measurement model of five factors including attitudes, self-efficacy, social norms, entrepreneurial network relations, and entrepreneurship policies to entrepreneurial intention among engineering and technology undergraduates in Thailand and ensure its alignment with empirical data.

Population and Sample Group

The population comprises students from seven universities in Thailand. The sample group consists of 420 volunteer fourth-year undergraduate engineering students enrolled in the first semester of the 2024 academic year.

Research Instruments

The research employed a self-administered questionnaire distributed via Line and Google Form, comprising 22 observable variables validated by three experts through the Index of Item-Objective Congruence (IOC) and approved by the Institutional Review Board (IRB) under Human Research Ethics Protocol Number: KMUTT-IRB-COE-2024-144. Each question was assessed using a Likert scale ranging from "Strongly Disagree" (1 score) to "Strongly Agree" (5 scores).

Data Analysis

The analysis involves processing survey data using the LISREL program to determine the Cronbach's alpha coefficient, percentage values, frequency (f), mean ($\bar{x}$), and standard deviation (S.D.). Data collection is carried out alongside the application of both First and Second-Order Confirmatory Factor Analyses (CFA) to evaluate the conformity of the measurement model with the empirical data. The model's fit is assessed based on Conformance Index values, including Chi-square (χ^2), P-value, χ^2/df, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Tucker-Lewis Index (TLI) or Non-Normed

Fit Index (NNFI), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).

Data Symbols Representative

In this study, the research analysis involved 22 observable variables across five key factors, with their corresponding symbols as follows: Attitude (ATD Y1-Y5), Self-Efficacy (SEF Y6-Y10), Social Norm (SCN Y11-Y14), Entrepreneurial Network Relations (ENR Y15-Y18), and Entrepreneurship Policy (EPL Y19-Y22).

Results of Correlation Coefficient Analysis

Table 1: Correlation Values of Observable Variables Comprising Entrepreneurial Intention Among Undergraduate Students in Engineering and Technology Fields in Thailand

Variables	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22
Y1	1																					
Y2	.531**	1																				
Y3	.425**	.501**	1																			
Y4	.384**	.438**	.498**	1																		
Y5	.337**	.470**	.467**	.564**	1																	
Y6	.341**	.456**	.426**	.486**	.490**	1																
Y7	.316**	.427**	.399**	.415**	.456**	.518**	1															
Y8	.314**	.402**	.376**	.364**	.322**	.428**	.466**	1														
Y9	.303**	.335**	.389**	.328**	.297**	.341**	.401**	.471**	1													
Y10	.222**	.346**	.413**	.354**	.371**	.417**	.411**	.458**	.532**	1												
Y11	.319**	.424**	.373**	.351**	.346**	.396**	.397**	.417**	.437**	.516**	1											
Y12	.248**	.266**	.197**	.318**	.267**	.272**	.280**	.322**	.416**	.390**	.423**	1										
Y13	.213**	.153**	.235**	.183**	.139**	.177**	.172**	.211**	.289**	.291**	.333**	.232**	1									
Y14	.155**	.154**	.275**	.222**	.201**	.177**	.184**	.121*	.306**	.235**	.141**	.113*	.282**	1								
Y15	.405**	.461**	.456**	.408**	.346**	.496**	.417**	.438**	.319**	.382**	.373**	.271**	.255**	.274**	1							
Y16	.297**	.409**	.436**	.293**	.363**	.412**	.399**	.439**	.348**	.444**	.415**	.245**	.293**	.269**	.605**	1						
Y17	.367**	.372**	.496**	.377**	.351**	.394**	.413**	.427**	.387**	.473**	.384**	.303**	.223**	.304**	.558**	.540**	1					
Y18	.267**	.330**	.350**	.323**	.294**	.326**	.341**	.416**	.412**	.485**	.400**	.329**	.267**	.253**	.370**	.412**	.486**	1				
Y19	.245**	.284**	.304**	.364**	.252**	.260**	.342**	.351**	.399**	.356**	.327**	.283**	.299**	.421**	.381**	.378**	.442**	.495**	1			
Y20	.291**	.354**	.371**	.341**	.306**	.367**	.262**	.329**	.430**	.469**	.415**	.281**	.313**	.317**	.395**	.444**	.396**	.488**	.560**	1		
Y21	.278**	.352**	.325**	.400**	.355**	.421**	.403**	.373**	.370**	.428**	.377**	.338**	.331**	.282**	.419**	.460**	.440**	.471**	.572**	.596**	1	
Y22	.257**	.346**	.363**	.332**	.338**	.358**	.331**	.273**	.394**	.383**	.314**	.238**	.300**	.367**	.435**	.459**	.482**	.468**	.516**	.537**	.565**	1
Mean	4.18	4.10	4.10	4.15	4.23	4.30	4.28	4.09	4.02	4.16	4.08	4.08	4.02	3.89	4.20	4.20	4.16	4.00	3.88	4.05	4.09	4.07
S.D.	0.73	0.77	0.81	0.87	0.77	0.69	0.74	0.79	0.76	0.75	0.74	0.81	0.92	0.98	0.74	0.76	0.79	0.85	0.83	0.80	0.79	0.81

KMO : Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .941

Bartlett's Test of Sphericity = 4012.691, p = .000, df = 231

*p < .05, **p < .01

According to Table 1, the result showed that, the Pearson correlation coefficients among 22 observed variables across 5 components range from 0.113 to 0.596, all significant at the .01 level. The results of Bartlett's Test of Sphericity yielded a chi-square χ^2 equal to 4012.691 ($p<.001$). The Kaiser-Meyer-Olkin (KMO) equal to .941, therefor all data and indicating of the variables in this dataset are suitability for confirmatory factor analysis (CFA).

Result of Confirmatory Factor Analysis (CFA)

Result of CFA 1st Order

Table 2: CFA 1st Order for Attitude Towards Entrepreneurship

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 1st Order Analysis				
1. Attitude				
ATD Y1	1.00	.56	<------>	.31
ATD Y2	1.22 (.11)	.68	11.33**	.46
ATD Y3	1.38 (.13)	.74	10.28**	.54
ATD Y4	1.19 (.12)	.66	9.64**	.44
ATD Y5	1.10 (.12)	.62	9.26**	.38

In Table.2, all indicators were statistically significant at the .01 level. Attitude components towards entrepreneurship elements ranged from of 31.00-54.00%. The most significant observed variables were "I will start my own new business because it is fun and challenging" (ATD Y3), followed by "I find it attractive to have my own new business" (ATD Y2).

Table 3: CFA 1st Order for Self-Efficacy Towards Entrepreneurship

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 1st Order Analysis				
2. Self-Efficacy				
SEF Y6	1.00	.62	<------>	.38
SEF Y7	1.01 (.08)	.62	11.94**	.39
SEF Y8	1.09 (.10)	.67	11.22**	.45
SEF Y9	1.11 (.10)	.69	10.88**	.48
SEF Y10	1.13 (.10)	.70	11.59**	.49

In Table 3, all indicators were statistically significant at the .01 level. Self-Efficacy towards entrepreneurship elements ranged from 38 percent to 49 percent. The most significant observable variable was "I look for great situations and opportunities to start my own business" (SEF Y10), followed by "I believe I have enough knowledge to be an entrepreneur" (SEF Y9).

Table 4: CFA 1st Order for Social Norms Towards Entrepreneurship

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 1st Order Analysis				
3. Social Norms				
SCN Y11	1.00	.73	<------>	.53
SCN Y12	.76 (.08)	.56	9.48**	.31
SCN Y13	.65 (.08)	.47	8.39**	.22
SCN Y14	.68 (.09)	.49	7.56**	.24

In Table 4, all indicators were statistically significant at the .01 level. Social Norms towards entrepreneurship elements ranged from 22.00 percent to 53.00 percent. The most significant observable variable was "My important person is ready to support and encourage me in starting my own new business" (SCN Y11), followed by "My important persons often speak positively about running my own business being good" (SCN Y12).

Table 5: CFA 1st Order for Entrepreneurial Network Relation Towards Entrepreneurship

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 1st Order Analysis				
4. Entrepreneurial Network Relation				
ENR Y15	1.00	.76	<------>	.58
ENR Y16	1.01 (.07)	.77	15.13**	.59
ENR Y17	.93 (.07)	.71	14.28**	.50
ENR Y18	.93 (.08)	.71	12.13**	.50

In Table 5, all indicators were statistically significant at the .01 level. Entrepreneurial Network Relation elements ranged from 50.00 percent to 59.00 percent. The most significant observable variables were: "Building relationships with entrepreneurial networks gave me the confidence to start my own business" (ENR Y16), followed by "Building relationships with an entrepreneurial network was an important factor in starting my business" (ENR Y15).

Table 6: CFA 1st Order for Entrepreneurship Policy Towards Entrepreneurship

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 1st Order Analysis				
5. Entrepreneurship Policy				
EPL Y19	1.00	.71	<------>	.50
EPL Y20	1.08 (.08)	.76	14.26**	.58
EPL Y21	1.11 (.08)	.78	14.61**	.61
EPL Y22	1.01 (.08)	.71	13.40**	.51

In Table 6, all indicators were statistically significant at the .01 level. Entrepreneurship policy towards entrepreneurship elements ranged from 50.00 percent to 61.00 percent. The most significant observable variables were: "The policy of promoting entrepreneurship by supporting free vocational training responds to my intention to start a new business" (EPL Y21), followed by "The policy of promoting entrepreneurship by supporting low-interest rates made me think that I could start a new business" (EPL Y20).

From the above discussion, it can be concluded that all indicators developed in this research for the components of entrepreneurial intention among undergraduate students in engineering and technology fields in Thailand are statistically significant at the .01 level. These indicators have positive factor loadings, which means that higher scores on these indicators correspond to higher entrepreneurial intentions among the students.

Result of CFA 2nd Order

Table 7: The Results of CFA Second Order in the Entrepreneurial Intention of Undergraduate Engineering and Technology Students in Thailand

Variable	Weight of all the indicators		t	r^2
	b (SE)	β		
CFA 2nd Order Analysis				
Attitude	.47 (.04)	.84	10.38**	.71
Self-Ef	.59 (.05)	.95	12.80**	.91
Soc-Norm	.61 (.05)	.85	13.51**	.72
Net-Rel	.69 (.04)	.90	15.70**	.82
Policy	.59 (.04)	.84	13.60**	.71
Chi-square=164.00, df=160, p-value=.40, χ^2/df=1.03, GFI=.97, AGFI=.95, NFI=.99, TLI Or NNFI=1.00, CFI=1.00, RMSEA=.008, RMR=.030, SRMR=.030				

Correlation matrix observed variables	Attitude	Self-Ef	Soc-Norm	Net-Rel	Policy	**Ent-Intention**
Attitude	1.00					
Self-Ef	.80	1.00				
Soc-Norm	.71	.81	1.00			
Net-Rel	.76	.86	.76	1.00		
Policy	.71	.80	.71	.76	1.00	
Ent-Intention	.84	.95	.85	.90	.84	1.00

** p < .01, The numbers in parentheses are the standard tolerances.
<------> No value is reported SE and T because it is a mandatory parameter (constrained parameter)

From Table 7, the results of the CFA 2nd Order show that the Chi-square value is 164.00, with a probability value of .40 at 160 degrees of freedom (df = 160). The ratio of Chi-square to degrees of freedom is 1.03, which is less than 2. This means that the Chi-square value is not significantly different from zero at the .05 statistical level, indicating acceptance of the null hypothesis that the measurement model is consistent with the empirical data. The Goodness of Fit Index (GFI) is .97, the Adjusted Goodness of Fit Index (AGFI) is .95, the Normed Fit Index (NFI) is .99, the Tucker-Lewis Index (TLI) or Non-Normed Fit Index (NNFI) is 1.00, and the Comparative Fit Index (CFI) is 1.00. The Root Mean Square Error of Approximation (RMSEA) is .008, the Root Mean Square Residual (RMR) is .030, and the Standardized Root Mean Square Residual (SRMR) is .030.

The results of CFA 2nd Order of entrepreneurial intention revealed that the five components had standardized factor loadings ranging from .84 to .95, statistically significant at the .01 level. Self-efficacy demonstrated the highest factor loading, followed by entrepreneurial network relations and social norms. Attitude towards entrepreneurship and entrepreneurship policy had equal loadings. The shared variance in explaining components was 91.00%, 82.00%, 72.00%, and 71.00%, respectively. Additionally, the five components exhibited high positive interrelationships (r=.71 to .95), indicating they are not independent but interconnected, as detailed in the second-order confirmatory factor analysis model in Figure 2.

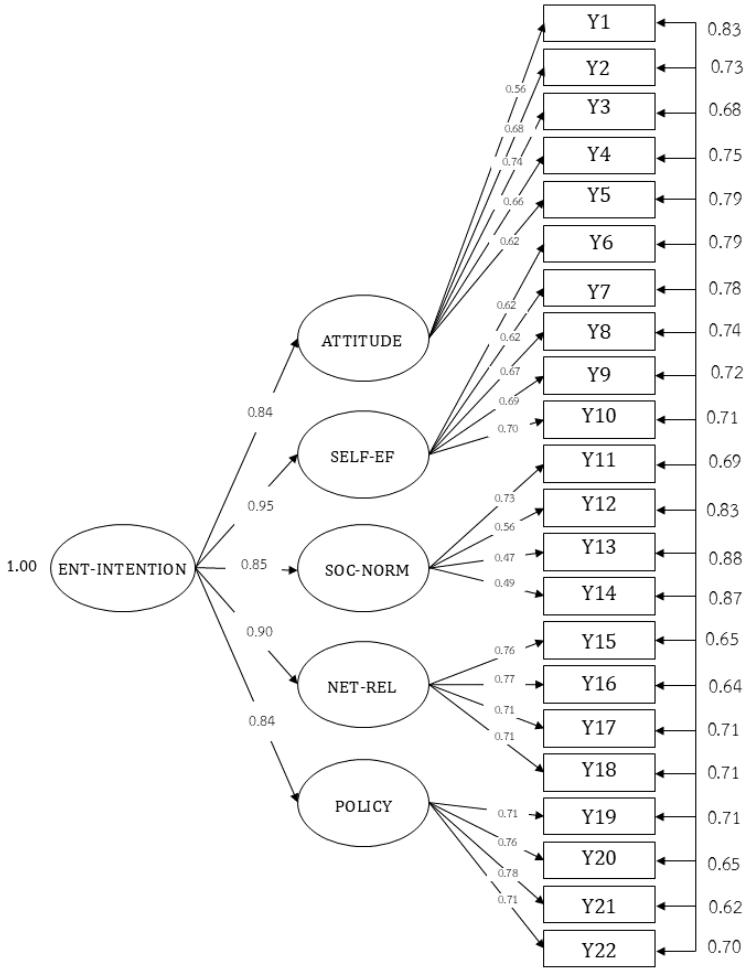

Figure 2: Results of the CFA Second Order Analysis Model of Entrepreneurial Intention for Undergraduate Engineering and Technology Students in Thailand

Discussion and Conclusion

From the Figure 2, the results showed that the confirmatory factor analysis model, which demonstrates five components including: 1. Attitude. 2. Self-efficacy. 3. Social norms. 4. Entrepreneurial network relations and 5. Entrepreneurship policies had standardized factor loadings between .84 and .95, statistically significant at the .01 level. Indicating that these five components are statistically significant factors of entrepreneurial intention. from most to least influential are self-efficacy (0.95), entrepreneurial network relationships (0.90), social norms (0.85), and entrepreneurship policy and attitude, both equally at (0.84) respectively. This analysis demonstrates that all five factors are significantly related and have substantial weight in determining the entrepreneurial intention of engineering students in Thailand.

Therefore, this research developed a measurement tool that demonstrates validity and reliability, confirmed through by both 1st and 2nd order confirmatory factor analysis. The tool can be applied to curriculum development, teaching and learning management, and entrepreneurial support policy planning for engineering and technology students in Thailand. This aims to effectively promote entrepreneurship, which is a crucial index for the country's economic and innovation development.

Finding

The confirmatory factor analysis model, which demonstrates the relationship between components of entrepreneurial intention among undergraduate students in engineering and technology fields in Thailand, reveals that the self-efficacy component has the highest statistical significance on entrepreneurial intention. The observed variables with the highest importance weights are: “I often look at various situations and think of good opportunities to start my own new business” (SEF Y10) “I believe I have sufficient knowledge to start my own new business” (SEF Y9) and “I am confident that I can be a good new business entrepreneur” (SEF Y8) This research result reflects that this group of students has a positive attitude and high confidence towards entrepreneurship, especially among engineering students. These new findings can be applied to improve and develop more effective entrepreneurship curricula. Moreover, it can also serve as a foundation for future research and development of entrepreneurship training programs to enhance students' potential to become successful entrepreneurs.

References

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.

Asawapiboon, T., & Toach, R. (2019). A study of entrepreneurial intention among engineering students in Thailand. Thammasat University Academic Journal, 13(1), 73–85.

Asee. (2024). Proceedings of the Annual Conference of the American Society for Engineering Education. Washington, DC: American Society for Engineering Education.

Barba-Sánchez, V., & Atienza-Sahuquillo, C. (2018). Entrepreneurial intention among engineering students: The role of entrepreneurship education. European Research on Management and Business Economics, 24(1), 53–61.

Basu, A. (2010). The entrepreneur's selection and performance: A representative review. Journal of Economic Literature, 48(4), 1103–1107.

Chowdhury, F., Audretsch, D. B., & Belitski, M. (2012). Institutions and entrepreneurship quality. Entrepreneurship Theory and Practice, 37(5), 1031–1044.

Cui, J. (2022). Entrepreneurial intention and influencing factors: A comprehensive review. International Journal of Entrepreneurial Behavior & Research, 28(6), 1345–1368.

The Department of Industrial Works. (2024). Annual report on factory closures in Thailand.

Enterprise Incubation Center, King Mongkut's University of Technology Thonburi. (2022). A study report on technology business incubation program. Bangkok, Thailand.

Fishbein, M., & Ajzen, I. (1975). Theory of reasoned action: Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Iakovleva, T., Kolvereid, L., & Stephan, U. (2011). Entrepreneurial intentions in developing and developed countries. Education + Training, 53(5), 353–370.

Krueger, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(5–6), 411–432.

Liñán, F., & Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. Entrepreneurship Theory and Practice, 33(3), 593–617.

Luekitinun, W., Saomuang, S., & Theerathanachai, K. (2023). Factors influencing entrepreneurial intention among engineering students in Bangkok. Journal of Management and Administration, 13(1), 95–110.

Luo, X., & Huang, X. (2018). College students' proactive personality and entrepreneurial intention: The chain mediating role of preemptive and preventive coping. Journal of Jilin Engineering Technology Normal College, 34(11), 15–18.

Maresch, D., Harms, R., Kailer, N., & Wimmer-Wurm, B. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. Technological Forecasting and Social Change, 104, 172–179.

Meechai, P., & Chanteuk, T. (2022). Guidelines for developing entrepreneurship among technology students: A case study of universities in the eastern region. Kanchanaburi Rajabhat University Academic Journal, 11(2), 154–169.

Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. Academy of Management Learning & Education, 16(2), 277–299.

National Innovation Agency. (2016). Startup promotion plan 2016–2021. Bangkok, Thailand.

The National Higher Education, Science, Research and Innovation Policy Council. (2021). National strategy for the promotion of entrepreneurship in higher education.

The National Statistical Office. (2024). Population employment survey report, Quarter 1: January–March 2024. Retrieved from http://www.nso.go.th

Nie, Y. (2023). A study on the effect of entrepreneurship education on college students' entrepreneurial intention: Mediated by entrepreneurial attitudes and moderated by entrepreneurial policies. Research Square. https://www.researchsquare.com

Office of National Economic and Social Development Council. (2023). The 13th national economic and social development plan (2023–2027).

Pan, C., Smith, J., & Chen, T. (2024). Factors influencing entrepreneurial intention among engineering students in Thailand. Journal of Entrepreneurial Education, 45(3), 234–250.

Piperopoulos, P., & Dimov, D. (2015). Entrepreneurial intentions among engineering students: An exploration of key factors. Journal of Engineering Education, 102(4), 506–525.

Poolsawat, T. (2020). Entrepreneurial intention among Thai students: A contextual analysis. Journal of Asian Business Studies, 14(3), 345–362.

Schlaegel, C., & Koenig, M. (2014). Determinants of entrepreneurial intent: A meta-analytic test and integration of competing models. Entrepreneurship Theory and Practice, 38(2), 291–332.

Setiawan, J. L. (2022). Examining entrepreneurial self-efficacy among students in Indonesia: Comparing engineering and business students. International Journal of Engineering Education, 38(2), 423–435.

Solesvik, M. Z. (2013). Entrepreneurial motivations and intentions: Investigating the role of education and policy. Education + Training, 55(3), 253–271.

Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programs raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration, and resources. Journal of Business Venturing, 22(4), 566–591.

Van der Geer, J., Hanraads, J. A. J., & Lupton, R. A. (2010). The art of writing a scientific article. Journal of Scientific Communications, 163, 51–59.

Viyaaphorn, S., & Thongprasert, N. (2022). An analytical study of research related to entrepreneurial intention among students in Thailand. Khon Kaen University Business Administration and Accounting Journal, 6(2), 85–102.

Wongsupachat, A., Sathirathai, S., & Tansuhaj, P. (2018). Entrepreneurial intention of Thai students: A case study of business and engineering students in Thailand. Journal of Economics, Business and Management, 6(2), 53–57.

The World Bank Group. (2024). Global economic outlook: Impact of the COVID-19 pandemic, conflicts, and trade tensions. Washington, DC.

Zapkau, F. D., Schwens, C., & Kabst, R. (2015). The role of prior entrepreneurial exposure in the entrepreneurial process: A review of the literature. Management Review Quarterly, 65(4), 293–320.

Zhang, H. P., Regmi, R., Zhang, Z., & Pan, C. C. (2022). Entrepreneurial intention among engineering students: A cross-cultural investigation. Global Journal of Engineering Education, 24(1), 30–38.

Contact email: Piyanan.wong@kmutt.ac.th