

The Components of Entrepreneurial Orientation of Higher Education Student: A Systematic Literature Review

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Abstract

The objective of this article is to synthesize the components of entrepreneurial orientation of higher education student using a systematic literature review methodology. Information was sought by searching the following electronic journal databases: 1) Eric (Education Resources Information Center), 2) Science Direct, 3) Scopus, and 4) Thai-Journal Citation Index Centre (TCI) covering publications from 2015 to 2023. The tool used in this systematic literature review consists of 3 parts: research screening form, critical appraisal form and data extraction table. Research selection is carried out by researchers and experts. Analyzing data by using descriptive statistics such as frequency, percentage, and summary analysis of content. The research results indicate that out of a total of 1,205 studies identified, only 13 met the criteria. The researchers selected the components of entrepreneurial orientation of higher education student level that occurred with a frequency of three or more, constituting 25 percent of the total frequency. In conclusion, the components of entrepreneurial orientation of higher education student consists of 5 elements, ranked from highest to least frequent, as follows: 1) Risk Taking, 2) Innovativeness, 3) Proactiveness, 4) Autonomy, and 5) Competitive Aggressiveness.

Keywords: entrepreneurial orientation, entrepreneur, systematic literature review

1. Introduction

More than three decades ago, entrepreneurial orientation became one of the most studied theories in research related to entrepreneurship and management (Amin et al., 2016; Covin and Wales, 2019). This is because entrepreneurial orientation affects work efficiency, generating profits, and fostering growth at the organizational level (Otache & Mahmood, 2015). Entrepreneurial orientation encourages entrepreneurial behavior that promotes the development of ideas, new mindsets, and processes suitable for the current environment. They also dare to take risks in business operations to create economic activities (Hooi et al., 2016). This notion aligns with Semrau et al. (2016), who argue that entrepreneurial orientation serves as motivators for innovation. They find systematic ways to solve problems to become leaders in their respective businesses. Moreover, entrepreneurial orientation helps to run the business smoothly, facilitating decision-making and conducting business more effectively. These orientations are manifested in the way business is conducted, including the courage to take risks, creativity, and proactivity (Irwin et al., 2018).

At present, many researchers have proposed various ideas related to entrepreneurial orientation. Research conducted abroad, for example, a study by Masa'deh et al. (2018), has suggested that entrepreneurial orientation must encompass nine components as follows: 1) open to new business ideas and continuously seeking innovation, 2) recognize the importance of innovation and creation at the organizational level, 3) succeed in product development or improvement, 4) focus on investing in new products, services, and business operations, 5) prioritize staying ahead of competitors in business endeavors, 6) strive to become a market leader over competitors, 7) remain vigilant to seize arising opportunities, 8) recognize the necessity of successfully achieving organizational goals, 9) demonstrate courage in taking risks amidst uncertainty. This contrasts with Triyono et al.'s (2023) research, which suggests that entrepreneurial orientation consist of three components: innovativeness, proactiveness, and risk-taking. Domestic research, exemplified by the work of Vashararangi (2017), suggests that entrepreneurial orientation comprise nine elements as follows: 1) goals, 2) determination, 3) humility, 4) leadership, 5) courage to take risks, 6) working techniques, 7) creative ideas, 8) entrepreneurial desire, and 9) ability to manage. Additionally, there is the concept proposed by Glaharn and Saiyakul (2020),

suggesting that entrepreneurial orientation encompass four traits: 1) possessing inner characteristics and individuality, 2) demonstrating creativity and perseverance, 3) setting goals, and 4) exhibiting morality and a willingness to accept risks, among others.

Based on the preceding information, it is evident that the composition of entrepreneurial orientation varies both domestically and internationally. Therefore, the researchers aimed to identify the elements of entrepreneurial orientation of higher education student through a systematic literature review. This study also benefits government agencies, the private sector, and educational institutions, as they can apply this knowledge as a guideline for entrepreneurial development. Moreover, it contributes to the cultivation of modern entrepreneurs, aligning with the master plan outlined in the National Strategy, Issue (08). The aim of this plan is to foster and develop entrepreneurs at all levels, transforming them into new-age entrepreneurs who play a more significant role in the economic system (Office of the National Economic and Social Development Council, 2018).

2. Method

2.1 Research Methodology

This study uses a systematic literature review to conduct a comprehensive search of published literature from databases and perform manual screening for relevance. The chosen literature is then analyzed using content analysis to derive insights into aspects of entrepreneurial orientation. The steps are outlined as follows:

Table 1. Table of Inclusion Criteria and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1) search for and retrieve the complete version from a database published from 2015 to 2023.	1) The article lacks elements pertaining to entrepreneurial orientation in its content.
2) Attributes of research articles subjected to expert review (Peer Review)	2) The study did not utilize a population consisting of students at the higher education level.
3) Research articles in Thai and English only.	
4) The title and abstract of the article align with the research objective, which focuses on entrepreneurial orientation.	
5) The article's content delineates the elements comprising entrepreneurial orientation.	
6) The study population: Higher education students.	

The researcher searched for studies using the keyword "Entrepreneurial Orientation" in the following databases: 1) Education Resources Information Center (ERIC), 2) Science Direct, 3) Scopus, and 4) Thai-Journal Citation Index Centre (TCI). The search covered publications from 2015 to 2023 that were complete versions and peer-reviewed. This search resulted in a total of 1,250 studies. The researcher then filtered these studies based on title and abstract, excluding irrelevant ones, which reduced the number to 177. Studies that did not demonstrate the components of entrepreneurial orientation were further excluded, leaving 123 studies. Finally, studies that did not focus on higher education students as the study population were excluded, resulting in a final total of 13 studies. Refer to Figure 1 for details.

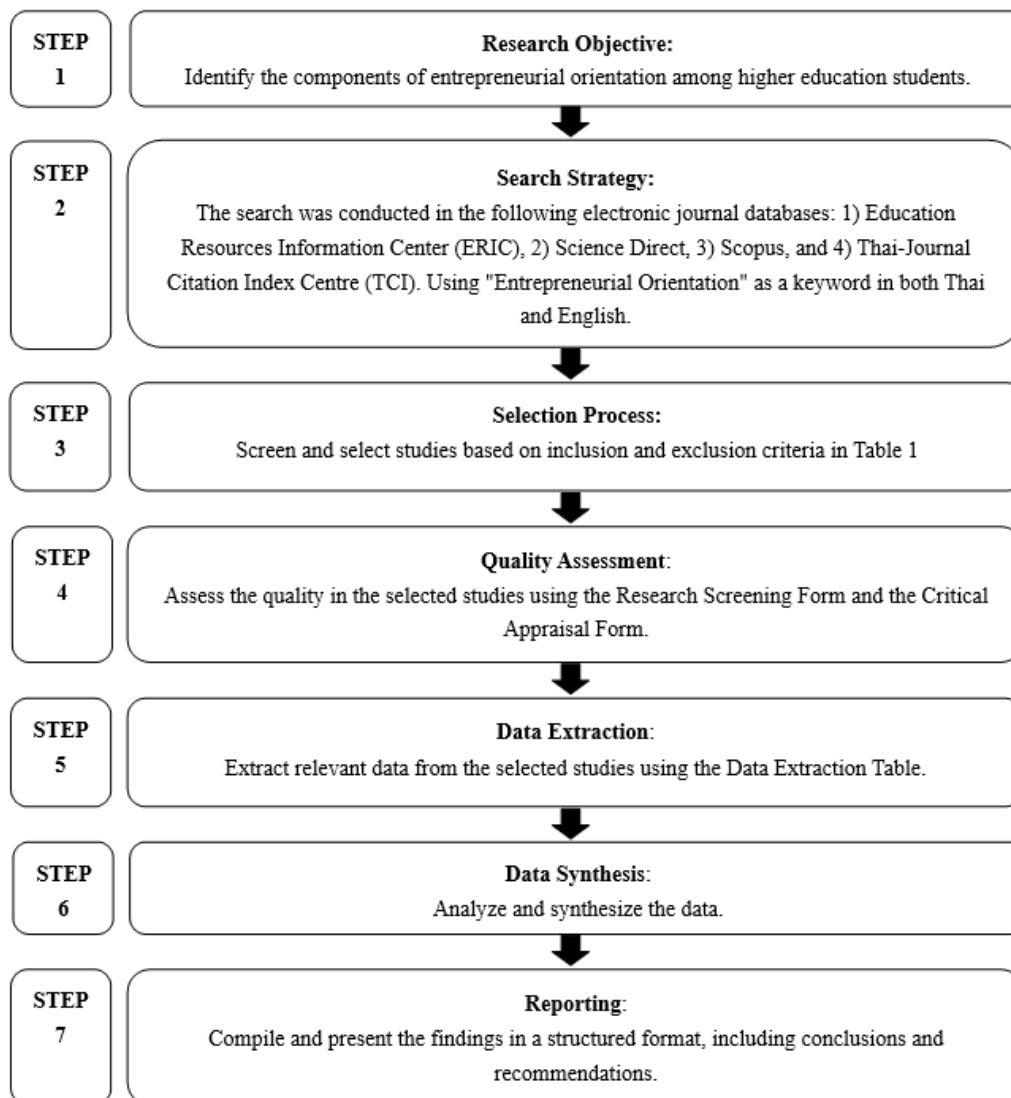


Figure 1. Selection Process

Selection Process “Entrepreneurial Orientation”					
A List	Eric	Science Direct	Scopus	TCI	Total
Research encompassing the content on entrepreneurial Orientation “Entrepreneurial Orientation” in title and abstract	57	455	538	155	1,205
B List	Eric	Science Direct	Scopus	TCI	Total
Research with titles and abstracts of entrepreneurial Orientation. “Entrepreneurial Orientation” in title, abstract and components of entrepreneurial orientation	14	46	59	58	177
C List	Eric	Science Direct	Scopus	TCI	Total
Research with a title, abstract, and demonstration of the components of entrepreneurial orientation. “Entrepreneurial Orientation” in title, abstract, components of entrepreneurial orientation and the study population	6	34	31	52	123
D List	Eric	Science Direct	Scopus	TCI	Total
Thoroughly screen and select articles that meet the criteria.	3	2	5	3	13

After obtaining the final total of 13 studies, the researcher conducts the research selection using the Research

Screening Form. This process is reviewed by an expert who independently evaluates the research alongside the researcher, ensuring that only studies meeting the selection criteria are chosen. Next, the Critical Appraisal Form is used to evaluate the research quality. Finally, the researcher thoroughly reads the full research papers to extract information consistent with the objectives of the systematic literature review. The data is recorded in the Data Extraction Table results form and verified for accuracy by cross-checking with entries made by an expert who has independently reviewed the papers. If discrepancies are found, a consultation is held to reach a mutual agreement on the recording.

2.2 Research Instruments

The systematic literature review in this study utilizes a tool comprising three parts:

- 1) Research Screening Form devised by the researchers, aligned with the selection criteria for research.
- 2) Critical Appraisal Form adapted from the Secretariat of the Education Council (2009) to ensure the selection of high-quality research.
- 3) Data Extraction Table, documenting researcher name, publication year, research title, objective, sample group, research method, findings, and components of entrepreneurial orientation.

2.3 Validation of Instruments

The researcher assessed the quality of the tools utilized in the study by submitting them to five experts for evaluation using the Item of Objective Congruence (IOC) index. A congruence index value of 0.87, meeting all criteria indicates that the tools align with the research objectives and are suitable for use in the study (Rovinelli & Hambleton, 1977).

2.4 Data Analysis

The researcher utilized descriptive statistics, including frequency, percentage, and content summary analysis.

3. Results

The search yielded 1,205 research studies from Thai and international databases published between 2015 and 2023. Among them, a total of 13 subjects met the criteria, representing 100 percent. These subjects were distributed across the following databases: 1) Eric, with 3 subjects meeting the criteria (23 percent); 2) ScienceDirect, with 2 subjects meeting the criteria (15 percent); 3) Scopus, with 5 subjects meeting the criteria (39 percent); and 4) TCI, with 3 subjects meeting the criteria (23 percent). Refer to Table 2 for details.

Table 2. Summary Table of Search Results

Databases	Quantity		Percent
	Search results	Met the criteria	
Eric	57	3	23
Science Direct	455	2	15
Scopus	538	5	39
TCI	155	3	23
Total	1,205	13	100

Table 3. Synthetic Table of Components of Entrepreneurial Orientation

The Components of Entrepreneurial Orientation	Nikitina et al. (2023)	Triyono et al. (2023)	Na-Allah and Ahmad (2022)	Puntapa and Trimetsoomtom (2022)	Himasen et al. (2022)	Wei-Loon et al. (2021)	Okreglicka et al. (2021)	Popov et al. (2019)	Gorostiaga et al. (2019)	Martins et al. (2018)	Vasharangi (2017)	Ngah et al. (2016)	Ismail et al. (2015)	Frequency
Innovativeness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	12
Proactiveness	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	11
Risk Taking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	13
Autonomy					✓		✓				✓			3
Competitive				✓	✓		✓		✓					4
Aggressiveness														
Achievement Orientation				✓					✓					2
Learning Orientation									✓					1
Self-Confident				✓										1
Passion for Learning				✓										1
Goals											✓			1
Determination											✓			1
Humility											✓			1
Leadership											✓			1
Working Techniques											✓			1
Creative Ideas											✓			1
Entrepreneurial Desire											✓			1

From the aforementioned synthetic Table 3, the researchers found that there are 16 components of entrepreneurial orientation among students at the higher education level, ordered from the highest frequency to the least frequent, as follows: 1) Risk Taking, 2) Innovativeness, 3) Proactiveness, 4) Competitive Aggressiveness, 5) Autonomy, 6) Achievement Orientation, 7) Learning Orientation, 8) Self-Confident, 9) Passion for Learning, 10) Goals, 11) Determination, 12) Humility, 13) Leadership, 14) Working Techniques, 15) Creative Ideas, 16) Entrepreneurial Desire.

The researchers selected the components of entrepreneurial orientation of higher education student level that occurred with a frequency of three or more, constituting 25 percent of the total frequency. In conclusion, the components of entrepreneurial orientation of higher education student consists of 5 elements, ranked from highest to least frequent, as follows: 1) Risk Taking, 2) Innovativeness, 3) Proactiveness, 4) Autonomy, 5) Competitive Aggressiveness.

4. Discussion

Through a study of the components of entrepreneurial orientation among students at the higher education level and by systematically reviewing the literature, the researchers found that three components of entrepreneurial orientation frequently utilized in educational context research are: Risk Taking, Innovativeness and Proactiveness. This is consistent with research by Ismail et al. (2015), Martins et al. (2018), Na-Allah and Ahmad (2022), Ngah et al. (2016), Popov et al. (2019), Loon Koe et al. (2021), Nikitina et al. (2023) and Triyono et al. (2023). Furthermore, the research conducted by Na-Allah and Ahmad (2022) found that these three components are individual-level factors that can affect the creation of businesses.

In subsequent research, Lumpkin and Dess (1996), as cited in Gorostiaga et al. (2019), added two more components of entrepreneurial orientation, namely Autonomy and Competitive Aggressiveness, which is consistent with the research of Okręglicka et al. (2021) and Sirima Snowsen et al. (2022).

From a systematic review of the literature, it was found that there are five components of entrepreneurial orientation as follows:

1) Risk Taking involves the bravery to act decisively, whether it involves investing in a novel, unfamiliar market, committing substantial financial or material resources to ventures with uncertain outcomes, or even borrowing significant sums. This courage illustrates a readiness and audacity to explore uncharted territories, reallocating ample resources for potentially unpredictable results. It necessitates the readiness to allocate resources even in the face of considerable risk of failure (Gorostiaga et al., 2019).

2) Innovativeness involves experimenting to develop fresh products, services, or technological methods. Being innovative reflects a willingness to contribute to crafting and experimenting with new offerings. Technology leadership entails pioneering the development and exploration of novel processes (Gorostiaga et al., 2019). Innovation may also entail employing creativity and experimentation to introduce new products or services, leveraging researched and developed technologies in innovative processes (Na-Allah and Ahmad, 2022). Embracing innovation means nurturing creativity in product or service creation, alongside undertaking experimental endeavors driven by cutting-edge technological processes and innovative offerings (Ismail et al., 2015; Himasen et al., 2022).

3) Proactiveness involves taking initiative, anticipating, and seeking new opportunities (Gorostiaga et al., 2019). In other words, it is forward-looking, involving the identification of opportunities to bring products or services to market ahead of competitors and taking timely action to meet future market demands (Na-Allah and Ahmad, 2022). Proactiveness includes identifying opportunities and forecasting demand, shaping and adapting the business environment, and proactively addressing competition by offering superior products and services. It manifests in various forms, including adopting an aggressive stance towards competitors and pursuing opportunities beneficial to the business. Proactivity also entails the ability to take initiative when needs arise and the willingness to initiate actions in response to competitors (Na-Allah and Ahmad, 2022).

4) Autonomy involves individuals or teams collaborating to share ideas or visions to achieve goals. It denotes the capacity to seek out and identify opportunities, as well as the ability to work independently. It is not constrained by organizational boundaries, enabling smooth and efficient investment in the business (Lumpkin and Dess, 1996, cited in Gorostiaga et al., 2019).

5) Competitive Aggressiveness involves challenging competitors or striving to outperform existing competitors in the market. Defeating competitors is a strategy for maintaining a strong market position, whether by intentionally entering the same market as a specified competitor or by undertaking new initiatives to capture market share or respond to competitors (Lumpkin and Dess, 1996, cited in Gorostiaga et al., 2019).

In conclusion, the components of entrepreneurial orientation of higher education student consists of 5 elements, ranked from highest to least frequent, as follows: 1) Risk Taking, 2) Innovativeness, 3) Proactiveness, 4) Autonomy, and 5) Competitive Aggressiveness.

It is now widely recognized that Government agencies, private sector organizations, and educational institutions are focused on expanding and enhancing educational initiatives to make entrepreneurship more effective. Their goal is to foster entrepreneurial orientation and impart knowledge of business concepts (Obschonka et al., 2017). This aligns with research by Martins and Perez (2020), which suggests that educational institutions should incorporate entrepreneurial orientation into curriculum design as a measurement tool. This approach aims to enhance knowledge and understanding of risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness. This method assists in preparing students for their careers and increase their self-awareness of strengths and weaknesses (Puntapa and Trimetsoomtorn, 2022). It also fosters essential traits that contribute to more successful business operations. Another crucial aspect is that educational institutions should offer necessary training and appropriate tools to teachers to motivate students and further enhance their entrepreneurial orientation (Himasen et al., 2022; Puntapa and Trimetsoomtorn, 2022).

5. Research Recommendation

5.1 Recommendations for Implementing Research Findings

Government agencies, private sector organizations, and educational institutions providing courses in entrepreneurial development can incorporate the identified entrepreneurial orientation from this study. Fostering entrepreneurial orientation requires structuring the learning process both inside and outside the classroom. This

can include organizing seminars and inviting successful business professionals to give lectures that provide knowledge, understanding, and inspiration. Moreover, field trips can introduce learners to real-world business opportunities, while business planning competitions enable them to uncover their potential through hands-on experience. These insights can serve as a blueprint for designing curricula focused on nurturing future entrepreneurs.

5.2 Recommendations for Future Research

Future research endeavors should contemplate enlarging the search database to encompass a broader sample size. Additionally, studies should extend their investigative scope by incorporating a diverse population, facilitating result comparisons to unveil potential differences.

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Authors contributions

Rinthida Denphitath was responsible for the initial drafting and writing of the article. Chintana Kanjanavisutt and Methinee Wongwanich Rumpagaporn provided guidance, feedback, and revisions throughout the writing process, contributing to the final of manuscript.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

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The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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Appendix

Data Extraction Table of The Components of Entrepreneurial Orientation.

The Researcher Names (Publication Year)	Research Title	Objective	Sample Group Research Method	Findings	Components of Entrepreneurial Orientation
Nikitina et al. (2023)	Individual entrepreneurial orientation: comparison of business and STEM students	The present study has been designed with the aim to determine whether there are differences in individual entrepreneurial orientation (IEO) between students, doing their major in business studies and the ones whose areas of study are science, technology, engineering, and mathematics (STEM).	Sample Group Business and STEM students in Latvia and Poland Research Method Quantitative Research	The yielded research results demonstrate that there are significant differences between business and STEM students when they analyze their IEO. It turned out that STEM students obtain significantly lower scores for risk-taking and innovation but higher for proactiveness. Additionally, it was detected that the chosen field of study affects students' perception of educational support, thus, influencing their innovation, proactiveness, and risk propensity characteristics.	Innovativeness Proactiveness Risk Taking
Triyono et al. (2023)	Examining the Mediating-Moderating Role of Entrepreneurial Orientation and Digital Competence on Entrepreneurial Intention in Vocational Education	This study examines the determination of the role of social and psychological capital, and entrepreneurial orientation on entrepreneurial intentions.	Sample Group 757 participants who were vocational education students Research Method Quantitative Research	Findings revealed that social and psychological capital, and entrepreneurial orientation (Innovativeness, Proactiveness, Risk Taking) play a significant role in entrepreneurial intentions. Entrepreneurial orientation plays a significant role in mediating the influence of social capital and psychological capital in determining intentions. Finally, digital competence can prove its moderating role significantly in its interaction with entrepreneurial orientation in determining intentions.	Innovativeness Proactiveness Risk Taking
Na-Allah and Ahmad (2022)	Entrepreneurial Orientation and Venture Creation in Nigerian Context: Assessing Mediating and Moderating	This study analyzed the mediating role of self-efficacy (SELF) and the moderating effect of entrepreneurial support (ENTSP) in relation to individual-level entrepreneurial	Sample Group 291 Nigerian graduates. Research Method	The result of partial least squares structural equation modeling (PLS-SEM) reveals that the indirect relationship between ILEO and VC through SELF was positive and significant but negatively moderated by	Innovativeness Proactiveness Risk Taking

	Roles of Self-Efficacy and Entrepreneurial Support among Graduates	orientation (ILEO; innovativeness, risk taking and proactiveness) and venture creation (VC) among Nigerian graduates.	Quantitative Research	ENTSP, implying that not all instances of ILEO will result in VC through SELF because ILEO can directly lead to VC. The finding also indicates ENTSP did not have an impact on strengthening the relationship between SELF and VC.	
Puntapa and Trimetsoomton (2022)	The Relationship Between Entrepreneurial Knowledge and Attitude and Entrepreneurial Orientations of Private Higher Education Institutions' Students in Bangkok.	This research aims to (1study the level of knowledge Attitude towards being an entrepreneur and entrepreneurial orientation of students at private higher education institutions in Bangkok (2Compare the entrepreneurial orientation of students at private higher education institutions Classified according to personal factors and (3study the relationship between knowledge Attitude towards being an entrepreneur with the entrepreneurial orientation of students at private higher education institutions	Sample Group 390 students at private higher education institutions in Bangkok Research Method Quantitative Research	The results of the research found that (1 students had knowledge Overall understanding and ability gained from education regarding entrepreneurship is at a high level. Overall attitude towards entrepreneurship is at the highest level. and has entrepreneurial orientation that consists of Innovativeness, Risk Taking, Competitive Aggressiveness, Achievement Orientation, Self-Confident and Passion for Learning is at a high level 2) students who have experience in working to earn their own income while studying and different mother's occupations It affects different entrepreneurial orientation and 3) knowledge about entrepreneurship and attitude towards entrepreneurship. There is a statistically significant relationship with entrepreneurial orientation. at the significance level of 0.05	Innovativeness Risk Taking Competitive Aggressiveness Achievement Orientation Self-Confident Passion for Learning
Himasen et al. (2022)	Confirmatory Factor Analysis of Entrepreneurship Characteristics of Undergraduate Students in the Three Southern Boarder Provinces	The objectives of this research article were to analyze the corroborating components of entrepreneurship characteristics of undergraduate students in the three southern border provinces	Sample Group 600 students pursuing a bachelor's degree in the three southern border provinces. Research Method Quantitative Research	The results show that the entrepreneurial characteristics of college students in the three southern provinces are composed of five parts, which have certain weights 0.71 to 0.91. The order of composition weight is: Competitive Aggressiveness, Risk Taking, Autonomy, Innovativeness and Proactiveness 0.91, 0.90, 0.87, 0.84 and 0.71. The consistency test and result analysis of the measurement model of college students' entrepreneurial characteristics in three southern provinces. Considering the chi-square value, it is equal to 2.97, the probability value (p) = 0.40 Under 3 degrees of freedom, the GFI value is 1.00 after correction, the harmony index (AGFI) is 0.99, and the benchmark consistency index (CFI) is 1.00 values The quadratic mean of the residual calculated in the form of standard score (SRMR) is 0.01 the square root of the estimated error (RMSEA) is 0.00	Innovativeness Proactiveness Risk Taking Autonomy Competitive Aggressiveness
Wei-Loon et al. (2021)	The Influence of Self-Efficacy and Individual Entrepreneurial Orientation on Technopreneurial Intention among Bumiputra Undergraduate Students	This study was geared towards identifying the factors influencing technopreneurial intention among Bumiputra students in Malaysia.	Sample Group 138 Bumiputra undergraduate students from a public university in Malaysia Research Method Quantitative Research	Based on the analyses performed, it found that information and communication technology (ICT) self-efficacy and two elements of IEO (risk-taking and proactiveness) positively and significantly influenced technopreneurial intention. However, Innovativeness did not influence technopreneurial intention significantly. As such, this study suggested that higher learning institution should realize the importance of technopreneurial education in developing competitive technopreneurs among Bumiputra youths. Furthermore, students should be given more opportunities to pro-actively search for business opportunities, handle actual business to learn risk management and attend ICT courses to increase their ICT capabilities.	Innovativeness Proactiveness Risk Taking
Okreglicka et al. (2021)	Students' Entrepreneurial Orientation and Plans of Setting Up Business- The Importance of Educational System	This paper is research article in character. The main aim of the article is to investigate the correlation between entrepreneurial attitudes and entrepreneurial intentions	Sample Group 250 students in Poland Research Method Quantitative	The study confirmed a positive relationship between the potential for entrepreneurial orientation (Innovativeness, Proactiveness, Risk Taking, Autonomy and Competitive Aggressiveness) and the intentions to start a business.	Innovativeness Proactiveness Risk Taking Autonomy Competitive Aggressiveness

		of students, understood as a declaration of willingness to start their own business.	Research		
Popov et al. (2019)	Psychometric evaluation of the Serbian adaptation of the individual entrepreneurial orientation scale	Entrepreneurial orientation (EO) at the organizational level refers to the process which includes methods, practices and decision-making styles which enhance the company's approaches to business. At the individual level, EO is assessed using the individual entrepreneurial orientation (IEO: Bolton and Lane, 2012) scale, comprising three dimensions: risk-taking, innovativeness and proactiveness. The purpose of this paper is to evaluate and further validate the Serbian adaptation of the IEO scale among students.	Sample Group 685 students from Serbia Research Method Quantitative Research	Results supported the three-factor structure and satisfactory reliability of the IEO scale and its subscales. Omitting one item from the innovativeness scale led to better model fit, thus resulting in a nine-item solution. Convergent validity correlations were confirmed, showing that each IEO subscale obtained the expected correlations with similar constructs.	Innovativeness Proactiveness Risk Taking
Gorostiaga et al. (2019)	Assessment of Entrepreneurial Orientation in Vocational Training Students: Development of a New Scale and Relationships with Self-Efficacy and Personal Initiative	The present study aimed to address this by developing and examining the psychometric properties of the Entrepreneurial Orientation Scale (EOS). A second objective is to study the relationships between entrepreneurial orientation and gender, self-efficacy, and personal initiative.	Sample Group 411 vocational training students in Spain Research Method Quantitative Research	The final version of the instrument comprised 32 items assessing six dimensions: innovativeness, risk-taking, proactiveness, competitiveness, achievement orientation, and learning orientation. The EOS showed good psychometric properties and its dimensions demonstrated concurrent relationships with self-efficacy and personal initiative. The EOS may be used to measure entrepreneurial orientation in the educational context and to evaluate interventions designed to promote an entrepreneurial spirit in schools, colleges, and universities.	Innovativeness Proactiveness Risk Taking Competitive Aggressiveness Achievement Orientation Learning Orientation
Martins et al. (2018)	Self-confidence and fear of failure among university students and their relationship with entrepreneurial orientation: Evidence from Colombia	The purpose of this paper is to identify the impact of features of personality such as self-confidence and fear of failure on the entrepreneurial orientation (EO) of university students enrolled on entrepreneurial education courses.	Sample Group 656 students at EAFIT University in Columbia Research Method Quantitative Research	As pointed out by results, both self-confidence and fear of failure are determinants of the EO (Innovativeness, Proactiveness and Risk Taking) of university students. Self-confidence has a positive and consistent effect on the three dimensions of EO, whereas fear of failure has a negative effect on EO.	Innovativeness Proactiveness Risk Taking
Vasharangi (2017)	The Students Competencies and Attributes as Entrepreneurs in MBA Program in Benjamitr Universities Consortium	This research aimed to study the competency correlation in entrepreneurship, and attributes as an entrepreneur of students who study in the MBA program in Benjamitr Network.	Sample Group 215 students in the MBA program of five universities of Benjamitr Network in the year 2015. Research Method Quantitative Research	The research found that: 1. Students in the MBA program of Benjamitr Network had overall competency as entrepreneurs in a very good level, and had overall attribute as entrepreneurs at a very good level as well. 2. The overall competency in entrepreneurship and attribute as entrepreneurs of students in the MBA program of universities in Benjamitr network in all sides had positive correlation at high level.	Risk Taking Autonomy Goals Determination Humility Leadership Working Techniques Creative Ideas Entrepreneurial Desire
Ngah et al. (2016)	Comparative Study of Emotional Intelligence and Entrepreneurial Orientation Between Malaysian and Indonesian University Students	his paper presents a comparative study of Emotional Intelligence (EI) and Entrepreneurial Orientation (EO) between students of two universities from Malaysia and Indonesia.	Sample Group A total of 170 students participated in this survey, 98 from Malaysia and 72 from Indonesia. Research Method Quantitative Research	The study investigates the extent to which EI and EO test scores vary among the students. EI showed different scores between students of the two universities. The importance of EI also differs between two universities. EI and EO (Innovativeness, Proactiveness and Risk Taking) collectively have an impact on Entrepreneurial Inclination of Indonesian students, but only EO was significant for Malaysian students.	Innovativeness Proactiveness Risk Taking
Ismail et al. (2015)	Entrepreneurial Intention, Entrepreneurial Orientation of Faculty and Students towards Commercialization	The present study is conducted to find out the entrepreneurial intention and entrepreneurial orientation of faculty and students towards commercialization of research.	Sample Group 300 Students in Malaysia and 100 Staffs in the University Research Method Quantitative	The results indicate that entrepreneurial orientation (Innovativeness, Proactiveness and Risk Taking) of faculty and students is having more influence towards commercialization of research than entrepreneurial intention alone. The results also indicate that the faculty and students are having a strong	Innovativeness Proactiveness Risk Taking

			Research	entrepreneurial mindset. The study contributes to the existing body of literature related to entrepreneurship and the concept of entrepreneurial university.	
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Research Screening Form

Research code:

Title:

Researcher Names:

Screening criteria

1) Search for and retrieve the complete version from a database published between 2015 and 2023.

Yes No

2) Attributes of research articles subjected to expert review (Peer Review)

Yes No

3) Research articles in Thai and English only.

Yes No

4) The title and abstract of the article align with the research objective.

Yes No

5) The content of the article describes the composition of the variables studied.

Yes No

6) The study population: Higher education students.

Yes No

Decision Criteria ● 'Yes' to all questions Passed

 ● 'No' to any of the questions Failed

Result Passed Failed

Signature.....

Researcher Expert

Date.....

Critical Appraisal Form

Research code:

Title:

Researcher Names:

- 1. The title is concise and descriptive, effectively conveying the research topic. Yes No
- 2. The origin and significance of the problem are well-defined. Yes No
- 3. The research problem and objectives are aligned with the title. Yes No
- 4. The references are relevant to the research problem and objectives. Yes No
- 5. The references are current and linked to past research. Yes No
- 6. The research design is aligned with the research problem and objectives. Yes No
- 7. The research procedures are well-defined and suitable for the research. Yes No
- 8. The selection of the population or sample is justified and suitable for the research. Yes No
- 9. The research tools are suitable and effective for the study Yes No
- 10. The statistics used in data analysis are valid and appropriate for the research. Yes No
- 11. The research results are coherent and consistent with the research objectives. Yes No
- 12. The research discussion aligns with the findings and covers all relevant issues. Yes No
- 13. The suggestions are practical and actionable in both academic and practical settings. Yes No

- Decision Criteria**
- 'Yes' to all questions Passed
 - 'No' to any of the questions Failed

Result Passed Failed

Signature.....

Researcher Expert

Date.....