

# Intellectual Structure and Thematic Map of Entrepreneurship Education in Higher Education: A Bibliometric Analysis

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## Abstract

**Purpose** – The aim of this paper is to present a detailed analysis of the literature on entrepreneurship education in higher education published in international journals from 1988 to 2024, determining the intellectual structure of the field of entrepreneurship education and its maturity as an academic field of study. **Design/methodology/approach** – Using quantitative methodology for literature study, namely bibliometric analysis, relevant papers were obtained from the Scopus database retrieved on September 13, 2024. A total of 604 papers were identified and studied for bibliometric analysis. BiblioMagika, VOSviewer, Publish or Perish software were used for data analysis. While Open Refine was used for data cleaning.

**Findings** – This study identified a significant increase in scientific investigations of entrepreneurship education in higher education in recent years, along with greater collaboration and international research. It was demonstrated that a few countries dominate the entrepreneurship education research area, such as the United States and China, while institutional and individual research results are more evenly distributed. It was also found that authors or institutions dominate the entrepreneurship education literature. Epistemological orientation shows that the published literature is mostly theoretical and descriptive. **Research limitations/implications** – The database used only focuses on Scopus.

**Originality/value** – This paper makes important contributions. First, it presents the intellectual structure of entrepreneurship education as a discipline. Second, it determines the current maturity of the field based on its epistemological orientation, concluding that entrepreneurship education is maturing, with theory development followed by empirical testing and validation resulting in increasing consensus on the area of study.

**Keywords:** Entrepreneurship Education, Higher Education, Bibliometric Analysis

**Introduction**

Entrepreneurship education has become a major focus in economic development and is becoming increasingly relevant amidst the ever-changing dynamics of the global economy. Moreover, in this digital era, the ability to innovate and create new jobs has become key to increasing a country's competitiveness. Entrepreneurship education is considered an important tool to equip individuals with the skills and knowledge needed to create new businesses, as well as face the challenges of a changing world of work. According to Nabi et al. (2017), entrepreneurship education not only includes learning about business, but also the development of critical thinking skills, creativity, and the ability to take risks. In addition, it also develops the attitudes and behaviors needed to become a successful entrepreneur (Banha et al., 2022), and develops an innovative and solution-oriented mindset (Wardana et al., 2020).

Although the importance of entrepreneurship education is widely recognized, significant challenges remain in its implementation at various levels of education. Many educational institutions have yet to fully implement appropriate and relevant curricula that can produce competent entrepreneurs. Educational programs do not place enough emphasis on practical experience, which can leave graduates feeling underprepared for real-world challenges. An overly theoretical approach to entrepreneurship education often results in a lack of practical skills needed to start and run a business (Rao, 2024). There is a gap between the theory taught in the classroom and the real-world practices faced by aspiring entrepreneurs in the field (Wardana et al., 2020).

In addition, differences in cultural and economic contexts across countries also contribute to variations in approaches to entrepreneurship education. Research shows that methods that are effective in one country may not be successful in another, due to differences in social norms, regulations, and business ecosystems (Kuratko, 2005). This indicates the need for adaptation in entrepreneurship education strategies that are appropriate to local needs, in order to optimize the entrepreneurial potential in each region specifically (Clark et al., 2020). Curricula that do not consider local needs can result in a mismatch between the theory taught and practice in the field (Cui, 2021). This creates a gap between what students learn and what is needed in the real world of entrepreneurship.

Previous studies, both meta-analysis and systematic review, have not found a holistic picture of entrepreneurship education (Anubhav et al., 2024; Bui et al., 2023; Nájera-Sánchez et al., 2023; Rocha et al., 2024; Rosário & Raimundo, 2024; Sirelkhatim & Gangi, 2015; Sreenivasan & Suresh, 2023; Talukder et al., 2024; Zhang et al., 2024). Therefore, to identify the trends and dynamics of entrepreneurship education studies, a study with a bibliometric approach is needed. Bibliometric analysis is able to identify in a comprehensive and integrated way where the study started, at what level the study is currently, and where the study on entrepreneurship education will be conducted (Fauzan et al., 2022; Fauzan & Jahja, 2021).

For this purpose, this study attempts to identify the main research areas, current dynamics and future directions of studies on entrepreneurship education. To do so, bibliometric review techniques have been used to answer the following questions:

1. How is the development and trend of research on entrepreneurship education in higher education?

2. Which channels (journals, authors, institutions, and countries) are most influential in research on entrepreneurship education in higher education?
3. The most cited authors and researchers in research on entrepreneurship education in higher education
4. The most widely studied themes in research on entrepreneurship education in higher education

To answer the above research questions, this study uses a bibliometric approach to provide an extensive review of existing research that focuses on entrepreneurship education in higher education. The aim is to provide a structured, quantitative and objective analysis of existing entrepreneurship education research. In doing so, we can identify some potential areas and research gaps that can be considered by future researchers.

### **Literature Review**

Entrepreneurship education has become a topic that has attracted the attention of many researchers in recent years. This concept focuses not only on teaching business skills, but also on developing entrepreneurial character and attitudes. According to Kuratko (2005), entrepreneurship education aims to provide the knowledge, skills, and attitudes needed to start and run a business. This involves teaching about management, marketing, innovation, and interpersonal skills.

Several studies have shown that entrepreneurship education can increase an individual's intention to become an entrepreneur. Nabi et al (2017), found that entrepreneurship education contributed significantly to the development of entrepreneurial intentions among college students. In addition, research by Wardana et al., (2020) highlighted the importance of practical experience in entrepreneurship education, showing that students who engage in practical activities tend to be more confident in starting their own businesses.

However, challenges in implementing entrepreneurship education are also widely discussed in the literature. Banha et al (2022), noted that many entrepreneurship education programs are too theoretical and do not focus enough on practical experience. They emphasized the need for a more balanced approach, combining theory with real-world practice so that graduates are ready to face the challenges of the business world. Clark et al (2020), also highlighted that local relevance is essential, and the curriculum must be tailored to the social and economic context in which it is implemented.

On the other hand, the diversity of cultural and economic contexts is also a factor that influences the effectiveness of entrepreneurship education. Research by Cui (2021), shows that the approach to entrepreneurship education must consider the different cultural norms and values in each country. By understanding the local context, educational programs can be more effective in equipping prospective entrepreneurs with relevant skills.

Overall, the literature suggests that while entrepreneurship education has great potential to enhance entrepreneurship among individuals, challenges in implementation and local contexts must be addressed. Further research is needed to identify best practices and strategies that can be adopted to enhance the effectiveness of entrepreneurship education programs across countries.

### **Methodology**

Bibliometric analysis attempts to examine all published studies in a field through bibliographic data analysis. Bibliometric analysis is also called science mapping, which aims to understand the structure and relationships of the literature (Rosário & Raimundo, 2024). Bibliometric analysis focuses on bibliometric data such as documents per year, type and type of document, language, country, affiliation, keywords, citations, and others. Bibliometric analysis does not examine the quality of the literature, but presents a broad knowledge base about a field.

### **Identification of Sources**

Determining the topic is the first step in bibliometric analysis. Bibliometric analysis in this study focuses on literature on servant leadership. The second step is to determine the database used to identify literature. In this study, the Scopus database is used to identify literature on servant leadership. The Scopus index has advantages in terms of the range of journals provided, search capabilities, and the quality of bibliometric data provided (Kovačević & Hallinger, 2020; Pham et al., 2021).

The Scopus database is used to provide data sources on entrepreneurship education. The keyword "entrepreneurship education AND higher education" is used as a strategy to identify documents. Sources are only included in the article title. The initial search resulted in 604 sources. Scanning was carried out on the identified documents to ensure that they actually contained the term entrepreneurship education. No documents were removed after inspection, so 604 sources were eligible for analysis. Figure 1 is an illustration of source screening.

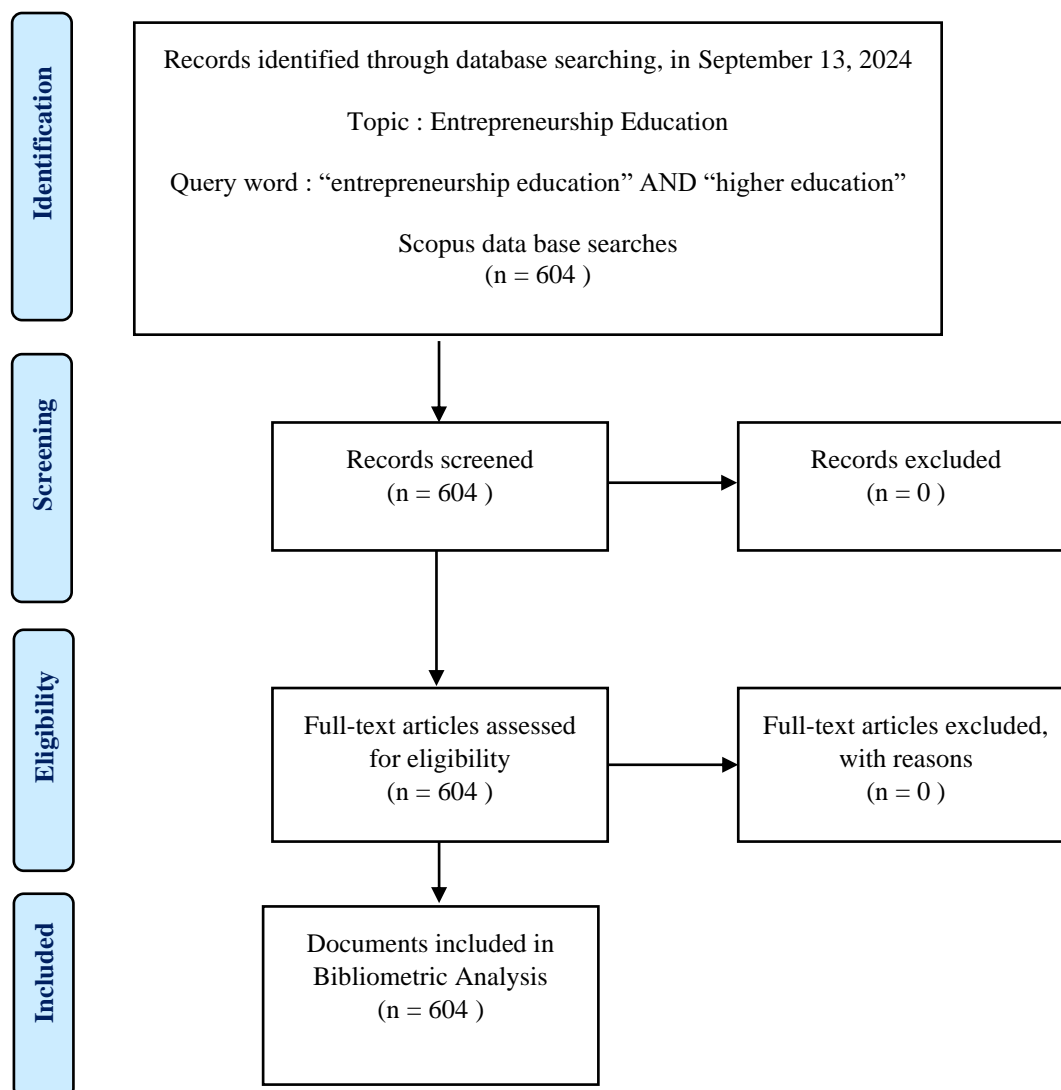


Figure 1. Data Identification PRISMA Flow Diagram

Source: (Moher et al., 2009)

### Data Analysis

Data were downloaded from the Scopus database consisting of 604 sources. Bibliometric meta-data containing information about the sources were entered into a Microsoft Excel spreadsheet. Bibliometric data including basic information (year of publication, document and source type, language, subject area), authors, affiliations, journal names, etc. were uploaded to biblioMagika<sup>®</sup> software (Ahmi, 2024), VOSviewer and Publish or Perish (van Eck & Waltman, 2010).

The analysis was carried out to answer the research questions. First, descriptive statistical analysis provides the possibility to examine the chronological nature of Servant Leadership. Second, citation analysis will provide information on which journals, authors, and documents have a significant influence on the field of Servant Leadership. Before the data were analyzed, data cleaning was carried out first using OpenRefine software. BiblioMagika<sup>®</sup> software helps with descriptive analysis, while VOSviewer allows us to perform co-citation analysis, citation, and keyword analysis.

Co-citation analysis examines how pairs of authors are cited together. In addition, co-citation analysis allows researchers to identify additional literature related to the field of entrepreneurship education (Sreenivasan & Suresh, 2023).

## Result and Finding

### *Basic Information*

In this research, there are 604 publications identified on entrepreneurship education in higher education that are focused on the article title only. The publication time span is 36 years (1988-2024) although there is a gap of 10 years, that is in 1988 to 1998, total citations 10,661 from 1542 contributors who wrote about the study of entrepreneurship education in higher education. And the average citations is 17.65 per article, while citations per author is 6.91. For 36 years, studies on entrepreneurship education in higher education found h-index 49 and g-index 93. Table 1 shows basic information from studies on entrepreneurship education in higher education.

Table 1

### *Basic information*

<b>Main Information</b>	<b>Data</b>
Publication Years	1988 - 2024
Total Publications	604
Citable Year	37
Number of Contributing Authors	1542
Number of Cited Papers	432
Total Citations	10,661
Citation per Paper	17.65
Citation per Cited Paper	24.68
Citation per Year	296.14
Citation per Author	6.91
Author per Paper	2.55
Citation sum within h-Core	9,647
h-index	49
g-index	93
m-index	1.324

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

## Document Profile

The results of the descriptive analysis show that research articles are the most popular type of document with 364 (60.26%) publications compared to other types of documents. As for the type of source, journals are the largest publishing studies on entrepreneurship education with 393 (65.07%) publications compared to other types of sources. While English is the most popular language used in the publication of entrepreneurship education in higher education, which is 598 (99.01%) compared to other languages. Table 2 shows the document profile of studies on entrepreneurship education in higher education.

Table 2

*Document profile*

Document Type	TP	%	Source Type	TP	%	Language	TP	%
Article	364	60.26	Journal	393	65.07	English	598	99.01
Conference Paper	139	23.01	Conference Proceeding	101	16.72	Spanish	3	0.50
Book Chapter	66	10.93	Book Series	64	10.60	Chinese	2	0.33
Review	10	1.66	Book	46	7.62	Croatian	1	0.17
Erratum	9	1.49				French	1	0.17
Retracted	8	1.32				Portuguese	1	0.17
Editorial	4	0.66				Russian	1	0.17
Book	2	0.33						
Data Paper	1	0.17						
Note	1	0.17						

Table 3 presents the results of the analysis in the form of categories of published documents based on subject areas. In general, the distribution reveals that literature on entrepreneurship education in higher education occurs in various fields such as "Social Sciences", "Business, Management and Accounting", and "Computer Science". As illustrated in table 3, the results of the analysis show that 41.72% of documents are in Social Sciences with 252 documents, followed by Business, Management and Accounting (36.92%), and Computer Science (28.64%).

Table 3

*Subject area*

Subject Area	TP	%
Social Sciences	252	41.72%
Business, Management and Accounting	223	36.92%
Computer Science	173	28.64%
Engineering	124	20.53%
Economics, Econometrics and Finance	119	19.70%
Mathematics	63	10.43%
Psychology	45	7.45%
Decision Sciences	30	4.97%
Environmental Science	23	3.81%
Energy	16	2.65%
Arts and Humanities	15	2.48%
Physics and Astronomy	11	1.82%
Agricultural and Biological Sciences	10	1.66%
Medicine	9	1.49%
Health Professions	8	1.32%
Earth and Planetary Sciences	7	1.16%
Materials Science	7	1.16%
Biochemistry, Genetics and Molecular Biology	5	0.83%
Multidisciplinary	5	0.83%
Chemical Engineering	3	0.50%
Immunology and Microbiology	1	0.17%
Neuroscience	1	0.17%

**RQ 1: Trend of research on entrepreneurship education in higher education**

Descriptive analysis of annual publication growth, answering the trend and impact of publications in the study of entrepreneurship education in higher education.

A detailed statistical summary of annual publications on entrepreneurship education in higher education is presented in Table 1. Referring to the Scopus database, the first author to study entrepreneurship education in higher education was Gerald E. Hills in 1988 with the title "Variations in University entrepreneurship education: An empirical study of an evolving field", which was published in the Journal of Business Venturing, vol. 3, issue 2, pages 109-122 (Hills, 1988). The publication in 2022 showed the largest compared to other years, with 84 documents. However, the documents published in 2017 received the highest citations, with 1258 citations, the average citations per publication was 29.95 citations from 42 published publications, and obtained the highest h-index and g-index, with h-index 9 and g-index 35. The article that contributed the most citations was written by Ghulam Nabi entitled "The impact of entrepreneurship education in higher education: A systematic review and research agenda", published in "Academy of Management Learning and Education", vol. 16, issue. 2, pages 277-299 (Nabi et al., 2017) with 899 citations. Figures 2 and 3 show the increase in publication activity and trends regarding entrepreneurship education in higher education from year to year.

Table 4

*Annual research output and citation metrics*

Year	TP	NCA	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>	<i>m</i>
1988	1	1	1	217	217.00	217.00	1	1	0.027
1998	1	2	1	49	49.00	49.00	1	1	0.037
1999	1	2	1	43	43.00	43.00	1	1	0.038
2001	1	1	1	12	12.00	12.00	1	1	0.042
2002	1	2	1	277	277.00	277.00	1	1	0.043
2003	1	1	1	1	1.00	1.00	1	1	0.045
2005	6	13	5	462	77.00	92.40	5	6	0.250
2006	3	8	2	328	109.33	164.00	2	3	0.105
2007	1	1	1	26	26.00	26.00	1	1	0.056
2008	4	12	3	118	29.50	39.33	2	4	0.118
2009	4	8	4	37	9.25	9.25	2	4	0.125
2010	14	35	12	214	15.29	17.83	6	14	0.400
2011	15	31	11	262	17.47	23.82	5	15	0.357
2012	8	18	8	300	37.50	37.50	6	8	0.462
2013	10	27	7	664	66.40	94.86	6	10	0.500
2014	27	66	23	830	30.74	36.09	10	27	0.909
2015	19	43	17	343	18.05	20.18	11	18	1.100
2016	15	43	14	792	52.80	56.57	8	15	0.889
2017	42	84	34	1258	29.95	37.00	9	35	1.125
2018	29	78	24	601	20.72	25.04	12	24	1.714
2019	47	142	40	923	19.64	23.08	12	30	2.000
2020	54	121	40	1100	20.37	27.50	15	33	3.000
2021	79	204	59	878	11.11	14.88	15	28	3.750
2022	84	247	69	657	7.82	9.52	13	22	4.333



2023	65	180	40	249	3.83	6.23	9	13	4.500
2024	72	172	13	20	0.28	1.54	2	3	2.000
<b>Total</b>	<b>604</b>	<b>1542</b>	<b>432</b>	<b>10661</b>	<b>17.65</b>	<b>24.68</b>	<b>49</b>	<b>93</b>	<b>1.324</b>

**Note:** TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.  
 Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

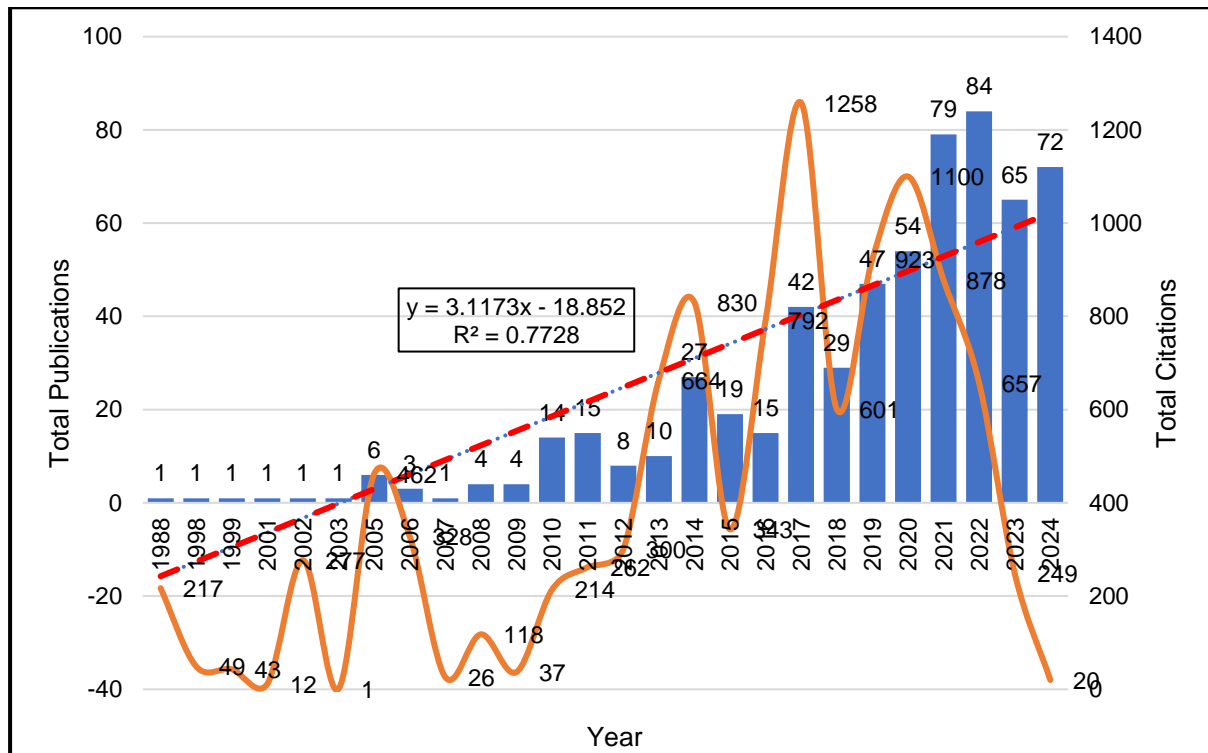


Figure 2. Total publications and total citations by year  
 Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

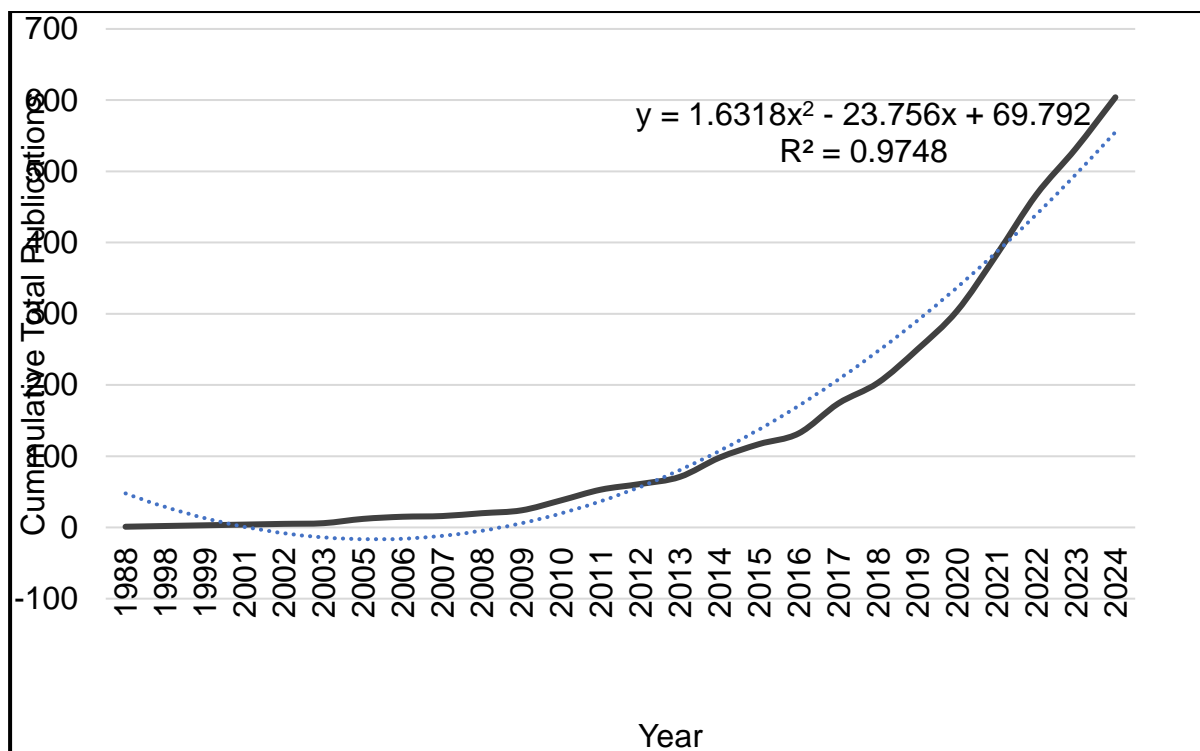


Figure 3. Cumulative Growth of Publications Over Time (1991-2024)

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

## RQ 2: Which channel are the most influential in entrepreneurship education research

The second question in this study is what channels are the most productive and influential in the study of entrepreneurship education in higher education. To answer this question, we analyze the most productive and influential countries, institutions, authors, and source titles.

### Publications by Countries

This analysis answers the most important countries in the study of entrepreneurship education in higher education. From the Scopus database that has been collected, there are researchers from 38 countries who have published documents on entrepreneurship education. The countries that contribute to the publication of entrepreneurship education in higher education are shown in Table 5, and the geographical distribution is shown in Figure 4. China ranks first, with a total publication of 258 (42.72%) documents, followed by the United States and the United Kingdom, each with 46 (7.62%) and 42 (6.95%). While Malaysia and Indonesia rank 4th and 6th out of 10 countries that contribute the most to the study of entrepreneurship education in higher education, with 28 and 20 documents.

Table 5

Top 10 most productive countries contributed to the publications

Country	Continent	TP	%
China	Asia	258	42.72%
United States	North America	46	7.62%
United Kingdom	Europe	42	6.95%
Malaysia	Asia	28	4.64%
Germany	Europe	23	3.81%
Indonesia	Asia	20	3.31%
India	Asia	19	3.15%
Italy	Europe	15	2.48%
Spain	Europe	14	2.32%
Australia	Oceania	10	1.66%

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

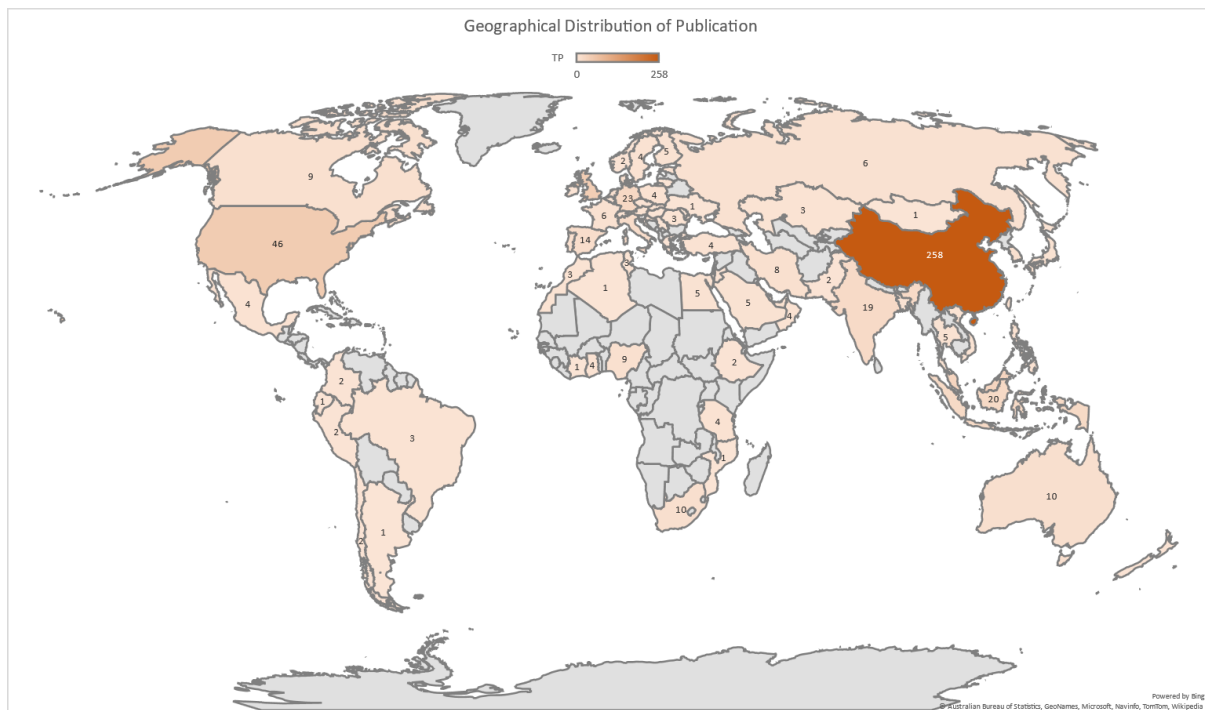


Figure 4. Geographical Distribution of Publication

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

**Publications by Institution**

The most active institutions in entrepreneurship education in higher education publications are shown in Table 6. This section focuses on analyzing the state of cooperation between authors and identifying the most active institutions in entrepreneurship education in higher education publications. These institutions are also involved in research related to entrepreneurship education in higher education, which is based on at least four publications. Wenzhou Medical University (China) has a total of 9 publications, followed by Universiti Utara Malaysia and Universiti Kebangsaan Malaysia from Malaysia, with 7 and 5 documents.

Table 6

*Top 15 Most Productive Institutions*

Institution	TP	%
Wenzhou Medical University	9	1.49%
Universiti Utara Malaysia	7	1.16%
Universiti Kebangsaan Malaysia	5	0.83%
The University of Hong Kong	5	0.83%
Sichuan University	5	0.83%
Shenzhen University	4	0.66%
Zhejiang University	4	0.66%
Zhejiang Gongshang University	4	0.66%
Coventry University	4	0.66%
Wuhan University of Technology	4	0.66%
Bergische Universität Wuppertal	4	0.66%
Beijing Normal University	4	0.66%
The British University in Egypt	4	0.66%
Università del Salento	4	0.66%
University of Plymouth	4	0.66%

**Note:** TP=total number of publications;

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

### Publications by Author

This section focuses on analyzing the current collaboration status and identifying the most effective authors in entrepreneurship education in higher education. The current study also identifies the most active authors who publish documents on entrepreneurship education in higher education. As illustrated in Table 7, which shows the most popular authors with at least three publications in the field of entrepreneurship education in higher education. Huang, Yangjie. is one of the most influential authors in entrepreneurship education in higher education and has published 4 papers on this issue.

There are a total of 1542 different authors contributing more than 604 articles on entrepreneurship education in higher education. Tables 8 and 9 show the number of articles by authors with the highest number of publications. Based on the table, 26.32% of the publications were written by a single author while the rest were multi-authored. Many research studies on entrepreneurship education in higher education contained two (29.80%) or three (20.70%) authors, and four (11.26%) authors in a study. In addition, the maximum number of authors publishing articles in entrepreneurship education in higher education was 13. Figure 5 shows single author vs. multi-author.

Table 7

*Top 10 Most Productive Author*

Author Name	TP	%	Affiliation	Country
Huang, Yangjie.	4	0.66%	School of Education, Hangzhou Normal University, Hangzhou	China
Jiang, He.	4	0.66%	Department of Business Administration Guangzhou College of Technology and Business Guangzhou	China
Walmsley, Andreas.	4	0.66%	Plymouth Marjon University, Plymouth	United Kingdom
Bischoff, Kathrin.	3	0.50%	School of Business and Economics, University of Wuppertal, Wuppertal	Germany
Cao, Yirong.	3	0.50%	Hangzhou College of Commerce, Zhejiang Gongshang University, Zhejiang	China
Ellermann, Lutz.	3	0.50%	Empirica Corporation for Communication and Technology Research mbH, Bonn	Germany
Hassan, Aamir.	3	0.50%	Department of Commerce, Aligarh Muslim University	India
Kailer, Norbert.	3	0.50%	Institute for Entrepreneurship and Organizational Development, Johannes Kepler University Linz	Austria
Lv, Yijun	3	0.50%	School of Innovation and Entrepreneurship, Wenzhou Medical University, Zhejiang	China
Maritz, Alex.	3	0.50%	La Trobe Business School, La Trobe University, Melbourne	Australia

**Note:** TP=total number of publications;

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

Table 8

*Number of Author*

Author Count	Frequency	%
0	5	0.83
1	159	26.32
2	180	29.80
3	125	20.70
4	68	11.26
5	43	7.12
6	15	2.48
7	7	1.16
9	1	0.17
13	1	0.17
<b>Grand Total</b>	<b>604</b>	<b>100</b>

Table 9

*Single Author vs Multi Author*

Year	Count of Authorship		Column Labels	
	Single-author	Multi-authors	[N/A]	Grand Total
1988	1			1
1998		1		1
1999		1		1
2001	1			1
2002		1		1
2003	1			1
2005		6		6
2006		3		3
2007	1			1
2008		4		4
2009	1	3		4
2010	4	10		14
2011	5	10		15
2012	1	7		8
2013	2	8		10
2014	6	21		27
2015	3	16		19
2016	3	12		15
2017	19	23		42
2018	5	24		29
2019	4	43		47
2020	24	30		54
2021	23	56		79
2022	18	64	2	84
2023	12	51	2	65
2024	25	46	1	72
<b>Grand Total</b>	<b>159</b>	<b>440</b>	<b>5</b>	<b>604</b>

Note: N/A, Not Available

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

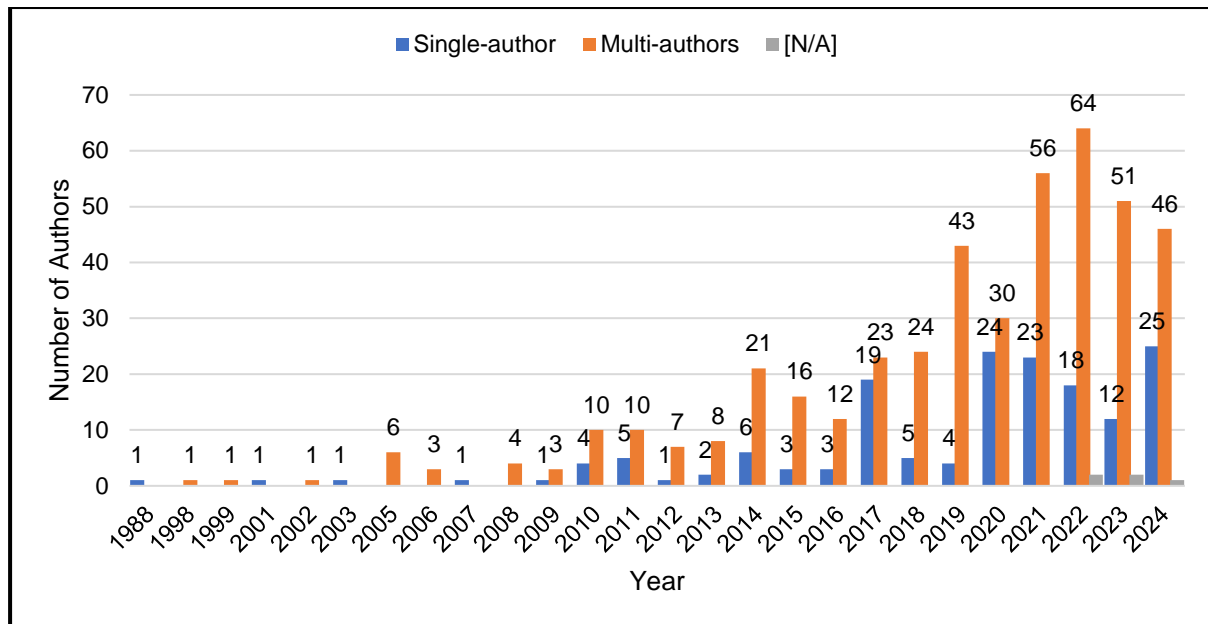


Figure 5. Single Author vs. Multi Authors

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

VOSviewer is used to analyze co-authorship and further analyze author collaboration in the field of entrepreneurship education in higher education. This analysis is based on the fact that influential authors have at least 2 publications and have been cited at least once and is calculated using full calculation. The analysis results found that out of 1542 authors, not all of them collaborate with each other, but only 85 authors collaborate with each other. The color of the connecting line, circle size, font size and thickness determine the strength of the author connection. Connected authors (shown in the same color) are usually grouped together. For example, in the red cluster, Huang, Yangjie; An Lanyijie; Wang, Jing; and Long, Zehai work closely together and often conduct joint research (Figure 6). Figure 6 also illustrates a group of authors (green) who have collaborated with Lv, Yijun, namely, Sha, Yimin; Li, Yuhui; and Wu, Yenchun Jim.

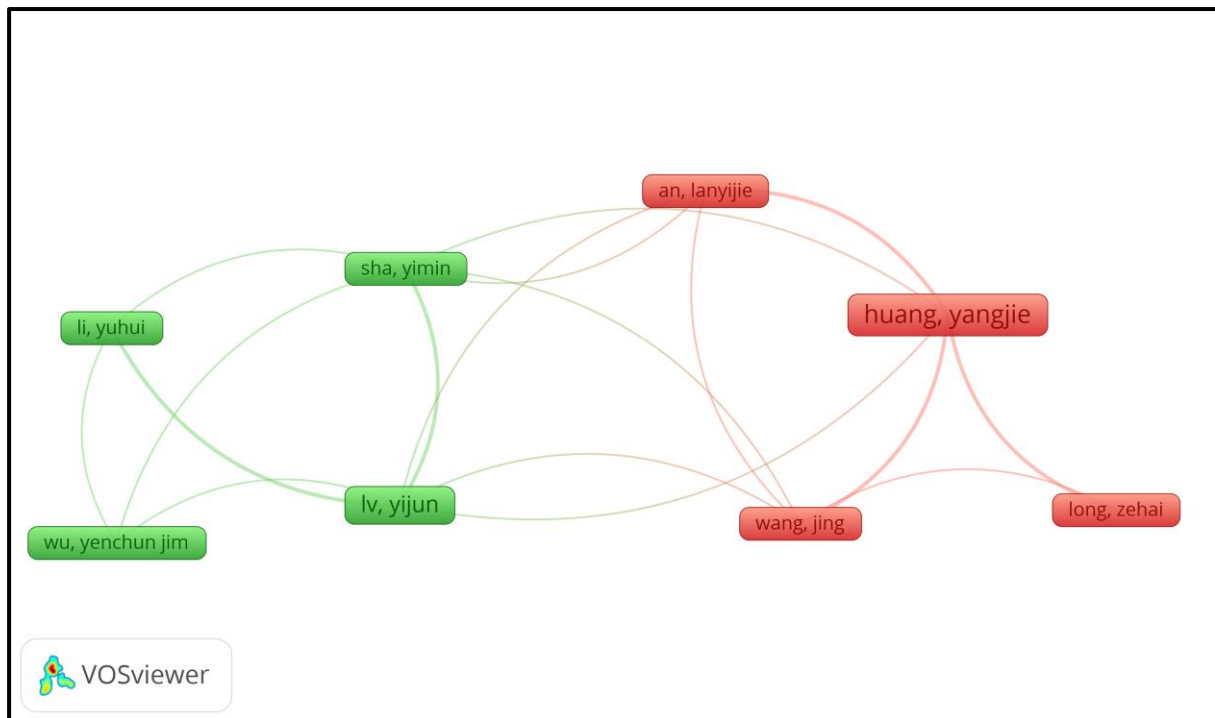


Figure 6. Network visualisation map of the co-authorship based on authors that have a minimum of two document of an author and one number of citations (full counting)

Figure 7 shows the visualization of the author country/region network regarding the study of entrepreneurship education in higher education. The analysis only includes countries that have at least five publications and cite at least one article. Based on the full calculation method, the findings show that China and the United States play a very important role in cooperation with other countries. China cooperates closely with India, South Korea, Pakistan, and Taiwan while the United States cooperates with Estonia, China, Australia, New Zealand, Germany, the United Kingdom, Spain, Chile. While the United Kingdom cooperates with China, Poland, and Spain.



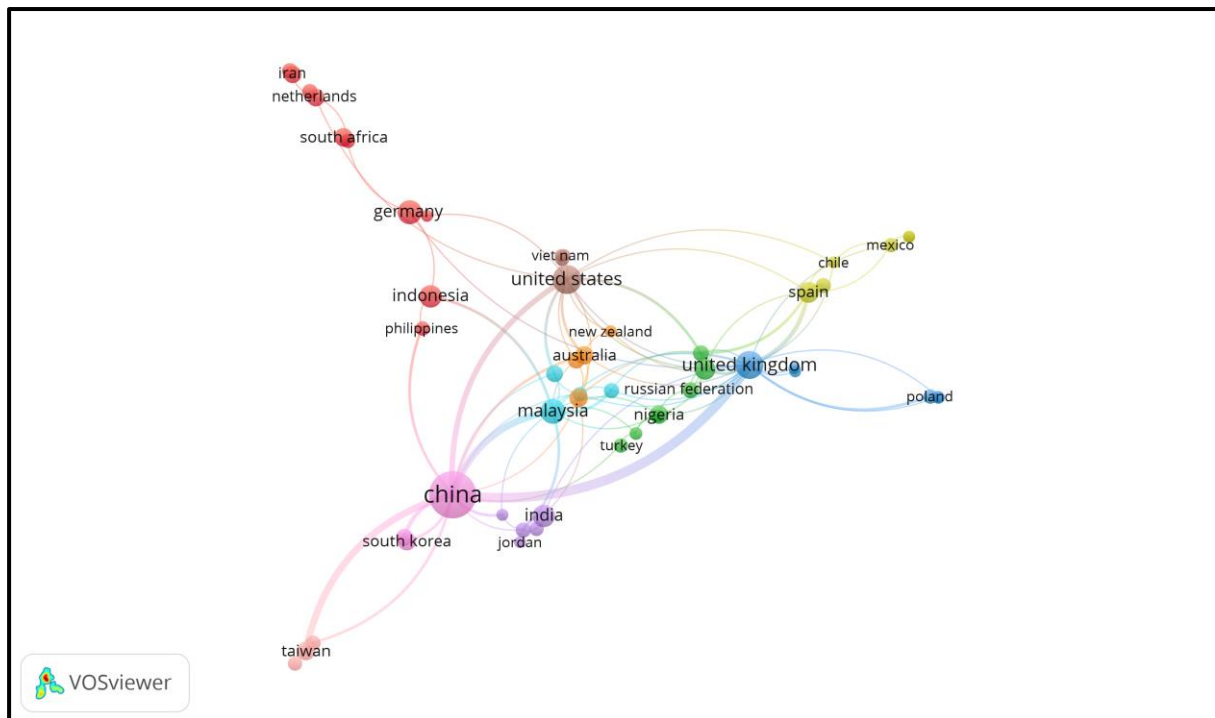


Figure 7. Network visualisation map of the co-authorship based on countries that have a minimum of one number of citations and two number of documents (full counting)

### Publications by Source Title

Research on entrepreneurship education in higher education is also published in various journals, conference proceedings, books, and book series. Table 11 shows the most active source titles publishing articles on entrepreneurship education in higher education. As can be seen from the table, “Frontiers in Psychology” is the highest source of documents publishing on entrepreneurship education in higher education with 32 documents. The source of documents that received the most citations was “Education and Training” with 1249 citations, and an average citation per paper of 56.77 out of 22 documents.

Figure 8 is the result of VOSviewer analysis of citations based on sources that place Frontiers in Psychology as the most dominant source from other sources. This analysis is based on sources that have at least 2 documents and 1 citation.

Table 11

*Top 10 most productive source title*

Source Title	TP	NCA	NCP	TC	C/P	C/CP	h	g	m
Frontiers in Psychology	32	102	32	380	11.88	11.88	10	18	1.667
Education and Training	22	56	20	1249	56.77	62.45	16	22	0.842
Applied Mathematics and Nonlinear Sciences	18	29	0	0	0.00	0.00	0	0	0.000
ACM International Conference Proceeding Series	16	28	7	15	0.94	2.14	2	3	0.333
Journal of Entrepreneurship Education	14	42	14	209	14.93	14.93	7	14	0.500
Advances in Intelligent Systems and Computing	12	19	7	25	2.08	3.57	2	4	0.200
International Studies in Entrepreneurship	11	16	8	11	1.00	1.38	2	2	0.105
International Journal of Management Education	10	28	8	370	37.00	46.25	7	10	0.636
Studies in Higher Education	10	33	10	810	81.00	81.00	9	10	1.286
Industry and Higher Education	9	27	9	127	14.11	14.11	4	9	0.222
Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST	9	14	3	3	0.33	1.00	1	1	0.143
Sustainability (Switzerland)	8	34	8	380	47.50	47.50	6	8	1.000
Journal of Physics: Conference Series	8	15	6	15	1.88	2.50	2	3	0.333
Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE	8	16	2	9	1.13	4.50	1	3	0.100
Lecture Notes in Electrical Engineering	7	16	4	4	0.57	1.00	1	1	0.071
Mathematical Problems in Engineering	7	13	6	45	6.43	7.50	5	6	1.250
Chinese Education and Society	6	14	4	42	7.00	10.50	3	6	0.333
Wireless Communications and Mobile Computing	6	10	3	13	2.17	4.33	2	3	0.667
Kuram ve Uygulamada Egitim Bilimleri	5	10	5	39	7.80	7.80	4	5	0.571
International Journal of Entrepreneurship and Small Business	5	15	4	194	38.80	48.50	4	5	0.235

**Note:** TP=total number of publications; NCA=number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

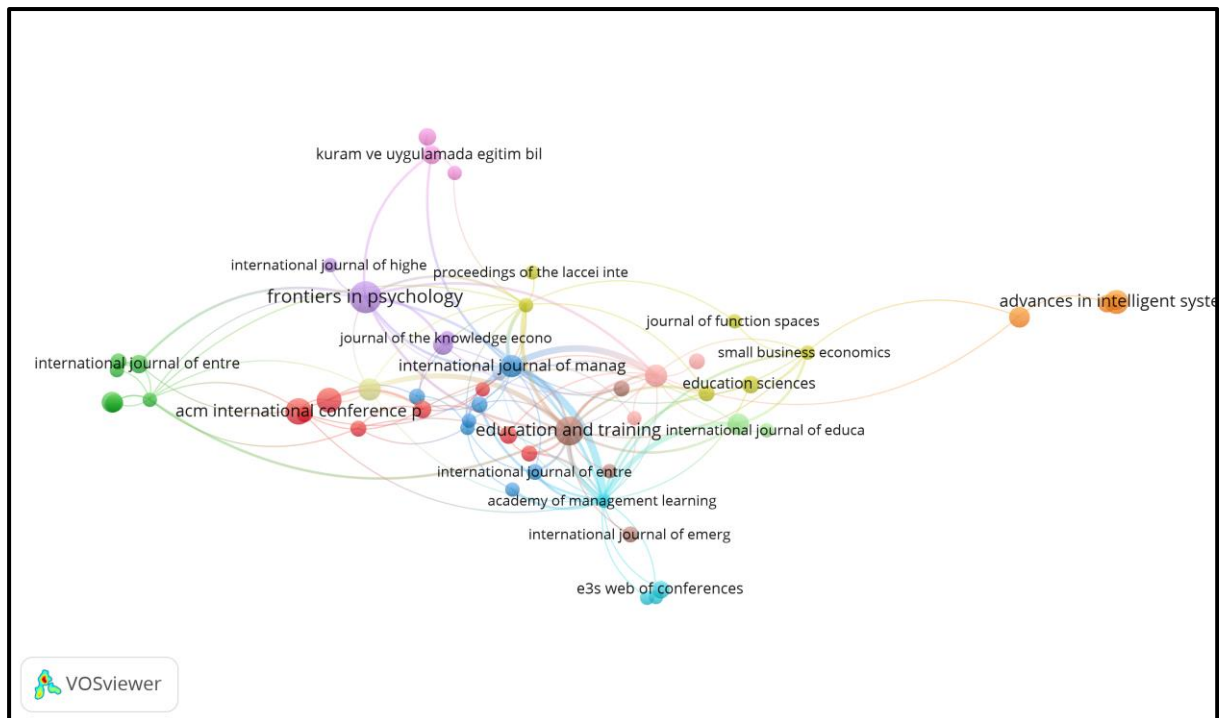


Figure 8. Network visualisation map of the Citation by source

Note: Minimum number of documents of a source = 2; Minimum number of citations of a source = 1,

### RQ 3 : The Most Cited Authors and Researchers

This part of the study answers the third RQ, which aims to determine the most influential authors in entrepreneurship education in higher education research. To answer RQ3, 604 articles were analyzed through the total number of citations for each document. Although there are several ways to measure the influence of research publications, citation analysis is the most common (Ding & Cronin, 2011).

At the same time, Table 12 shows the most cited articles based on the Scopus database (depending on the total number of citations for each document). Ghulam Nabi is ranked first in the article entitled "The impact of entrepreneurship education in higher education: A systematic review and research agenda" (Nabi et al., 2017), published in the Academy of Management Learning and Education, vol. 16, issue. 2, pages, 277-299, with a total number of citations of 899, and an average of 112.38 citations per year.

Figure 9 shows the results of the analysis using VOSviewer which is based on authors who have a minimum of 2 documents and 1 citation in each document, indicating that the authors cite each other.

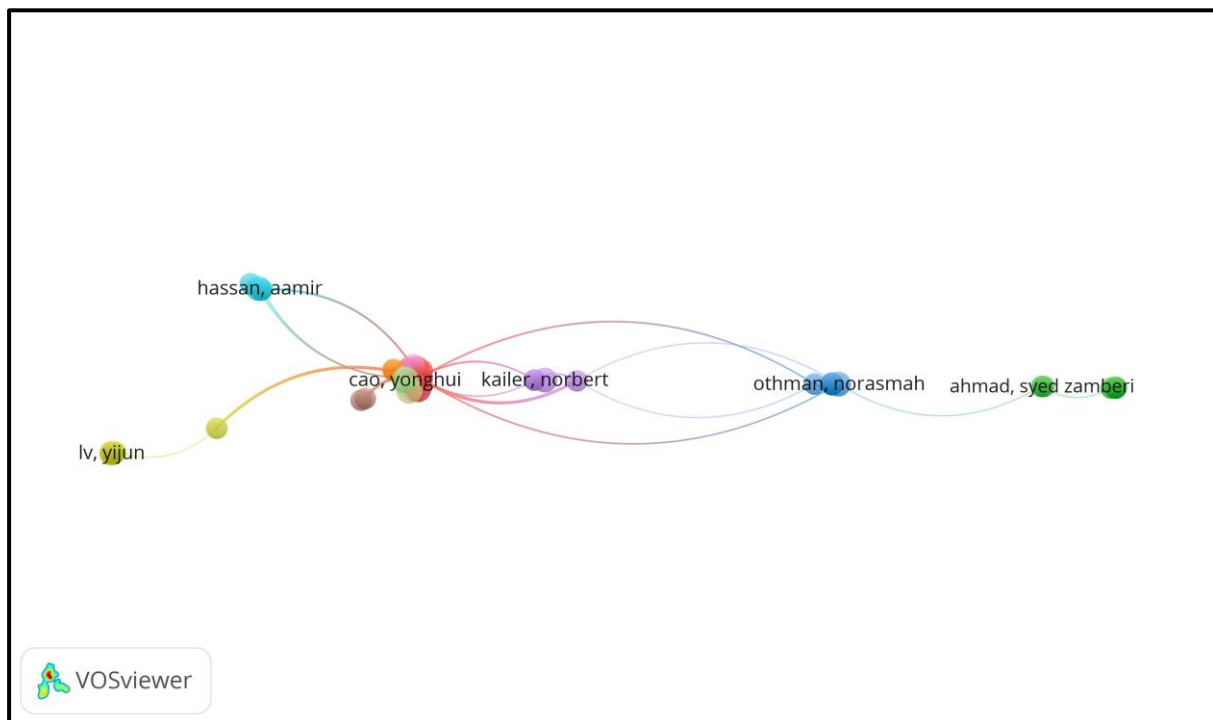
Table 12

*Top 20 Highly cited articles*

No.	Author(s)	Title	Source Title	TC	C/Y
1	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 and Education	899	112.38
2	Zhang Y.; Duysters G.; Cloudt M. (2014)	The role of entrepreneurship education as a predictor of university students' entrepreneurial intention	International Entrepreneurship and Management Journal	467	42.45
3	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	386	42.89
4	Rideout E.C.; Gray D.O. (2013)	Does entrepreneurship education really work? A review and methodological critique of the empirical literature on the effects of university-based entrepreneurship education	Journal of Small Business Management	379	31.58
5	Nowiński W.; Haddoud M.Y.; Lančarič D.; Egerová D.; Czeglédi C. (2019)	The impact of entrepreneurship education, entrepreneurial self-efficacy and gender on entrepreneurial intentions of university students in the Visegrad countries	Studies in Higher Education	370	61.67
6	Gürol Y.; Atsan N. (2006)	Entrepreneurial characteristics amongst university students: Some insights for entrepreneurship education and training in Turkey	Education and Training	315	16.58

7	Béchar J.-P.; Grégoire D. (2005)	Entrepreneurship education research revisited: The case of higher education	Academy of Management Learning and Education	309	15.45
8	Galloway L.; Brown W. (2002)	Entrepreneurship education at university: A driver in the creation of high growth firms?	Education + Training	277	12.04
9	Nabi G.; Walmsley A.; Liñán F.; Akhtar I.; Neame C. (2018)	Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration	Studies in Higher Education	252	36.00
10	Boldureanu G.; Ionescu A.M.; Bercu A.-M.; Bedrule-Grigoruță M.V.; Boldureanu D. (2020)	Entrepreneurship education through successful entrepreneurial models in higher education institutions	Sustainability (Switzerland)	244	48.80

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)



**Figure 9.** Network visualisation map of the Citation by author

Note: Minimum number of documents of a author = 2; Minimum number of citations of a author = 1,

#### RQ 4: Themes and Keyword entrepreneurship education in higher education

The last RQ in this study aims to examine the most frequent themes in the field of entrepreneurship education in higher education. VOSviewer software helps analyze to answer research questions, through keyword analysis.

#### Keywords Analysis

The basic principle of keyword analysis is that the author's keywords are sufficient to reflect the content of the article (Comerio & Strozzi, 2019). When two keywords appear in an article simultaneously, it indicates that there is a relationship between the two concepts. To answer the last research question, we used keyword and co-occurrence analysis in VOSviewer software. The author used VOSviewer to analyze keywords. VOSviewer is software for creating and visualizing bibliometric networks, as well as for mapping the keywords provided by each document. Figure 10 illustrates the visualization of the author's keyword map generated by VOSviewer which displays the strength of the relationship between keywords in color, circle scale, font, and thickness of the connecting line. Related keywords are often classified in the same color. Based on the analysis, 7 clusters have been developed in the research of entrepreneurship education in higher education based on the author's keywords. For example, the diagram shows that entrepreneurship education, higher education, entrepreneurial mindset, and entrepreneurial intention, which are marked in yellow, are closely related and often appear together. The analysis results also provide information that there are 43 items, 7 clusters, 217 links, and 565 total links strength. The 7 clusters are represented by the colors red, yellow, green, blue, light blue, orange, pink, and purple.

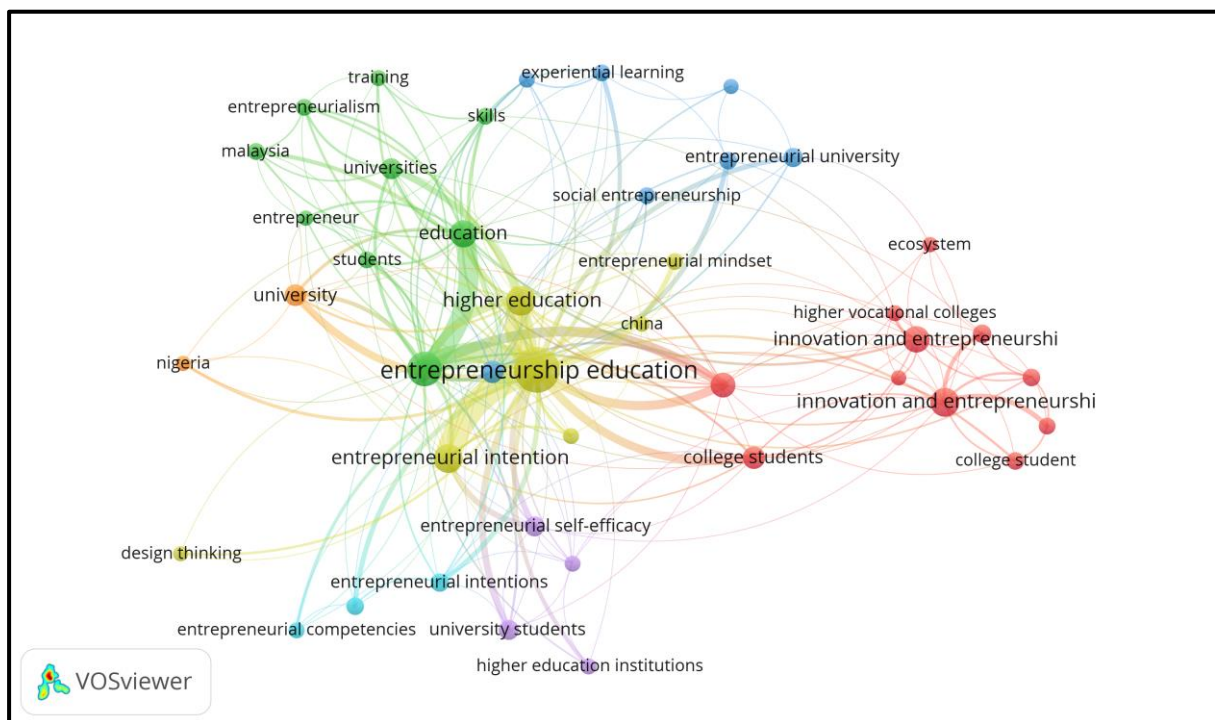


Figure 10. Network visualisation map of the author keywords

Note: Minimum number of occurrences of a keywords = 5

Meanwhile, research topics that can be used as recommendations for further research can be seen in Figure 11. The yellow color indicates new topics related to entrepreneurship education in higher education. This means that further research on entrepreneurship education in higher education can be associated with the variables ecosystem, higher vocational colleges, innovation and entrepreneurship, quality evaluation, college students, theory of planned behavior and entrepreneurial self-efficacy.

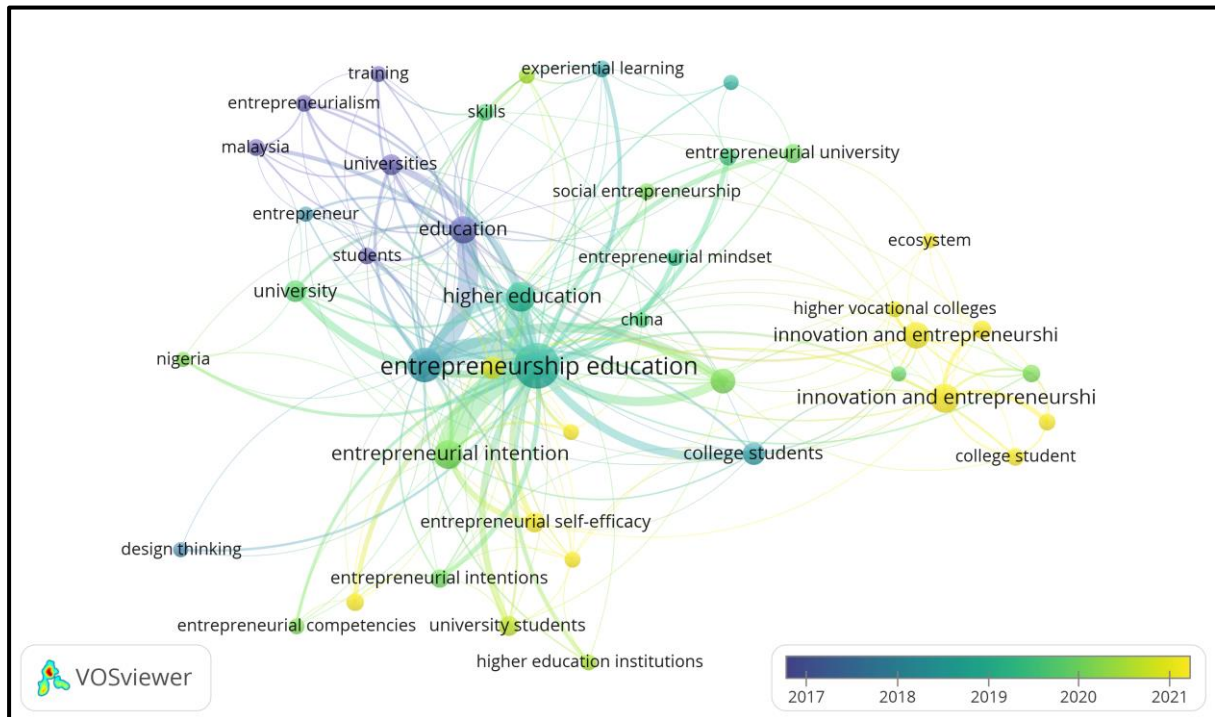


Figure 11. Key words overlay visualization map

At the same time, after using the core keywords specified in the search query (i.e. entrepreneurship education and higher education), it was obtained that keywords about entrepreneurship education, entrepreneurship, and higher education were some of the most frequently appearing keywords (Table 13).

Table 13

*Top 15 Keywords*

<b>Author Keywords</b>	<b>Count</b>	<b>Percentage</b>
Entrepreneurship education	225	9.72%
Entrepreneurship	81	3.50%
Higher education	47	2.03%
Entrepreneurial intention	46	1.99%
innovation and entrepreneurship education	45	1.94%
Education	37	1.60%
Innovation And Entrepreneurship	33	1.43%
Innovation	25	1.08%
Entrepreneurial education	19	0.82%
College students	18	0.78%
University	16	0.69%
Universities	15	0.65%
Entrepreneurial self-efficacy	12	0.52%
University students	12	0.52%
Entrepreneurial university	10	0.43%

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

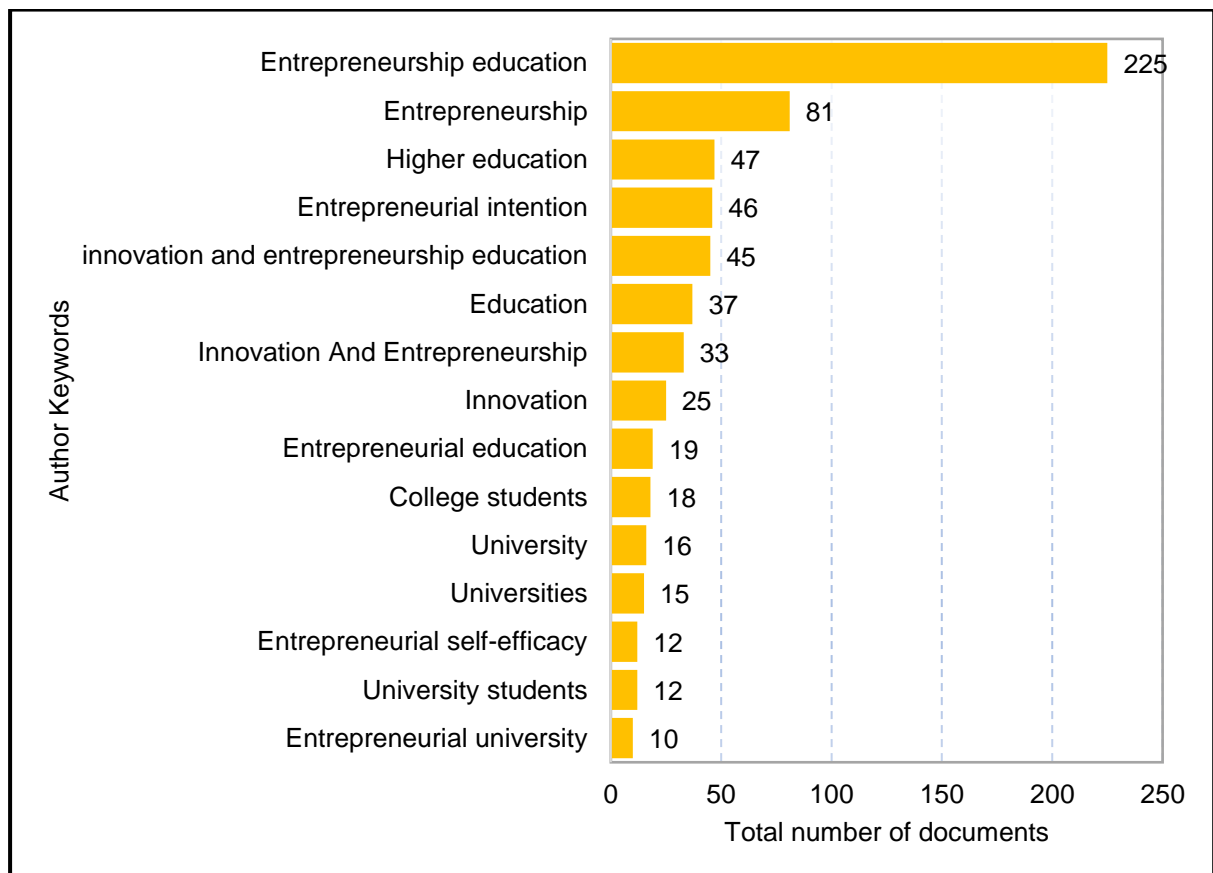


Figure 12. Frequency Distribution of Top 15 Author Keywords

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)



**Conclusion**

The first research question of this study is about identifying current trends in the field of entrepreneurship education in higher education. Therefore, to meet the main objective of exploring research trends on entrepreneurship education in higher education, a bibliometric analysis has been conducted. Using bibliometric analysis can assess research productivity and publications in a particular research field (Moed et al., 2001). According to Gu(2004), information obtained from bibliometric data can evaluate the performance of a field of study, and help related research institutions to set some policies related to fund allocation, and to compare scientific input and output. In addition, bibliometric research findings can further explain the factors that support the contribution of research in a field of study and guide researchers to conduct influential research (Akhavan et al., 2016).

Therefore, the concentration of this study is on the publication of entrepreneurship education in higher education collected from the Scopus database. This study uses a specified search query to find 604 documents from the specified database. The main keywords used to search for relevant documents are "entrepreneurship education AND higher education" and their equivalents. The research on entrepreneurship education in higher education (according to documents collected from the Scopus database) was started by Gerald E. Hills in 1988 with the title "Variations in University entrepreneurship education: An empirical study of an evolving field". Since then until 2024, the number of publications has increased. Starting from 2010 until now, the number of publications has increased. The trend of publications has increased linearly, meaning that the topic of entrepreneurship education is still interesting to researchers.

Compared to other types of documents, more than 50% of documents are published as articles. However, most of the publications are published in English and come from 39 identified countries. The United States and China have been ranked as the top countries with the largest contribution to publications on entrepreneurship education in higher education. Research on entrepreneurship education in higher education is usually published in publications in the fields of Social Sciences; Business, Management and Accounting; and Computer Science. Research on entrepreneurship education in higher education is concentrated in the field of social sciences.

Regarding the second research question, which is to find the impact of publications in the field of entrepreneurship education in higher education, the citation matrix has been used. The importance of entrepreneurship education publications can be explained from the citation metrics discussed in this study. As a consequence of 36 years of publications in the field of entrepreneurship education in higher education (1988-2024), 604 articles have been published and more than 10,661 citations. In general, entrepreneurship education in higher education documents collected from the Scopus database are cited 296.14 times each year, 17.65 citations per paper and 6.91 authors per paper, and have also achieved an h-index of 49, and a g-index of 93.

To answer the third research question regarding the most influential authors in the publication of entrepreneurship education in higher education, we analyzed 604 document sources. The results of the analysis found that "The impact of entrepreneurship education in

higher education: A systematic review and research agenda” written by Nabi et al. (2017) is the most cited article.

Finally, to answer the fourth research question regarding the most common themes of entrepreneurship education in higher education among researchers. The key points of this field can be seen from the results of keyword analysis, title analysis and summary generated by VOSviewer. For example, when we look at Table 13, the keywords "entrepreneurship education", "education", "higher education", are among the 15 most popular keywords that we identified in the document collection.

### **Limitation of the Study**

Although bibliometric analysis has special characteristics, this study also has some limitations, which should be limited so that readers can understand this article clearly and strengthen future research. The results are only from certain keywords, namely entrepreneurship education based on document titles, abstracts, and keywords. So, search query results for other fields (e.g., authors and sources) are not involved in this analysis. The main point is that most academic studies use titles, abstracts, and keywords as relevant document search queries. Some researchers may also focus on search words on authors or sources; as a result, their research may not be directly related to their objectives. Therefore, data screening (screening and cleaning) is needed before data analysis. Future research can expand to it.

### **Future Research**

It should also be noted that no search query is 100% ideal; therefore, false positives and false negatives should be considered (Sweileh et al., 2017). The current study exclusively relied on the Scopus database as the primary source for documents. Although Scopus is one of the most comprehensive databases that archives all academic research, it does not cover all published sources (Ahmi & Mohd Nasir, 2019). Further databases, for example, Web of Science, Google Scholar, Dimensions and others, can be used in future studies. Integrating all these databases can help add interesting and valuable results. Despite these limitations, the current study adds to the knowledge by providing current research trends on entrepreneurship education. This study also contributes by applying bibliometric methods to expand the knowledge of entrepreneurship education literature.

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