

ENTREPRENEURSHIP AND EDUCATION IN THE 21ST CENTURY: ANALYSIS AND TRENDS IN RESEARCH

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ABSTRACT

Entrepreneurship is a subject of great interest and depth which is currently being introduced into various education systems and is also the subject of a great deal of scientific research published in the form of case studies and innovative methodologies. This article will present the main contributions in this area of research. To this end a bibliometric retrospective description analysis of the documents included in the Web of Science Core Collection (WoS) and Scopus databases between 2001 and 2018. Various variables are included in the analysis of the research on this topic: total number of documents, articles and citations per year, their relative Hirsch index; articles and citations by country; trends in articles in the principal countries; most relevant authors and research organizations; most influential journals; most influential organizations by author; most cited articles and keyword trends. After applying the relevant filters a total of 1,564 and 1,308 documents were found on WoS and Scopus, respectively. The results show a positive evolution in the number of articles and citations, particularly since 2010. Both databases show that the United States and the United Kingdom are the most relevant countries in this field, both in terms of articles and citations. The most influential organizations are located in the U.S., the U.K. and Finland. An analysis of the co-occurrence of keywords and an indication of future lines of research included terms such as neoliberalism, active learning, youth and design thinking.

Keywords: Entrepreneurship, Education, Bibliometric, Web of Science, Scopus, Trends.

INTRODUCTION

Entrepreneurship is closely linked to the concepts of initiative and action. Those individuals with an entrepreneurial spirit possess the capacity to innovate, that is, the ability to do things differently or at least experiment with new ways of doing things. Entrepreneurial training or education should not be confused with business or economic studies, or even with corporate studies, as the main focus of entrepreneurship is to promote creativity, innovation and self-employment (European Commission, 2009). In contrast, corporate studies focus on identifying business opportunities and gathering the most appropriate and diverse resources to carry these out. Entrepreneurship is a much richer and active field, developing attributes such as the capacity for transformational change, the ability to experiment with their own ideas and the capacity to be flexible and react quickly. Entrepreneurship involves developing both personal attributes and social values, characterized by responsibility, commitment, endeavor, dedication, perseverance and a strong work ethic (Lee & Peterson 2000; Verzat & Bachelet, 2006, Brazeal et al., 2008; Thornton et al., 2011).

In contemporary society, education should foster the creation of an entrepreneurial culture and spirit which favors both enterprises and individuals and which promotes

entrepreneurial initiatives. Education and entrepreneurship are issues which have impacted a wide range of studies (Table 1).

Authors	Content
Vesper & Gartner, 1997	Presentation of the results of a survey which classified entrepreneurship programs in universities.
Katz, 1999	Chronological analysis of more than 100 articles about entrepreneurial education in the United States between 1876 and 1999.
Peterman & Kennedy, 2003	Examines the effect of participation in an enterprise education program on perceptions of the desirability and feasibility of starting a business.
Kuratko, 2005	Focuses on the trends and challenges of entrepreneurial education in the 21 st century.
Rasmussen & Sørheim, 2006	Focuses on the activities of universities to increase the motivation and competence of their graduates as key elements for promoting innovation and entrepreneurship.
Wilson et al., 2007	Examines the relationships between gender, entrepreneurial self-efficacy, and entrepreneurial intentions in two sample groups: adolescents and adult master of business administration (MBA) students.
Pittaway & Cope, 2007	Explores different themes within entrepreneurial education by means of a systematic literature review.
Oosterbeek et al., 2010	Analyzes the impact of a leading entrepreneurship program on the entrepreneurial skills and motivations of college students.
Neck & Greene, 2011	Focuses on the ability for students to practice entrepreneurship and introduces a portfolio of practice-based pedagogies.
Martin et al., 2013	A quantitative review of the literature which, in the context of human capital theory, finds that there is support for entrepreneurship education and human capital formation.
Zhang et al., 2014	Identifies the relationship between entrepreneurship education, prior entrepreneurial exposure, perceived desirability and feasibility, and entrepreneurial intentions of university students.
Fayolle & Gailly, 2015	Proposes to put into practice the concept of entrepreneurial intentions and its antecedents in an attempt to address those issues.
Piperopoulos & Dimov, 2015	Contextualizes the relationship between student's self-efficacy beliefs and entrepreneurial intentions in the content and pedagogy of the entrepreneurship course.
Westhead & Solesvik, 2016	Explores the links between entrepreneurship education (EE) participation, alertness and risk-taking skills and the intensity of entrepreneurial intention relating to becoming an entrepreneur.
Karimi et al., 2016	Building on the theory of planned behavior, ex ante and ex post surveys were used to assess the impact of elective and compulsory entrepreneurship education programs on students' entrepreneurial intention and identification of opportunities.
Walter & Block, 2016	Drawing on institutional theory and the model of entrepreneurial action, the article builds and tests a multilevel model on the outcomes of entrepreneurship education.
Premand et al., 2016	Identifies how entrepreneurship education has the potential to enable youth to gain skills and create their own jobs.
Mandel & Noyes, 2016	Analyzes experiential entrepreneurship education offerings, programs and courses, among the "Top 25" undergraduate schools of entrepreneurship in the USA.
Bae et al., 2014	Investigates the relationship between entrepreneurship education and entrepreneurial intentions.
Neck & Corbett, 2018	Focuses on the scholarship of teaching and learning of entrepreneurship.

Source: Own Compilation.

The so-called “*entrepreneurial society*”, which was introduced into the education system from primary school, plays an important role in the development of the attributes and skills which are needed to stimulate the potential for innovation of the students and can influence the processes of socialization and adaption to change.

In order to develop entrepreneurship education and training it is important to consider it within the wider concept of business studies and skills and have an understanding of basic economics, including the development of personal attributes focused on the creation of new businesses (Chamber of Commerce and Ministry of Education, 2006). The proper approach for the development of entrepreneurial competencies must be strengthened from an educational perspective by means of a variety of skills such as creativity, personal and group leadership, problem solving, assessment of economic risks and the ability to develop plans and entrepreneurial projects as well as the capacity to carry these out to the end (Sobrado Fernández & Fernández Rey, 2010). Other personal attributes and general and transversal competencies must also be developed and form the base for enterprise mentality and behavior. On the other hand, the sector must be sensitive to the option of self-employment and entrepreneurial start-ups. Education can lead to the creation of innovative entrepreneurs capable of learning and using their education in innovative ways (González, 2001). To learn about enterprises means to learn about the management of people and things for economic gain. To learn about business is also about learning to do things for oneself. This is why, sometimes, teaching about starting a business may be a very hard work (Pérez-Orive, 2004).

Among the conclusions reached by the Council of the European Union (2015) regarding “*entrepreneurial education and training*”, special reference was made to Higher Education in which “*an entrepreneurial mentality was developed which could be of considerable benefit to citizens, both in their professional and private lives*”. Member States were invited to “*promote the development of a coordinated focus on educational projects for entrepreneurship which would cover the entire education and training system*”. These types of projects are not just relevant in Europe but are also important in other countries such as Turkey (Turker & Sonmez Selçuk, 2009), Indonesia, Japan, South Korea, Taiwan and Thailand (Indarti et al., 2016).

An important issue to address is the identification of “*potential entrepreneurs*” who will embark on this type of education. As to the question of whether entrepreneurs are born or made (Freire, 2015), the answer is that they can be made but, just like an apprentice pianist who must develop their muscle dexterity, their eyesight, and most of all, their hearing, an entrepreneur must develop their skills and abilities, both at a personal and professional level (Uribe-Toril, 2008). Hence, in the case of journalism students, the acquisition of knowledge delivered by the university which is later applied to entrepreneurial journalism and communication projects has increased the entrepreneurial intentions of many students (Aceituno et al., 2015, 2018; Barnes & de Villiers Scheepers, 2017). A similar behavior can be observed among software engineering students (Quezada-Sarmiento & Mengual-Andrés, 2018).

The needs of researchers to publish their finding in scientific publications which have an impact factor index has had repercussions in academia. One of its effects is that Spanish authors publishing in the field of entrepreneurship education currently occupy fourth place in a global ranking which is headed by the United States. This fact has led to the interesting field of bibliometric analysis which is based on two principal criteria: the scientific publication of results as a consequence of academic or scientific research (Moed, 2005) and the citations derived from these articles as a proxy measurement of their scientific impact (Merton, 1977).

Indeed, this paper utilizes bibliometric analysis to achieve its objectives and analyze, in the period between 2001 and 2018, the research included in scientific journals of impact of the terms associated with education and entrepreneurship. The current trends in entrepreneurship education research are also analyzed and identified by means of a keyword analysis. The final results are analyzed using graphics produced by the VOSviewer.

This article has the following structure. First, the introduction sets out the synergies between education and entrepreneurship and the bibliometric methodology is summarized as well as the resources utilized in this research. Next, the conclusions are presented, incorporating and proposing lines of research which can enrich the subjects currently under investigation.

METHODOLOGY

Bibliometric analysis is a common methodology used to analyze scientific output in various dimensions. It can be applied to a single journal as studied by García-Lillo et al. (2015) (*The International Journal of Human Resource Management*), Corrales-Reyes et al. (2018) (*Investigación en Educación Médica*), Uribe-Toril et al. (2019) (*Forest*). This methodology can also be used to analyze specific issues such as the article by Caballero et al. (2011) on the use of social networks in television as contained in Spanish doctoral theses (1976/2007), or the study by Beltrá & Llaguno (2013) in relation to the study of women in advertising and the differences between printed and audio-visual media.

In relation to the subject of entrepreneurship education, the article by Arias et al. (2016) in which the entrepreneurial intention of university students is studied, stands out. In addition, Nabi et al. (2017) present a systematic review of the current keywords used in 159 articles published between 2001 and 2016.

Although there is controversy about the best database for bibliometric analysis (Bar-Ilan, 2008; Vieira & Gomes, 2009; Salvador-Oliván & Agustín-Lacruz, 2015; Mongeon & Paul-Hus, 2016) this research has used both. For the knowledge areas of Social Sciences, Politics, Behavior and Education as well as for Economic and Business Studies, articles which are published in high ranked journals, such as those that included in the list of “*Journal Citation Reports (JCR), Social Sciences Edition*” and “*Journal Citation Reports, Science Edition*”, as well as the Scimago Journal Rank (SJR) are deemed worthy of inclusion.

This study of the evolution of keywords related to education and entrepreneurship published in scientific journals has been carried out by means of a bibliometric analysis of the literature using those terms. The study is based on the sequential steps proposed by Brereton et al. (2007) (Figure 1):

1. Definition of search criteria, keywords and period under investigation.
2. Selection of databases, Web of Science and Scopus.
3. Adjustment of search criteria.
4. Data selection.
5. Complete export of retrieved data.
6. Analysis and discussion of results.

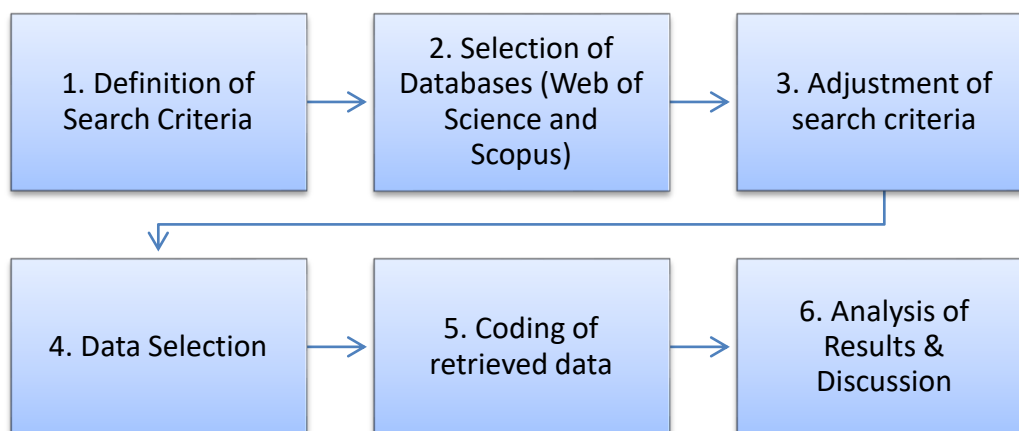


FIGURE 1
PROCESS FOR SELECTING KEYWORDS
SOURCE: OWN COMPILATION

The results of the searches on the Core Collection of WoS and Scopus, in addition to the search criteria can be seen in Table 2.

WoS (Core Collection)		Scopus			
<i>"Entrepreneurship"</i> and <i>"Emprendimiento"</i>		36,160	<i>"Entrepreneurship"</i> and <i>"Emprendimiento"</i>	34,687	
Excludes	2019	36,042	Excludes	2019	34,484
Limited to	Education educational research	3,386	Limited to	Social Science	10,251
Limited to	2001-2018	3,346	Limited to	2001-2018	9,431
Limited to	articles	1,564	Limited to	articles	6,814
			Limited to	journals	6,713
			Included	Education	3,423
			Included	Educational	1,308

Source: Own compilation

After adjusting the research criteria and applying the relevant filters (Table 3), in the period 2001 to 2018 resulted in 1,564 articles in the WoS Core Collection database and 1,308 articles in Scopus. In the case of WoS, other types of documents could have been included and results are displayed in Table 3.

Type	Number of Documents
Proceedings papers	1,566
Articles	1,564
Book chapters	359
Editorials	90
Book Reviews	53
Reviews	43
Books	28
Letters	3
Corrections	1

Source: Own compilation

The following aspects were analyzed in this study: total number of documents, articles and citations per year; their Hirsch index (h-index) (Hirsch, 2005); articles and citations by country; evolution of articles in the most influential countries; principal authors and universities; most influential journals; principal organizations by author; most cited articles and keyword trends.

RESULTS

Evolution in the Number of Articles per Year

Table 4 displays the evolution in the publication of scientific articles between 2001 and 2018, the Article Citation Rate (ACR) (total citations divided by the number of year) as well as their H-index.

WOS					SCOPUS				
Year	Articles	Cites	ACR	h	Year	Articles	Cites	ACR	h
2001	1	2	0.11	1	2001	5	313	17.38	5
2002	3	23	1.35	2	2002	6	182	10.70	4
2003	2	18	1.12	2	2003	13	380	23.75	11
2004	11	889	59.26	10	2004	11	666	44.40	9
2005	28	777	55.50	12	2005	18	780	55.71	11
2006	43	714	54.92	13	2006	20	510	39.23	8
2007	63	505	42.08	12	2007	23	243	20.25	8
2008	64	692	62.90	13	2008	38	862	78.36	15
2009	66	629	62.90	14	2009	47	1,095	109.5	19
2010	100	886	98.44	16	2010	60	1,506	167.33	20
2011	81	610	76.25	14	2011	60	1,042	130.25	17
2012	93	826	118	17	2012	91	1,179	168.42	20
2013	128	785	130.83	16	2013	92	1,120	186.66	18

2014	158	700	140	12	2014	152	865	173	15
2015	153	566	141.50	11	2015	147	792	198	13
2016	181	316	105.33	9	2016	160	610	203.33	10
2017	226	152	76	5	2017	184	285	142.50	7
2018	163	30	30	2	2018	181	112	112	4

Source: Own compilation

There has been a growing trend in the number of articles indexed in both the databases analyzed (Figure 2), with WoS holding more articles between 2005 and 2017. However, this trend is reversed in 2018 with Scopus leading in terms of number of articles. During the period of the financial crisis between 2007 and 2014, the rate of publication grew moderately. Although 2010 saw a sharp increase in the number of publication on WoS, the level fell to previous levels in the following year. In 2011, Scopus saw an increased level of publications with the same trend being repeated on WoS the following year.

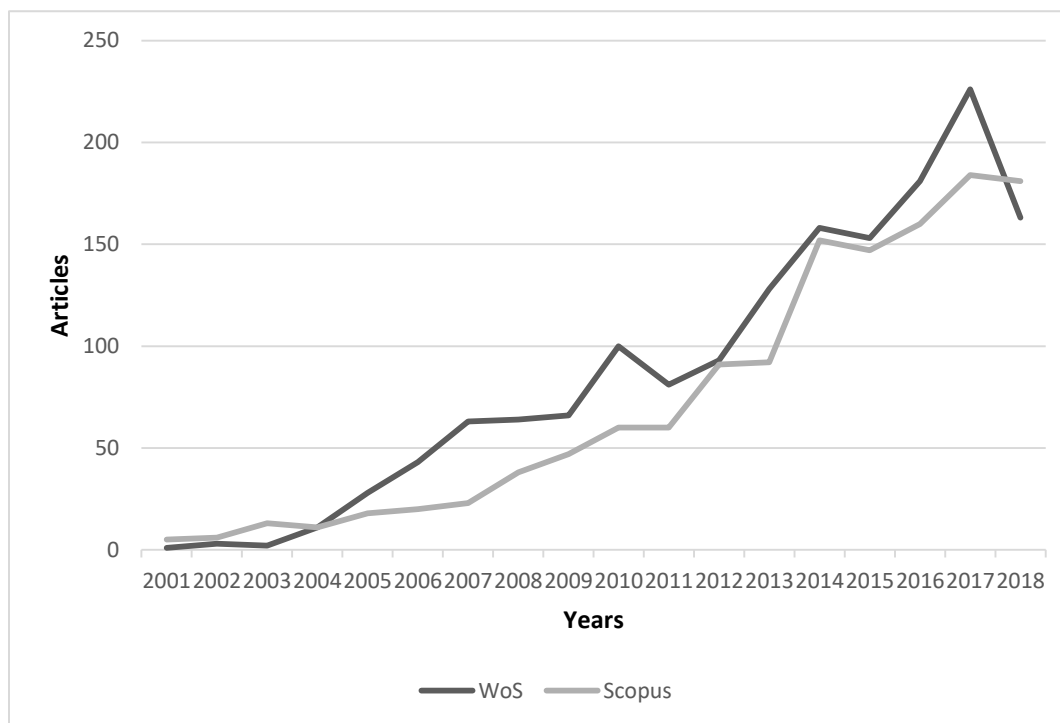


FIGURE 2
EVOLUTION IN NUMBER OF ARTICLES ON WoS AND SCOPUS
SOURCE: OWN COMPILATION

Figure 3 shows the evolution in the number of citations per article. The highest number was achieved in 2004 on WoS with 889 citations. For Scopus, the highest number of citations was achieved in 2010 with 1,506 citations. Both databases show the highest concentration of citations during the global financial crisis. The same phenomenon occurs with the H-index.

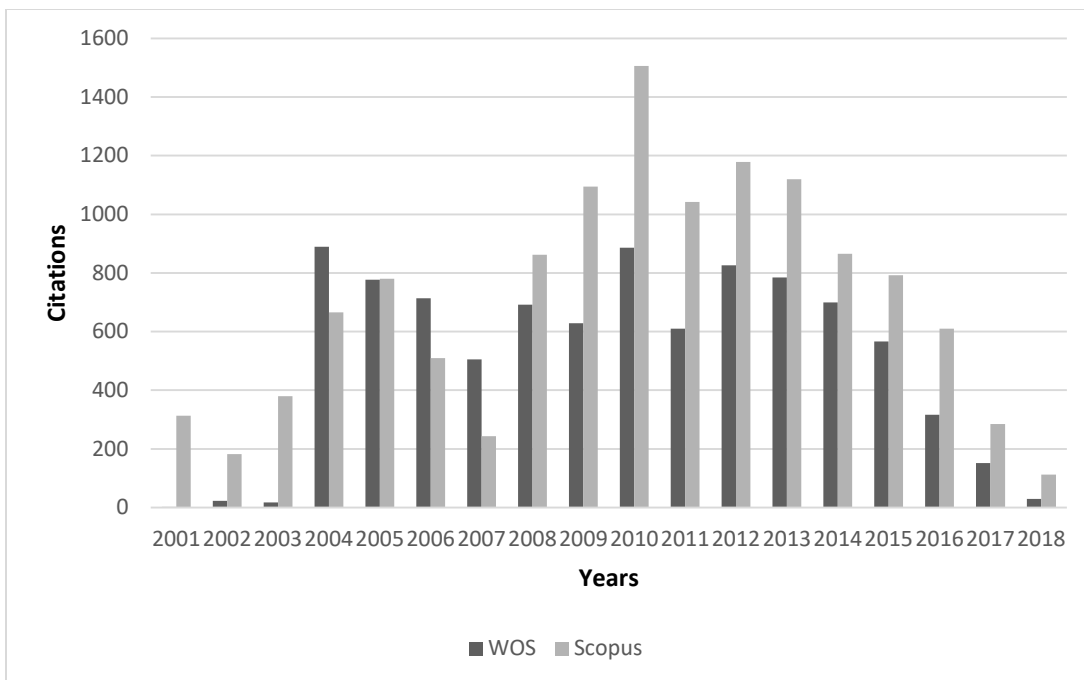


FIGURE 3
EVOLUTION IN NUMBER OF CITATIONS IN WOS AND SCOPUS
SOURCE: OWN COMPILATION

Most Influential Countries

When considering the countries publishing articles on entrepreneurial education, both databases show the United States and the United Kingdom as leading this ranking with these two countries being considerably ahead of the remainder. Spain also plays an important role in the scientific output on this subject and is ranked third in both databases. Table 5 also displays the ACR, the number of article per year (AY) as well as their H-index.

Table 5 MOST INFLUENTIAL COUNTRIES											
WOS						SCOPUS					
Country	Articles	Cites	AY	ACR	h	Country	Articles	Cites	AY	ACR	h
USA	346	2,555	19.22	0.14	24	USA	281	3,477	15.61	193.17	31
United Kingdom	268	2,622	14.89	0.15	25	United Kingdom	160	3,064	8.89	170.22	28
Spain	121	188	6.72	10.44	8	Spain	80	398	4.44	22.11	9
Australia	74	671	4.11	37.28	14	South Africa	68	253	3.78	14.06	7
Finland	65	495	3.61	27.50	12	Finland	67	655	3.72	36.39	15
China	61	133	3.39	7.39	7	Australia	64	621	3.56	34.50	14
Canada	48	633	2.67	35.17	10	Malaysia	54	245	3.00	13.61	9
Netherlands	42	363	2.33	20.17	11	Sweden	38	348	2.11	19.33	11
Sweden	42	341	2.33	18.94	11	Germany	38	668	2.11	37.11	13
Ireland	41	415	2.28	23.06	9	Canada	34	488	1.89	27.11	11
South Africa	38	120	2.11	6.67	5	China	32	130	1.78	7.22	6

Portugal	36	142	2.00	7.89	5	Netherlands	32	803	1.78	44.61	14
Ecuador	36	4	2.00	0.22	1	Denmark	28	413	1.56	22.94	11
Italy	34	74	1.89	4.11	5	Norway	27	288	1.50	16.00	9
France	33	110	1.83	6.11	7	Portugal	25	106	1.39	5.89	5
Norway	32	286	1.78	15.89	9	France	23	405	1.28	22.50	9
Denmark	32	183	1.78	10.17	8	Italy	20	61	1.11	3.39	5
Brazil	30	22	1.67	1.22	2	Brazil	20	44	1.11	2.44	3
Germany	28	193	1.56	10.72	6	Ireland	13	490	0.72	27.22	7
Malaysia	27	196	1.50	10.89	7	Ecuador	1	6	0.06	0.33	1

Source: Own compilation

Most of the citations come from the United States and the United Kingdom, followed by Australia, Canada and Finland in the case of WoS and the Netherlands, Germany and Finland in the case of Scopus. With regards to the average number of citations, some differences can be observed in the two databases. In the case of WoS, Canada and Ireland lead the ranking with an average of 13.19 and 10.12 citations per articles, respectively. In contrast, Scopus ranks Ireland and the Netherlands as the countries with the highest average of citations with 37.69 and 25.09 respectively. In terms of the H-index, both databases give the highest ranking to the United States and the United Kingdom. Spain, whilst being ranked third in terms of the number of articles, does not have a significant ranking in terms of average number of citations. The reason for this could be because Spanish researchers traditionally did not to publish in journals included in those two databases, a trend which was reversed from 2013 onwards (Figure 4).

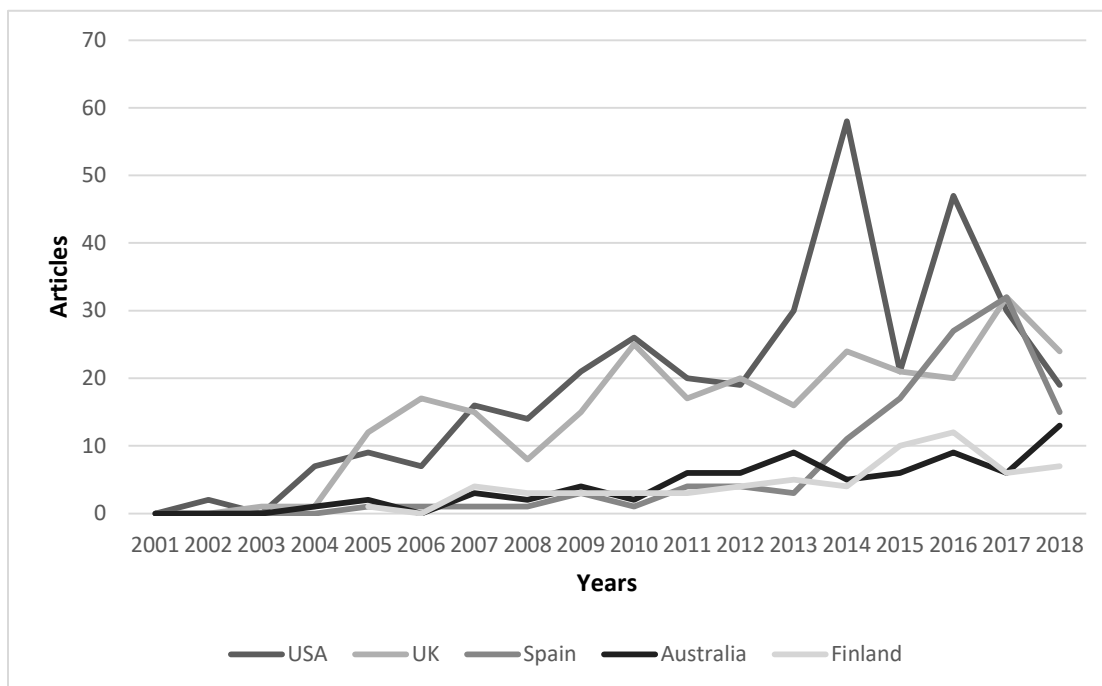


FIGURE 4
EVOLUTION IN THE NUMBER OF ARTICLES PUBLISHED BY THE MOST INFLUENTIAL COUNTRIES (2001-2018)
SOURCE: OWN COMPILATION

Leading Universities

Of the top ten institutions of higher learning appearing on WoS related to entrepreneurial education, four are located in the United Kingdom, three in the United States, and one each in Finland, Ireland and Denmark (Table 6). The University of Florida (U.S.) leads the ranking with 30 published articles. It is followed by the University of Birmingham (U.K.) with 18 and the universities of Indiana, London and Turku with 16 articles each.

With regards to the number of citations, the universities of Birmingham (324), Turku (183) and Babson College (153) stand out. The highest h-indexes belong to the universities of Birmingham (9) and Turku (7). It is evident that research in this field is dominated by universities in English-speaking countries on the WoS database.

In the case of Scopus, however, the most outstanding institutions are located in Finland (Polytechnic University of Lappeenranta, University of Turku and University of Western Finland), two of them in Malaysia (Putra University and Kebangsaan University), and the rest with one institution in the top 10: United States, Australia, Spain, Denmark and South Africa. In terms of the number of publications, the ranking is led by the Polytechnic University of Lappeenranta (14); followed by the University of Pennsylvania (13) and a group of eight universities with 10 articles each. In terms of the h-index, the Polytechnic University of Lappeenranta and the universities of Pennsylvania and Tasmania stand out with an h-index of 8.

Table 6
MOST RELEVANT UNIVERSITIES

WOS						SCOPUS					
University	Articles	Cites	AY	ACR	h	University	Articles	Cites	AY	ACR	h
University of Florida (USA)	30	53	1.67	2.94	3	Polytechnic University of Lappeenranta (Finland)	14	214	0.78	11.89	8
University of Birmingham (UK)	18	324	1.00	18.00	9	University of Pennsylvania (USA)	13	137	0.72	7.61	8
University of Turku (Finland)	16	183	0.89	10.17	7	University of Tasmania (Australia)	10	198	0.56	11.00	8
University of London (UK)	16	71	0.89	3.94	5	University of Turku (Finland)	10	160	0.56	8.89	6
University of Indiana (USA)	16	66	0.89	3.67	4	Autonomous University of Barcelona (Spain)	10	159	0.56	8.83	5
University of Ulster (UK)	15	95	0.83	5.28	5	Aarhus University (Denmark)	10	108	0.56	6.00	7
Babson College (USA)	14	153	0.78	8.50	5	Putra University (Malaysia)	10	95	0.56	5.28	5
8. University of Limerick (Ireland)	14	109	0.78	6.06	5	University of Western Finland (Finland)	10	66	0.56	3.67	4
Aarhus University (Denmark)	14	99	0.78	5.50	4	Kebangsaan University (Malaysia)	10	51	0.56	2.83	3
University of South Wales (UK)	13	147	0.72	8.17	5	University of Limpòpo (South Africa)	10	25	0.56	1.39	3

Source: Own Compilation

Most Influential Journals

Proof of the importance and topical nature of the subject of entrepreneurial education is the fact that the majority of journals which cover this topic are included in the Emerging Sources Citation Index of WoS. Specifically, the journal Education and Training leads the ranking with 208 published articles, whilst Industry and Higher Education is ranked second with 170 articles. Both of these journals are also included in Scopus, the former leads the ranking with 138 articles (Q1) whilst the latter is third in the ranking with 75 articles (Q3).

In addition to the number of articles, the most influential journals in terms of the number of citations and h-index in the Emerging Sources Citation Index are Education and Training (3,275 citations and h-index of 30); Academy of Management Learning Education (1,261 citations and h-index of 16). The first of these is located in the United Kingdom whilst the second is in the United States.

Scopus also includes two journals from the United Kingdom: Education and Training (3,276 citations and h-index of 31) and the International Journal of Gender and Entrepreneurship (322 citations and h-index of 10).

When both databases, WoS and Scopus, are analyzed together, the most important journals are the following: Education and Training, Industry and Higher Education, International Journal of Management Education and Eurasia Journal of Mathematics, Science and Technology Education (Tables 7 and 8).

Journal	Impact Factor	Art	Cit	Cit/Art	h
Education and Training (United Kingdom)	Emerging Sources Citation Index	208	3,275	15.75	30
Industry and Higher Education (United States)	Emerging Sources Citation Index	170	527	3.1	10
Review of Austrian Economics (Netherlands)	Emerging Sources Citation Index	40	187	4.68	7
International Journal of Management Education (Netherlands)	Emerging Sources Citation Index	35	270	7.71	9
Revista Publicando (Ecuador)	--	32	3	0.09	1
Academy of Management Learning Education (United States)	2.866 (Q1)	27	1,261	46.7	16
E Mentor (Poland)	Emerging Sources Citation Index	16	8	0.5	2
Journal of Education for Business (China)	Emerging Sources Citation Index	15	113	7.53	6
Educational Sciences Theory Practice (Turkey)	0.532 (Q4)	14	0	0	0
Eurasia Journal of Mathematics, Science and Technology Education (United Kingdom)	0.903 (Q3)	14	33	2.36	2
Journal for Educators Teachers and Trainers (Spain)	Emerging Sources Citation Index	14	2	0.14	1
Journal of Management Education (United States)	Emerging Sources Citation Index	14	63	4.5	6

Source: Own Compilation

Journal	Impact factor	Art	Cit	Cit/Art	h
Education and Training (United Kingdom)	0.51 (Q1)	138	3.276	23.74	31
Journal Of Entrepreneurship Education (United States)	0.31 (Q2)	80	214	2.68	11
Industry and Higher Education (United States)	0.23 (Q3)	75	308	4.11	9
Mediterranean Journal of Social Sciences (Italy)	0.12 (Q3)	55	90	1.64	5
International Journal of Gender and Entrepreneurship (United Kingdom)	0.45 (Q2)	24	322	13.42	10
International Journal of Management Education (Netherlands)	0.6 (Q2)	24	195	8.13	9
Eurasia Journal of Mathematics Science and Technology Education (United Kingdom)	0.38 (Q2)	16	42	2.63	3
Sustainability (Switzerland)	0.54 (Q2)	14	36	2.57	3
International Journal of Engineering Education (Ireland)	0.43 (Q2)	13	102	7.85	5
Advances in Engineering Education (United States)	0.55 (Q1)	11	106	9.64	6

Source: Own Compilation

Most Relevant Authors

Table 9 displays the authors with the highest volume of articles published on the WoS database on the topic of entrepreneurial education. The highest ranked author is Harry Matlay with 22 articles, 426 citations and an h-index of 10. He is followed by Andrew Penaluna with an h-index of 7, 12 articles and 123 citations. There are a further three researchers, each with an h-index of 6: Paul Jones (13 articles and 152 citations); Colin Jones (11 articles and 162 citations) and David Rae (9 articles and 104 citations).

Author	Centre/University	Art	Cites	C/A	h
Matlay, H.	Global Independent Res, Coventry, W Midlands, England	22	426	19.36	10
Jones, P.	Coventry Univ, Int Ctr Transformat Entrepreneurship, Coventry, W. Midlands, England	13	152	11.69	6
Morris, M.H.	Univ Florida, Warrington College Business Adm, Entrepreneurship, Gainesville, FL, USA	13	3	0.23	1
Penaluna, A.	Univ Wales Trinity St David, Carmarthen, Dyfed, Wales	12	123	10.25	7
Jones, C.	Queensland Univ Technology, Brisbane, Qld, Australia	11	162	14.73	6
Fayolle, A.	EMLYON Business School, Entrepreneurship, Ecully, France.	10	41	4.10	4
Karatko, D.F.	Indiana University, Entrepreneurship, Kelly Sch Business, Bloomington, IN, USA	10	4	0.40	1
Rae D.	Bishop Grosseteste University, Lincoln, United	9	104	11.56	6
Mars, M.M	Univ Arizona, Dept Agr Educ, Tucson, AZ, USA	9	104	11.56	4
Penaluna, K.	Univ Wales Trinity St David, Carmarthen, Dyfed, Wales	9	94	10.44	5
Greene, P.G.	Babson Coll, Babson Pk, MA, USA	9	16	1.78	3

Source: Own Compilation

Table 10 includes the results of the most relevant authors according to Scopus. The results are similar to those from WoS. The most relevant authors, in this instance, are Colin Jones with an h-index of 8 (10 articles and 194 citations); Harry Matlay with an h-index of 7 (9 articles and 301 citations) and Andrew Penaluna, also with an h-index of 7 (9 articles and 199 citations). The author with the largest number of citations (301) is Matlay.

Author	Centre/University	Art	Cit	C/A	h
Jones, C.	Queensland Univ Technol, Brisbane, Qld, Australia	10	194	19.40	8
Yemini, M.	Tel Aviv University, Tel Aviv-Yafo, Israel	10	67	6.70	5
Matlay, H.	Global Independent Res, Coventry, W Midlands, England	9	301	33.44	7
Penaluna, A.	Univ Wales Trinity St David, Carmarthen, Dyfed, Wales	9	119	13.22	7
Urbano, D.	Universitat Autònoma de Barcelona, Barcelona, Spain	9	150	16.67	5
Fatoki, O.	University of Limpopo, School of Economics and Management, Sovenga, South Africa	7	22	3.14	3
Johansen, V.	Østlandsforskning, Welfare and organisation, Lillehammer, Norway	7	48	6.86	3
Komulainen, K.	Itä-Suomen yliopisto, School of Educational Sciences and Psychology, Kuopio, Finland	7	58	8.29	4
Penaluna, K.	Univ Wales Trinity St David, Carmarthen, Dyfed, Wales	7	97	13.86	5
Räty, H.	Itä-Suomen yliopisto, Department of Education and Psychology, Kuopio, Finland	7	56	8.00	4

Source: Own Compilation

Most Cited Articles

As previously shown in Graph 2, 2004 obtained the largest volume of citations on the WoS database, this fact is also shown in Table 11 with regards to the most cited articles. Indeed, among the four most cited articles, three were published in 2004: Benson Honig (315 citations), Dawn R. DeTienne & Gaylen N. Chandler (198) and Dean A. Shepherd (146).

Title	Author	Source	Citations
Entrepreneurship Education: Toward a Model of Contingency-Based Business Planning	Honig, B.	Academy of Management Learning & Education. 3(3), 258-273: 2004	315
Entrepreneurship education and training: can entrepreneurship be taught? Part I	Colette, H.; Hill, F., & Leitch, C.	Education and Training. 47(2), 98-111; 2005	218
Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test	DeTienne, D.R., & Chandler, G.N.	Academy of Management Learning & Education. 3(3), 242-257: 2004	198
Educating Entrepreneurship Students About Emotion and Learning From Failure	Shepherd, D.A.	Academy of Management Learning & Education. 3(3), 274-287: 2004	146
Researching entrepreneurship and education Part 2: what is entrepreneurship education and does it matter?	Matlay, H.	Education and training. 48(8-9), 704-718: 2006	111

Source: Own Compilation

With regard to the most relevant articles as shown in Table 10, the first of these, Honig (2004) affirms that despite the ubiquity of business planning education in entrepreneurship, there is little evidence that planning leads to success and that using Piaget's concept of equilibration can provide cognitive tools and flexibility in order to accommodate unanticipated factors. The second article by Colette et al. (2005) highlights the need for evaluating educational programs as well as the need for educators and trainers to have a fuller understanding of their programs from the start in order to more accurately assess the outcomes.

Despite the growth in entrepreneurship education and training, the article highlights the lack of uniformity and draws attention to the art and science of entrepreneurship, reaching the consensus that at least some aspects of entrepreneurship can be successfully taught. The third paper by DeTienne & Chandler (2004) proposes that the identification of opportunities is a competency to be applied to the entrepreneurship classroom and the development of skills needed to identify opportunities. The results show that individuals can learn processes of opportunity identification and improve both the number of ideas generated and the innovativeness of those ideas. In addition, the results indicate that a predisposition towards innovation does not significantly alter the ability to learn processes of opportunity identification. The fourth article by Shepherd (2004) explains that as theory develops and our understanding of the role of emotion in learning from failure increases, entrepreneurship educators have the opportunity to consider these advancements in their pedagogies. This requires a focus on how students “*feel*” rather than on how, or what, they “*think*.” The article suggests educating the students in how to manage their emotions in order to avoid failure and for organizations to improve their ability to regulate their emotions. Lastly, the fifth article by Matlay (2006) carries out an exhaustive review of the literature and structured evaluation of topics related both directly and indirectly with “*entrepreneurial training*” in the United Kingdom. The research points out that, in order to obtain conclusive results, more in depth research is required of the current provision of entrepreneurship education in the United Kingdom, as well as the initiatives which would help gain a better understanding of the scope and limitations of the wide range of entrepreneurship education programs. All five articles were published in the Academy of Management Learning & Education and Education and Training journals.

With regards to Scopus, the most cited articles are by Navis & Glynn (247); Colette, H., Hill, F. & Leitch, C. (239); Kirby, D.A. (216); Karlan, D. & Valdivia, M. (179) and Gelderen, M.V., Brand, M., Praag, M.V., Bodewes, W., Poutsma, E. & Gils, A.V. (173).

Title	Author	Source	Citations
How new market categories emerge: Temporal dynamics of legitimacy, identity, and entrepreneurship in satellite radio, 1990-2005	Navis, C. & Glynn, M.A.	Administrative Science Quarterly. 55(3), 439-471: 2010	247
Entrepreneurship education and training: can entrepreneurship be taught? Part I	Colette, H.; Hill, F. & Leitch, C.	Education and Training. 47(2), 98-111: 2005	239
Entrepreneurship education: Can business schools meet the challenge?	Kirby, D.A.	Education and Training. 46, 510-519: 2004	216
Teaching entrepreneurship: Impact of business training on microfinance clients and institutions	Karlan, D. & Valdivia, M.	Review of Economics and Statistics. 93(2), 510-527: 2011	179
Explaining entrepreneurial intentions by means of the theory of planned behaviour	Gelderen, M.V.; Brand, M.; Praag, M.V; Bodewes, W.; Poutsma, E. & Gils, A.V	Career Development International. 13(6), 538-559: 2008	173

Source: Own Compilation

The first article by Navis and Glynn (2010) explains how the new market categories are legitimated by a confluence of internal (entrepreneurial ventures) and external (interested audiences) factors. The second paper by Colette et al. (2005) has been mentioned in the previous section on articles within WoS. The third article by Kirby (2004) examines the characteristics and role of the entrepreneur and challenges for business schools faced with the need to develop more enterprising individuals. The article argues that the traditional education system stultifies rather than develops the necessary attributes and skills to produce entrepreneurs and affirms that in order to develop entrepreneurs, significant changes, both in terms of content and the process of learning, are required. In particular, the article suggests that there needs to be a change in emphasis, from educating “*about*” entrepreneurship to educating “*for*” it. The fourth article, by Karlan & Valdivia (2011) is based on the fact that a growing number of microfinance organizations seek to improve the human capital of micro-entrepreneurs in order to improve the livelihood of their clients and thus help them alleviate poverty. Using a randomized control trial, the marginal impact of adding business training to a Peruvian village banking program for female micro-entrepreneurs was measured. Lastly, the fifth paper by Van Gelderen et al. (2008) sets out an empirical investigation of the entrepreneurial intentions of business students. The authors employ the theory of planned behavior (TPB), in which intentions are regarded as resulting from attitudes, perceived behavioral control, and subjective norms.

Trends in Research

By means of a keyword analysis the most used terms are identified as well as the current trends related to the new lines of research in education and entrepreneurship. To this end, VOSviewer was used to produce trend maps using a graduation of colors indicating the most current terms. For example, blue is used for terms since 2012, whilst yellow is used for the most recent research terms. Keywords from both databases are used in the trend maps. Within WoS, the keyword trends revolve around concepts such as governance, neoliberalism, university, youth, design thinking, action-research, active learning, lifelong learning, effectuation and entrepreneurial education (Figure 5).

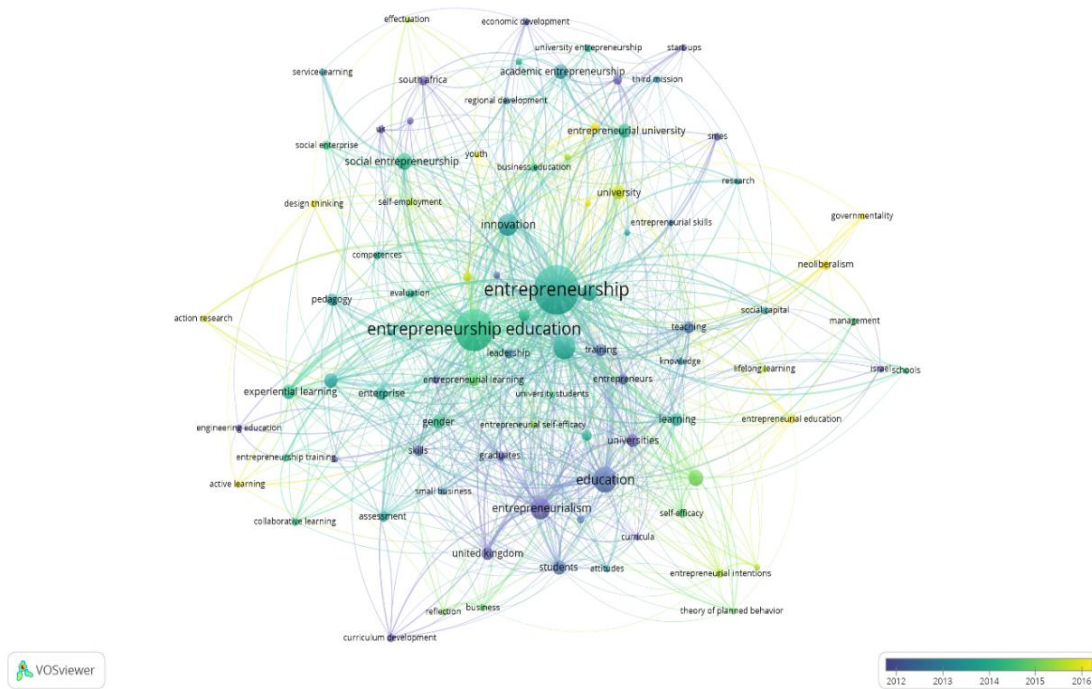


FIGURE 5
TRENDS IN KEYWORDS ON WoS

The keyword trends on Scopus are focused on terms related to motivation, neoliberalism, youth, entrepreneur’s intentions, pedagogy, active learning, teacher education, engineering education, design and opportunity recognition (Figure 6).

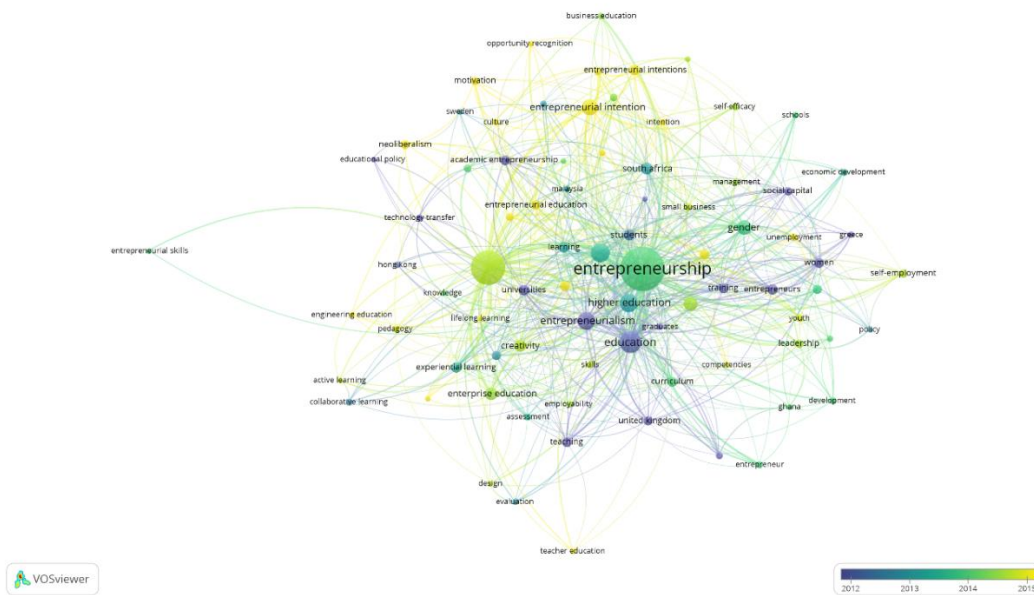


FIGURE 6
TRENDS IN KEYWORDS ON SCOPUS
SOURCE: OWN COMPILATION

The keyword trends in both databases overlap in terms such as neoliberalism, active learning, youth and design thinking.

CONCLUSIONS

This article analyzes the synergies between the concepts of education and entrepreneurship and trends in its research. The analysis was carried out using the WoS and Scopus databases by means of a bibliometric analysis. A total of 1,564 articles were found in the Core Collection of WoS and 1,308 documents were found on Scopus for the period 2001 to 2018.

The results show a clear and positive evolution in the scientific output on the topic, both in terms of the number of articles as well as citations, particularly after 2010. The United States and the United Kingdom are the most influential countries according to both WoS and Scopus in relation to both the number of documents, citations and h-index. Spain is ranked third in terms of the volume of articles published, although it shows below average values in terms of the number of citations and h-index.

The global financial crisis resulted in an increase in the number of articles and citations, particularly in 2010. For the most part, and according to WoS, the most influential organizations are located in the United Kingdom and the United States. On Scopus, however, the most influential organizations are located in Finland.

According to both WoS and Scopus, the most influential journal in the field of entrepreneurship education is *Education and Training*, based in the United Kingdom. With regards to the most relevant authors, Harry Matlay occupies first place on WoS, while Colin Jones is ranked first on Scopus.

The most cited article on WoS is “*Entrepreneurship Education: Toward a Model of Contingency-Based Business Planning*” (Honig, B.), while on Scopus, the most cited article is, “*How new market categories emerge: Temporal dynamics of legitimacy, identity, and entrepreneurship in satellite radio, 1990-2005*” (Navis, C. & Glynn, M.A.).

With reference to the trends in research keywords, both databases agree on the following terms: neoliberalism, active learning, youth and design thinking. These terms can serve as future lines of research.

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