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# SCIENTOMETRIC ANALYSIS ON ENTREPRENEURIAL ORIENTATION AND PERSEVERANCE PRODUCED BASED ON WEB OF SCIENCE DATA BETWEEN 1975 AND 2023

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## SUMMARY

The present analysis explicates the scientometric relationships, in line with entrepreneurial orientation and perseverance, with the purpose of understanding the relationship between entrepreneurial orientation and the construct called grit. The research, in its central purpose, is inserted in the description of bibliometric indicators of scientific development in this field, from the earliest records of the Web of Science database, online, corresponding to January 1, 1975, until December 31, 2023. The reported methodology identified authors, countries, publications, citations, indexed journals, and institutions according to research in the area of entrepreneurial orientation and persever-

ance in the context of an updated discussion on studies in this field. The results showed sustained evidence regarding a growing development of publications related to the thematic vector, increasing in recent years, and a geographical concentration associated with the United States. Additionally, the lines of research observed in the most influential publications are related to the areas of strategy, performance, and success. Altogether, the main contribution of this research revealed a synthesis of knowledge in the context of a scientometric analysis on entrepreneurial orientation and grit, offering an updated view on research in entrepreneurial orientation and perseverance.

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## Introduction

 According to studies on entrepreneurial orientation, we know it is a relevant conceptual construct and a source of competitive advantage as a form of entrepreneurial

behavior in academic and business environments (Lumpkin and Dess, 1996; 2001; Rauch *et al.*, 2009; Lee *et al.*, 2011; Mishra, 2017; Capelleras *et al.*, 2020; Kwon, 2021; Akos *et al.*, 2023; Chhabra *et al.*, 2023). Indeed, it is a category composed of innovation, risk-taking, and pro-activity (Miller, 2011; Barrientos Oradini

*et al.*, 2022; Guo *et al.*, 2023), to which autonomy and competitive aggressiveness are added (Covin and Slevin, 1989; Lumpkin and Dess, 1996).

In this line, what has been evidenced is the comparability of entrepreneurial behavior among different individuals or even within the same

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individual at different times, as it relates to: the ability to perceive opportunities, high entrepreneurial performance, fear of failure, and among other variables associated with business, with social capital and risk-taking (Hult *et al.*, 2004; Covin *et al.*, 2006; Naldi *et al.*, 2007; Stam and Elfring, 2008; Vij and Bedi, 2012; Boada-Grau *et al.*, 2016; Cho and Lee, 2018; Barrientos Oradini *et al.*, 2022).

Academic literature addresses the concept of entrepreneurial orientation in a multidimensional sense and considering the existence of a mode of behavior (Covin and Slevin, 1989; Ramachandran and Ramnarayan, 1993; Lumpkin and Dess, 1996, 2001; Zhou *et al.*, 2005; Miller, 2011; Rosenbusch *et al.*, 2011; Berrone *et al.*, 2012; Vij and Bedi, 2012; Mishra, 2017; Capelleras *et al.*, 2020; Kwon, 2021; Ákos *et al.*, 2023; Guo *et al.*, 2023). In this framework, the concept of entrepreneurial orientation can be linked to the components of the grit or perseverance construct, due to its association with optimal performance in different types of endeavors.

In other words, this is associated with sustained and focused application of talent over time, with results in various spheres, including organizational domains (Alhadabi and Karpinski, 2020; Al Issa, 2020; Allen *et al.*, 2021; Collantes *et al.*, 2021; Cousins *et al.*, 2021; Wang *et al.*, 2023) from a personality trait perspective (Duckworth *et al.*, 2007; Duckworth and Gross, 2014; Bernardy and Antoni, 2021).

Given the above, the research was carried out through a search for information in the online database, Web of Science (WoS), from the earliest records maintained by this information and technology provider, which correspond to the year 1975 up to the year 2023. The review, as a source of certified knowledge (Serrano *et al.*, 2019), considered the year 1975 as the starting point, as it was the year in which the Arts and Humanities Citation Index was first published (Jiménez-Bucarey *et al.*, 2020a; Araya-Castillo *et al.*, 2021a; Morales-Parragué *et al.*, 2022; Vicencio-Ríos *et al.*, 2023).

Regarding this line of work, the concepts of entrepreneurial orientation and perseverance, known in English, were used to analyze the bibliometric variables present in scientific production data, with the purpose of describing scientific productivity in this field.

Considering the above, and regarding the study typology, the basic concept of entrepreneurial orientation and its intersection with the concept of perseverance were combined and studied

through a network analysis based on graph theory (Vega-Muñoz *et al.*, 2020; Van Eck and Waltman, 2010). In this sense, the main methodological contribution of the research was the combined use of bibliometric and scientometric analyses with the aim of organizing and synthesizing scientific publications on entrepreneurial orientation and perseverance, as well as the updated orientation on research in entrepreneurial orientation and perseverance according to its criteria, characterization, and trends.

## Theoretical Framework

The phenomenon that has been raised with the concept of perseverance in relation to entrepreneurial orientation is related to the positive effects of the latter concept regarding the outcomes of this orientation, where the English category called grit stands out, associated with the Spanish term *determinación y perseverancia*, referring to a non-cognitive personality trait. This dimensionality, as a whole, is composed of: a) effort perseverance; and, b) passion, in terms of consistency of interest; both variables oriented towards long-term goals (Duckworth *et al.*, 2007; Duckworth and Gross, 2014; Christopoulou *et al.*, 2018; Barriopedro *et al.*, 2018; Alhadabi and Karpinski, 2020; Al Issa, 2020; Datu, 2021; Morell *et al.*, 2021; Nothnagle and Knoester, 2022; Barrientos Oradini *et al.*, 2022; Ákos *et al.*, 2023; Chhabra *et al.*, 2023; Guo *et al.*, 2023; Postigo *et al.*, 2023).

Therefore, the importance of the grit construct is highlighted within the framework of entrepreneurial orientation, which has been justified, as a standalone concept and in relation to organizational matters, in different researches in the scientific literature (Duckworth *et al.*, 2007; Duckworth and Gross, 2014). In this sense, it is possible to observe that there is attention and questioning of the grit concept in the field of organizational research related to entrepreneurial orientation, due to its operationalization problems, measurement, and inconsistencies in findings (Jordan *et al.*, 2019; Allen *et al.*, 2021; Morell *et al.*, 2021; Matthews and Edmondson, 2022). Clarifyingly, there is reflection regarding the different possible dimensions of the concept, such as hope or adaptation, among others, instead of traditional perseverance and passion, increasing the variables of this multidimensional term (Singh and Chukkali, 2021; Rioux, 2022).

In the context of the questioning of the grit concept, some studies establish that the predictive

abilities of this English category associated with the term determination could concentrate on some of its dimensions, such as effort perseverance, and not on the general concept, posing the challenge of measuring this construct optimally (Karaman *et al.*, 2019; Allen *et al.*, 2021).

On the other hand, regarding grit measured by the Short Grit Scale or Grit-S, there are questions about its components, particularly the term passion and the long term (Morell *et al.*, 2021); a situation that contrasts with findings where emphasis is placed on the passion component at the expense of perseverance, in relation to entrepreneurial orientation, or where entrepreneurial passion is highlighted in relation to this term (Duckworth *et al.*, 2021; Barrientos Oradini *et al.*, 2022; Zhou *et al.*, 2022). Thus, debates are established regarding inconsistencies and ambiguities, stimulating scientific development without invalidating the different aggregated findings (Duckworth *et al.*, 2021).

In this conceptual line, the questioning also concerns definitions and reflects on the traditional components of grit by presenting an analysis that establishes a greater distance between the variables of passion and perseverance (Duckworth *et al.*, 2021). In this sense, there are observations associating determination or grit with factors external to the individual, such as socioeconomic status, establishing that a high socioeconomic situation would translate structural advantages in the dimension of effort perseverance through a sense of control over their own lives, derived from the resources of high socioeconomic status; which would also establish an association with the individual's or parents' educational level in relation to consistency of interest or passion (Kwon, 2021).

Now, the way to address the problem of the term grit, as a conceptual inconsistency of the term, contrasts with the proliferation of studies developed according to Duckworth *et al.* (2021), which must be analyzed from perspectives or approaches (O'shea *et al.*, 2005; Lee and Jang, 2018; Duckworth *et al.*, 2021; Mirza *et al.*, 2021; Kim *et al.*, 2021; Samborowski *et al.*, 2021; Yu *et al.*, 2021; Ain *et al.*, 2021; Lee, 2022; Rioux, 2022). Thus, the present study provides a general review of the development of science linked to entrepreneurial orientation and the appropriation of one of the components of grit, perseverance.

## Methodology

To fulfill the study's purposes, a descriptive analysis based on

longitudinal data was conducted (Malhotra, 2004) as a means to synthesize and analyze existing production on the study topic over a 48-year timeframe. Secondly, this study utilized scientometrics methodology, allowing for the examination of emerging topics (Glänzel, 2012), based on scientometric analysis (Meneghini and Packer, 2010), focusing on researchers' productivity, publication citation impact, and the potential interconnectedness of relationships among produced articles (Yáñez-Jara *et al.*, 2019; Jiménez-Bucarey *et al.*, 2020a; Araya-Castillo *et al.*, 2021a; Morales-Parragué *et al.*, 2022; Vicencio-Ríos *et al.*, 2023).

Thus, in line with the aim of understanding the evolution of literature in this matter, 3,794 articles published on these topics between 1993 and 2023 were identified, with data presented in the results section, using the database from the inception of the WoS online database in 1975 until December 31, 2023. In accordance with this, the methodology involved a retrospective bibliometric analysis, which consisted of applying statistical methods to determine the qualitative and quantitative evolution of a scientific research topic; establishing the profile of publications on the subject, and identifying trends within a discipline (Diodato, 1994; Vanti, 2000; De Bakker *et al.*, 2005). Simultaneously, the scientometric analysis corresponded with the development of quantitative research methods on science as an informative process (Nalimov and Mulcjenko, 1971).

Among the main topics addressed by scientometrics are ways to measure the quality and impact of research, understanding citation processes, mapping scientific fields, and the use of indicators in research policy and management (Mingers and Leydesdorff, 2015; Morales-Parragué *et al.*, 2022; Hernández-Perlines *et al.*, 2023). On the other hand, there is a growing interest in science and technology studies in the globalization of knowledge production and the location of these activities in specific places (Frenken *et al.*, 2009; Araya-Castillo *et al.*, 2021; Lydiah Kiburu *et al.*, 2023).

From a specific viewpoint, the study was conducted through information retrieval in the Web of Science (WoS) database between January 1, 1975, and December 31, 2023, considering its indicators in the Science Citation Index Expanded (SCI-EXPANDED), which covers most major international journals in the fields of pure, applied, and medical sciences, as well as the Social Science Citation Index (SSCI), which serves the same function for the social sciences; and the Arts and Humanities

Citation Index (AHCI), which performs the same role for arts and humanities areas, in addition to the Conference Proceedings Citation Index-Social Science and Humanities (CPCI-SSH), Conference Proceedings Citation Index-Science (CPCI-S), the Book Citation Index-Social Science and Humanities (BKCI-SSH), and the Emerging Sources Citation Index (ESCI) implemented in late 2015 by Clarivate Analytics as a new WoS database.

Given the nature of the study, structural aspects of the scientific community were examined by addressing cases of associations through: co-authorships in publications, measuring the degree of impact of these associations between institutions, analyzing cooperation between countries, institutions, and/or authors, common references (co-citation or bibliographic coupling) establishing scientific networks, and common keywords (co-words) identifying membership in a specific scientific discipline. Thus, a greater closeness is established, considering a search vector based on keywords, logical conjunction connectors, and proximity constraints in indexed articles (Vega-Muñoz *et al.*, 2020).

Therefore, the basal concept of "entrepreneurial orientation" and its intersection with "perseverance" in all languages were analyzed. The search yielded 3,794 articles which have been cited 124,661 times. The outcome rate was studied through bibliometric analysis (Araya-Castillo *et al.*, 2021b; Yáñez-Jara *et al.*, 2022; Morales-Parragué *et al.*, 2023) and text mining (Van Eck and Waltman, 2010; Kumari *et al.*, 2019). Data retrieval was conducted in the WoS platform, updated until December 31, 2023, and its intervening verifier was as follows: (TS=("entrepreneurial orientation" or "entrepreneurial intention" and "perseverance")) AND DOCUMENT TYPES: (Article) Indexes=SCI-EXPANDED, SSCI, ESCI, AHCI, CPCI-SSH, CPCI-S, BKCI-SSH Timeframe=1975-2023.

## Results

### Articles and Citations in the Study Area

The approach employed allowed for an understanding of the evolution of research on the concepts of entrepreneurial orientation and perseverance from 1975 to 2023. Regarding the search, it also considered the concept of entrepreneurial intention, leading to the identification of 3,794 articles spanning from 1993 to 2023. In this regard, the first article was published in 1993 by Kavil Ramachandran and Subramaniam Ramnarayan, establishing that any article related to this concept, written before this date, was not published in WoS-indexed journals.

According to the WoS database, in 2016, article publication increased by 57% compared to the previous year, experiencing exponential growth since then, reaching its peak scientific production in 2022 with 596 articles. Over the last five years, accumulating 72.6% of the publications, indicating the increase in critical mass in this area of study.

Table I shows the distribution of article citations in WoS, and based on the description, we can establish that there are 411 articles that have not been cited, 1,885 have fewer than 50 citations, 184 articles have more than 50 citations and less than 100 citations; 80 articles have more than 100 and less than 200 citations, 48 articles have more than 200 and less than 1,000 citations, and only 9 articles have more than 1,000 citations.

Based on the found background, within the set of 3,794 articles, those with a high Hirsch or h-Index (Bornmann and Hans-Dieter, 2013) stand out. This index generally favors authors with long-standing careers who continuously publish works with lasting impact above the average. Among the most impactful publications in the entire

TABLE I  
CHARACTERISTICS OF THE STUDENTS (%)

Number of Citations	Number of Items	Articles (%)
More than 1,000	9	0.15
More than 200 less than 1,000	48	1.84
More than 100 minus 200	80	3.06
More than 50 less than 100	184	7.04
Least 50 quotes	1,885	72.17
0 quotes	411	15.74
Total citations	2,612	100.00

Source: Own based on data from Web of Science (2023).

study set is the article by Lumpkin and Dess (1996), which gathers 4.39 citations (1.88% of the total), aiming primarily to clarify the nature of the entrepreneurial orientation (EO) construct and propose a contingency framework to investigate the relationship between EO and firm performance.

Table II details the 11 articles considered the most influential in terms of total citations per article, each maintaining at least 800 citations.

#### Top Authors

Regarding authorship, considering the 3,794 articles, 5,384 authors are recognized for investigating the topic either as sole authors or in collaboration. When including the influential author variable, the top 10 prestigious authors account for 27% of the total

citations. From Table III, we can establish that the most influential author is Tom Lumpkin from the University of Oklahoma, who is a globally recognized academic. He serves as a co-editor of the Strategic Entrepreneurship Journal and received the Foundational Paper Award from the Entrepreneurship Division of the Academy of Management in 2009 for his influential contribution to entrepreneurship research through his article "Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance," co-authored with Gregory G. Dess, published in 1996.

On the other hand, concerning search concepts, Professor Lumpkin has 14 articles published in WoS-indexed journals related to entrepreneurial orientation and perseverance, with 3,183 citations. This represents 4.6% of the total citations related to the search concepts, with 8 of his articles among the

top 118 most influential considering the search vector's h-index. To understand the citation effect magnitude, it was noted that Professor Lumpkin's most cited article is "Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle," with 1,246 citations. It is noteworthy that this paper analyzes two of the five dimensions of EO: proactivity and competitive aggressiveness.

According to the analysis and information search, the second most influential author is Johan Wiklund from Syracuse University, with 9 articles garnering 2,676 citations, placing six of his articles among the top 118 influential articles in the period. The details of the most influential authors on the topic are observed in Table III.

On the other hand, the number of published articles serves to

TABLE II  
ARTICLES WITHIN SCIENTIFIC PRODUCTION WITH THE HIGHEST CITATION

Ranking	Authors	Year	Qualification	Magazine	Total Citations
1	Lumpkin GT and Dess GG	1996	Clarifying the entrepreneurial orientation construct and linking it to performance	Academy of Management Review	4,539
2	Rauch A, Wiklund J, Lupkin GT, Frese M	2009	Entrepreneurial Orientation and Business Performance: An Assessment of Past Research and Suggestions for the Future	Entrepreneurship Theory And Practice	1,655
3	Wiklund J and Shepherd, D	2005	Entrepreneurial orientation and small business performance: a configurational approach	Journal of Business Venturing	1,546
4	Lumpkin G and Dess GG	2001	Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle	Journal of Business Venturing	1,504
5	Berrone P, Cruz C, Gomez-Mejia LR	2012	Socioemotional Wealth in Family Firms: Theoretical Dimensions, Assessment Approaches, and Agenda for Future Research	Family Business Review	1,376
6	Wiklund J and Shepherd D	2003	Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses	Strategic Management Journal	1,357
7	Hult, GTM; Hurley, RF, Knight GA	2004	Innovativeness: Its antecedents and impact on business performance	Industrial Marketing Management	1,189
8	Lee C, Lee K, Pennings JM	2001	Internal capabilities, external networks, and performance: A study on technology-based ventures	Strategic Management Journal	1,088
9	Zhou, K.Z. Yim, C.K. and Tse, D.K.	2005	The effects of strategic orientations on technology- and market-based breakthrough innovations	Journal of Marketing	1,030
10	Rosenbusch N, Brinckmann J, Bausch A	2011	Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs	Journal of Business Venturing	990
11	Mueller SL and Thomas AS	2001	Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness	Journal of Business Venturing	847

Source: Own elaboration based on Data from Web of Science (2023).

TABLE III  
MOST INFLUENTIAL AUTHORS IN ENTREPRENEURIAL ORIENTATION AND PERSEVERANCE

R	Author	Institution	TP-EO	TC-EO	(%)	HA	TP	TC	T118
1	Lumpkin GT	University of Oklahoma System	14	3,138	4.6	25	49	10,201	8
2	Wiklund J	Syracuse University	9	2,676	4.0	39	50	9,350	6
3	Shepherd DA	University of Notre Dame	3	2,419	3.6	71	209	18,297	3
4	Knight G	Willamette University	7	1,724	2.6	28	54	7,166	3
5	Dess Gregory G	University of Texas Dallas	4	1,644	2.4	30	50	13,689	3
6	Kraus S	Free University of Bozen-Bolzano	40	1,462	2.2	43	227	5,750	2
7	Covin JG	Indiana University System	15	1,458	2.2	45	76	12,511	5
8	Wales W	State University of New York at Albany	18	1,336	2.0	16	24	1976	8
9	Hughes M	Loughborough University	21	1,270	1.9	27	66	2,583	3
10	Nordqvist M	Stockholm School of Economics	6	1,252	1.9	28	56	3,489	5

R: author ranking, TP-EO: total articles by the author related to the search concepts, TC-EO: total author citations related to the search concepts, HA: *h*- author index, TP: total articles by the author, TC: total citations per author, T118: Total articles by the author that are among the 118 most influential articles published of all time. Source: Own elaboration based on Data from Web of Science (2023).

determine the authors' contribution to knowledge generation regarding the search vector. These authors are not always the most influential, but they become relevant as they contribute from the standpoint of scientific productivity. Thus, Table IV details the 11 authors who have at least 15 articles related to the search concepts, indicating the number of articles on the topic, the total citations related to the topic, and the average citations per published article. Additionally, it shows the percentage of the total articles published on the topic, the author's *h*-index, the total publications registered in the WoS platform as of December of the year 2021, and the total citations of the author calculated over the total publications in the WoS platform as of December of the year 2023.

On the other hand, from Table IV, it emerges that out of the 11 authors who have published the most regarding EO and perseverance, four of them are repeated as the most influential: Sascha Kraus, Mathew Hughes, William Wales, and Jeffrey Covin. Furthermore, we can establish that the most productive author concerning the search vectors is Sascha Kraus, who is a full professor of management at the Free University of Bozen-Bolzano (Italy). This author holds a Ph.D. in social and economic sciences from the University of Klagenfurt (Austria) and a Ph.D. in industrial engineering and management from the Helsinki University of Technology, and he has obtained habilitation (*Venia Docendi*) from the Lappeenranta University of Technology.

### Top Journals

Regarding the results obtained from the articles studied, it is verified that they have been published in 575 journals indexed in WoS, where 10 of them have published 631 articles, totaling 24.16% of the total publications on the topic, with an average of 36.34 citations per article, a total of 22,981 citations for the set, and an *h*-index of 72. Table V shows the details of the ten journals that accumulate the highest number of published articles.

Next, upon analyzing Table VI, we can establish that the ten journals that concentrate the highest production of scientific articles represent almost 25% of the total articles published

TABLE IV  
MOST PRODUCTIVE AUTHORS

R	Author	University	TP-EO	TC-EO	PC-EO	%Tt	HA	TP-A	TC-A
1	Kraus S	Free University of Bozen -Bolzano	40	1,462	36.55	11.66	43	227	5,750
2	Hughes M	Loughborough University	21	1,270	60.48	6.12	27	66	2,583
3	Hernández F	Castilla-La Mancha University	19	238	12.53	5.54	13	45	415
4	Wales W	State University of New York (Albany)	18	1,336	74.22	5.25	16	24	1976
5	Adomako S	University Birmingham	17	272	16.00	4.96	15	52	617
6	García P	Castilla-La Mancha University	16	214	13.38	4.66	13	54	584
7	Ruiz-Ortega J	Castilla-La Mancha University	16	209	13.06	4.66	14	3.4	430
8	Brettel M	RWTH Aachen University	15	457	30.47	4.37	35	123	4,023
9	Covin JG	Indiana University System	15	1,458	97.20	4.37	45	76	12,511
10	Li Y	Xi'an Jiaotong University	15	984	65.6	4.37	29	126	2,680
11	Tang J	Saint Louis University	15	579	38.6	4.37	20	31	1,785

R: author ranking, TP-EO: total of articles by the author considering the search vectors, TC-EO: total citations of the author's articles in the search vectors, PC-EO: Average citations per article in the search vectors, % Tt : percentage of the total articles on the search vectors, H-A: *h* - author's index , TP-A: total articles by the author, TC-A: total author citations. Source: Own elaboration based on Data from Web of Science (2023).

TABLE V  
JOURNALS IN WEB OF SCIENCE GENERATING SCIENTIFIC PRODUCTION

R	Sources (Journals)	N	%Tt	TC-OE	PC-OE	H-OE	IF 5Y	Q
1	<i>Journal of Business Research</i>	127	4.86	4,030	31.73	35	8,488	Q1
2	<i>Sustainability</i>	88	3.37	733	8.33	15	3,473	Q2
3	<i>Journal of Small Business Management</i>	82	3.14	2,928	35.71	30	6,799	Q2
4	<i>International Entrepreneurship and Management Journal</i>	69	2.64	1,366	19.8	22	6,458	Q2
5	<i>Entrepreneurship Theory and Practice</i>	60	2.30	3,520	100.2	35	15,191	Q1
6	<i>Industrial Marketing Management</i>	55	2.11	3,122	56.76	25	8,698	Q1
7	<i>International Small Business Journal Researching Entrepreneurship</i>	45	1.72	2,255	50.11	24	7,220	Q2
8	<i>Management Decision</i>	37	1.42	882	23.84	16	4,816	Q2
9	<i>International Journal of Entrepreneurial Behavior Research</i>	35	1.34	494	14.11	14	4,996	Q2
10	<i>International Business Review</i>	33	1.26	1,122	3.4	20	6,753	Q2
	Summary	631	24.16%	22,933	36.34	72	7,349	

R: Ranking, NP: total number of articles considering the search vectors in the journal, Tt (%) : percentage of articles out of the total articles related to the search vectors, TC-OE: total citations only with the search vectors, PC-OE: Average citations per article in the search vectors, H-OE: *h*-index considering the articles on search vectors, IF Y5: impact factor of the journal in the last 5 years, Q: quartile to which the magazine belongs. Source: Own based on data from Web of Science (2023).

TABLE VI  
INSTITUTIONS WITH WHICH SCIENTIFIC PRODUCTION IS ASSOCIATED ACCORDING TO AUTHOR AFFILIATION

R	Institution	Country	NP	%Tt	TC-OE	PC-OE	H-OE
1	Xi An Jiaotong University	China	47	1.80	1,527	32.49	22
2	Castilla-La Mancha University	Spain	45	1.72	640	14.22	16
3	University of Valencia	Spain	44	1.68	766	17.41	12
4	University of North Carolina	USA	35	1.34	647	18.49	14
5	Loughborough University	England	33	1.26	910	27.58	15
6	State University System of Florida	USA	33	1.26	1,871	56.7	13
7	Indiana University System	USA	31	1.19	2,891	93.41	19
8	Lappeenranta University of Technology	Finland	30	1.15	1,504	50.13	18
9	Beira Interior University	Portugal	30	1.15	321	10.7	12
10	Indiana University Bloomington	USA	29	1.11	2,882	99.38	19
	Summary		357	13.67	10,622	35.06	49

R: Ranking, NP: total articles with the search vectors, % Tt: percentage of articles out of the total articles published, TC-OE: total citations with the search vectors, PC-OE: Average citations per article for the search vectors, H-OE: *h*-index with search vectors only. Source: Data from Web of Science (2023).

in WoS and in the 575 journals that have published any article related to the search vectors. This set of journals, in turn, concentrates 33.94% of the total citations, demonstrating a high concentration around the journals that publish on this topic.

In light of this situation, we can establish that the Journal of Business Research, maintaining the highest number of articles (127), emerges as the most cited, with 4,030 citations, and holding the highest *h*-index at 35. It is noteworthy that, to better understand these indices, Entrepreneurship Theory and Practice stands out, maintaining the highest average citations (100.2 citations

per article) and the highest 5-year impact factor of 15.191, allowing for the determination of the significant consistency of the journal as a measure of publication quality.

#### Institutions

The results from Table VII show the top ten affiliations of researchers from among the 2,213 institutions that have published an article on the WoS platform related to the search vectors of this research. These 10 institutions concentrate 13.67% of the total articles published; moreover, collectively they maintain an *h*-index of 49 with a total of

10,622 citations and an average of 35.06 citations per article.

Analyzing the results from Table VI entails establishing that the most productive university is Xi'an Jiaotong University in China, which has published 47 articles related to entrepreneurial orientation and perseverance. In this regard, the mentioned university is a higher education institution in China, located in the city of Xi'an in central China, and it is one of the oldest and most important universities in China, directly under the Ministry of Education.

Now, one of the most productive authors in the search vectors, who belongs to this institution, is Yuan

TABLE VII  
CO-AUTHORSHIPS AMONG INSTITUTIONS

Cluster 1 (red)	Cluster 2 (green)	Cluster 3 (blue)	Cluster 4 (yellow)	Cluster 5 (purple)
Cardiff University	Brock University	Erasmus University	Northwestern Polytech	George Washington
Coventry University	Jilin University	Indiana University	Renmin China University	James Madison University
Islamic Azad University	Mississippi State University	Jonkoping Int Business	Rochester Inst Technol	Suny Albany
Kwame Nkrumah University	Northeastern University	Macquarie University	Shanghai Jiao Tong University	Syracuse University
Lappeenranta University Tech	Rhein Westal Th Aachen	University Bergano	St Louis University	Texas Tech. University
University Ghana	University Burn	University Lancaster	Sun Yat Sen Univ	University Alabama
University Leeds	University Louisville	University Missouri	Xi An Jiao Tong Univ	University Illinois
University Loughborough	University Mississippi	University Nebraska	Xiamen University	University Oklahoma
University Manchester	University of North Carolina			
Univ Pretoria	University Tennessee			
University Tasmania	Whu Otto Beisheim Sch			
University Tehran				
Cluster 6 (Light blue)	Cluster 7 (orange tree)	Cluster 8 (gray)	Cluster 9 (pink)	Cluster 10 (light pink)
Aalto University	De Montfort University	Athens University Econ & B	University Almeria	Free Univ Bozen Bolzano
Kent State University	Florida State University	Harbin Inst Technol	Univ Castilla La Mancha	Lut University
Lulea University Technol	Loughborough University	University Glasgow	University Jaume 1	University Innsbruck
University Eastern Finland	University Bradford	University of Granada	Univerzita V Novom Sade (University of Novi Sad – UNIVERSITY)	University Skovde
University St Gallen	University Kent	University Groningen	Univ Valencia	Zhejiang University
University Vaasa	University Utara Malaysia	University Twente		
Cluster 11 (dark green)	Cluster 12 (light blue)	Cluster 13 (beige)		
Menlo Coll	Qatar University	University Interior Beira		
University Bayreuth	Temple Univ	University Tras- os- Montes (Universidade de Trás-os-Montes e Alto Douro)		
University Durham	United Arab Emirates			
University Liechtenstein				
University Utrecht				

Source: Own elaboration based on Data from Web of Science (2023).

Li, although we also find other authors (such as Zhe Zhang, Xin Wang, Wan Chen, among others), who individually may not be among the most productive, but collectively have contributed to making this institution the most productive in the search vectors. However, in analyzing the results, we can also establish that the most influential university in the search vectors of the research is the Indiana University System in the United States with 2,891 citations, with 31 articles published, generating an average of 93.41 citations per article, closely followed by Indiana University Bloomington with a total of 2,882 citations and an average of 99.38 citations per article.

Specifically, the bibliometric analysis of co-authorships between institutions with a minimum of 10 published articles reveals 93 institutions

distributed across 13 clusters detailed in Table VII and represented in the graph in Figure 1. The graph depicts connections between different institutions, with different colors for each of the 13 clusters, highlighting the institution with the highest co-authorship in bold and italics.

#### Countries

It is important to note that scientists from different geographical origins have produced this knowledge with a high territorial concentration. Specifically, 56.9% of the articles belong to 10 out of 104 countries that have generated at least one article related to the search concept. Table VIII details the 10 countries that have developed and published at least 90 articles related to entrepreneurial orientation and perseverance. Collectively, these countries contribute

1,722 articles out of 2,612, garnering 56,396 citations, averaging 32.75 citations per article, and achieving a combined h-index of 108.

From the analysis of Table VIII, we can establish that the United States is the most productive and influential country, having published 558 articles related to the theme of entrepreneurial orientation and perseverance, which collectively have garnered 30,483 citations, along with the highest h-index of 82. It stands apart from China, which is in second place, presenting 307 articles and 5,609 citations, and third place is held by England with 286 articles and 8,663 citations.

The graph in Figure 1 corresponds to co-authorship among countries, which illustrates how 59 out of the 104 countries maintain, at least, 10 co-authored articles, grouped into eight clusters.

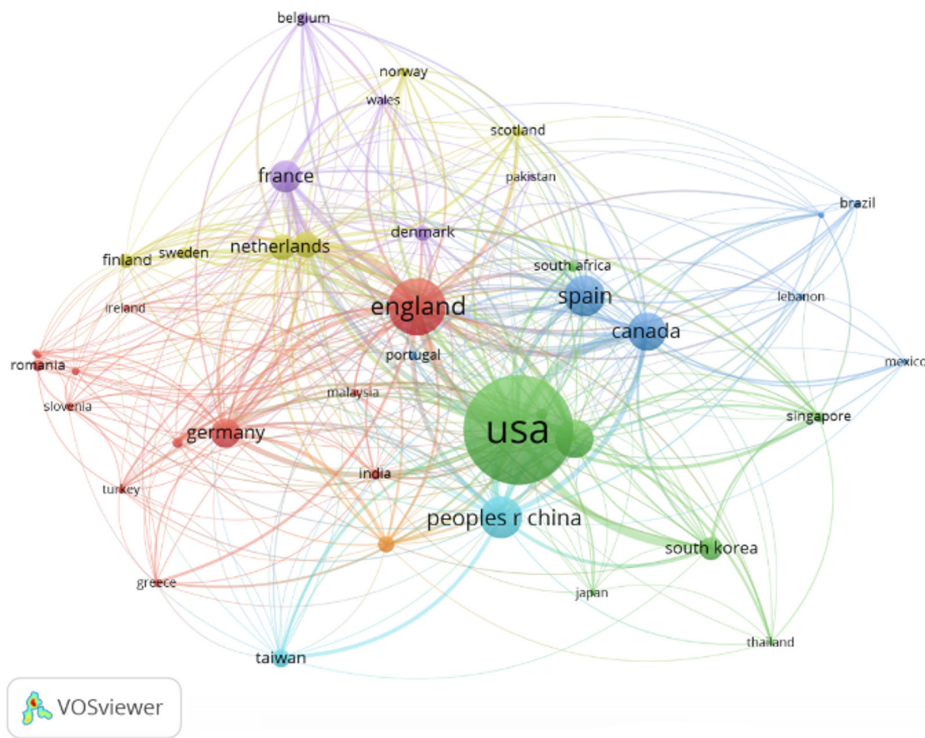


Figure 1. Co-authorship among countries Source: Authors own elaboration based on VOSviewer (2022).

Those countries maintaining the highest number of co-authorships with other countries are highlighted in bold and italicized. These figures are detailed in Table IX and represented in the graph of Figure 1 with different colors.

**Conclusions**

The scientometric analysis of publications over an extended

period on entrepreneurial orientation and perseverance highlights the study's primary contribution: synthesizing knowledge and offering an updated discussion on research regarding these concepts. This analysis considers critical bibliometric variables, including the most influential journals, the most cited articles, and the geographic distribution of research output.

By analyzing these parameters, this study can positively

impact future research within the WoS database system. It helps establish guidelines for future researchers, enhancing the efficiency and significance of their academic contributions.

Examining the scientific articles published between 1975 and 2023 reveals the evolution of research in entrepreneurial orientation and perseverance or "grit." Initially, a linear growth trend is observed, followed by a significant increase in 2016, with a 57% rise compared to 2015. This exponential growth continues until 2023, the end of the analysis period. In 2022, the peak of scientific production is reached, with 72.6% of the publications for the last five years, highlighting the importance of critical mass in this research area.

In contrast to the growth in publications, the number of citations shows a varied pattern, peaking in 2012 and then decreasing. The ten most influential authors, representing 27% of all citations, include Sascha Kraus, Mathew Hughes, William Wales, and Jeffrey Covin. Notably, Professor Sascha Kraus from the Free University of Bolzano in Italy is highlighted for his significant contributions to scientific productivity in this field.

Regarding scientific journals, the top ten concentrate nearly 25% of all articles and 33.94% of all citations, indicating a high concentration of citations. These journals include the *Journal of Business Research*, *Sustainability*, *Journal of Small Business Management*, *International Entrepreneurship and Management Journal*, *Entrepreneurship Theory and Practice*, *Industrial Marketing Management*, *International Small Business Journal*, and *Researching Entrepreneurship, Management*

TABLE VIII  
COUNTRIES ASSOCIATED WITH SCIENTIFIC PRODUCTION ACCORDING TO AUTHORS AFFILIATION

Countries/Regions	NP	Tt (%)	TC-OE	PC-OE	H-OE	H-OE
1 United States (USA)	558	21.26	30,483	54.63	82	22
2 China ( People's R China)	307	11.70	5,609	18.27	36	16
3 England	286	10.90	8,663	30.29	47	12
4 Spain	278	10.59	6,995	25.16	40	14
5 Germany	186	7.09	6,060	32.58	39	15
6 Italy	129	4.91	2,606	20.20	26	13
7 Australia (Australia)	120	4.57	2,458	20.48	27	19
8 Finland	107	4.08	3,538	33.07	33	18
9 France (France)	99	3.77	2,256	22.79	27	12
10 Malaysia (Malaysia)	94	3.58	840	8.94	15	19
Set Data	1,722	65.9	56,396	32.75	108	49

R: Ranking; NP: total related search vectors; % Tt: percentage of articles out of total articles; TC-OE: total citations only of the articles published on the search vectors; PC-OE: Average citations per article on the search vectors; H-OE: *h*-index considering the articles published by each country, on the search vectors. Source: Data from Web of Science (2023).



TABLE IX  
CO-AUTHORSHIP CLUSTER AMONG COUNTRIES

Cluster 1 (red)	Cluster 2 (green)	Cluster 3 (blue)	Cluster 4 (yellow)
Australia	France	Austria	Brazil
Bangladeshi	Greece	Denmark	Chili
Canada	Israel	Finland	Colombia
Indonesia	Oman	Germany	Mexico
Ireland	Qatar	Iran	Portugal
Lithuania	Romania	Liechtenstein	Russia
Malaysa	Saudi Arabia	Netherlands	Spain
New Zealand	Scotland	Sweden	USA
Norway	Tunisia	Tanzania	
Pakistan	Turkey		
People's R China	United Arabic Emirates		
Poland			
Singapore			
Thailand			
Vietnam			
Cluster 5 (purple)	Cluster 6 (light blue)	Cluster 7 (orange tree)	Cluster 8 (burgundy)
England	Belgium	Czech Republic	South Korea
Ghana	Croatia	Serbia	
India	Italy	Slovakia	
Nigeria	Japan	Taiwan	
South Africa	Switzerland		
Wales			

Source: Own elaboration based on Data from Web of Science (2023).

*Decision, International Journal of Entrepreneurial Behavior Research, and International Business Review.*

Xi An Jiaotong University in China emerges as the most productive higher education institution in terms of scientific publications, while the University of Indiana in the United States is the most influential. This geographical concentration shows that 56.9% of scientific publications come from 10 out of the 104 countries that have generated at least one publication in this area. The United States leads with 21.26% of the publications and the highest number of citations, followed by China with 11.70%. Notably, 84.26% of scientific articles have been cited at least once, demonstrating high citation rates in the global community.

Given the findings and the existing scientific literature, it is clear that further research is needed. New studies could focus on factors linked to entrepreneurial orientation in innovation performance and entrepreneurial behaviors in higher education institutions, utilizing mixed, multidisciplinary methods and exploring interrelationships with management, quality, and performance.

Considering the extensive bibliographic review conducted by

the authors, it is essential to propose future research directions that delve deeper into the relationship between perseverance (or "grit") and entrepreneurial outcomes. These future lines of investigation should consider various external and internal variables that could affect the motivational factor of perseverance in entrepreneurs.

Firstly, the economic context is crucial to explore. Future research could examine how economic cycles, market volatility, and access to capital impact an entrepreneur's perseverance. For instance, during economic downturns, the availability of funding and resources might be limited, testing the resilience and persistence of entrepreneurs in a more challenging environment.

Secondly, the socio-cultural context plays a significant role. Studies could investigate how cultural attitudes towards entrepreneurship, societal support systems, and familial expectations influence an entrepreneur's perseverance. Comparing different cultural backgrounds could provide insights into how societal values either bolster or hinder entrepreneurial perseverance.

Additionally, personal attributes and psychological factors warrant further exploration. Future research could

delve into the interplay between an entrepreneur's mental health, stress management strategies, and perseverance. Understanding the psychological resilience of entrepreneurs, including how they cope with failure and setbacks, could provide valuable insights for developing support systems that enhance perseverance.

Moreover, technological advancements and digital transformation are increasingly relevant. Investigating how adopting new technologies and the digitalization of business processes affect entrepreneurial perseverance could offer insights into how modern tools and platforms can support sustained entrepreneurial efforts.

Finally, the role of education and continuous learning in fostering perseverance deserves attention. Research could focus on how entrepreneurial education programs, mentorship, and lifelong learning opportunities contribute to building and maintaining perseverance among entrepreneurs.

By considering these variables, future research can provide a more comprehensive understanding of the factors that influence perseverance in entrepreneurship, ultimately leading to more targeted interventions and support

mechanisms to enhance entrepreneurial success. This addition highlights various potential areas of future research that can significantly contribute to understanding and enhancing the role of perseverance in entrepreneurial success.

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## ANÁLISIS CIENCIOMÉTRICO SOBRE ORIENTACIÓN EMPRENDEDORA Y PERSEVERANCIA ELABORADO A PARTIR DE DATOS DE LA WEB OF SCIENCE ENTRE 1975 Y 2023

Nicolás Barrientos Oradin, Luis Araya-Castillo, María Boada-Cuerva, Joan Boada-Grau y Francisco Ganga-Contreras  
RESUMEN

*El presente análisis explica las relaciones cuantitativas, en línea con la orientación emprendedora y la perseverancia, con el propósito de comprender la relación entre la orientación emprendedora y el constructo denominado grit. La investigación, en su propósito central, se inserta en la descripción de indicadores bibliométricos del desarrollo científico en este campo, desde los registros más antiguos de la base de datos Web of Science, en línea, correspondientes al 1 de enero de 1975, hasta el 31 de diciembre de 2023. La metodología reportada identificó autores, países, publicaciones, citas, revistas indexadas e instituciones según investigaciones en el área de orientación y perseverancia empresarial en el contexto de una discusión*

*actualizada sobre estudios en este campo. Los resultados mostraron evidencias sostenidas sobre un desarrollo creciente de publicaciones relacionadas al vector temático, aumentando en los últimos años, y una concentración geográfica asociada a los Estados Unidos. Además, las líneas de investigación observadas en las publicaciones más influyentes están relacionadas con las áreas de estrategia, rendimiento y éxito. En conjunto, la principal contribución de esta investigación reveló una síntesis del conocimiento en el contexto de un análisis cuantitativo sobre orientación emprendedora y grit, ofreciendo una visión actualizada sobre la investigación en orientación emprendedora y perseverancia.*

## ANÁLISE CIENCIOMÉTRICA SOBRE ORIENTAÇÃO EMPRENDEDORA E PERSEVERANÇA PRODUZIDA COM BASE EM DADOS DA WEB OF SCIENCE ENTRE 1975 E 2023

Nicolás Barrientos Oradin, Luis Araya-Castillo, María Boada-Cuerva, Joan Boada-Grau e Francisco Ganga-Contreras  
RESUMO

*A presente análise explicita as relações quantitativas, em consonância com a orientação empreendedora e a perseverança, com o propósito de compreender a relação entre a orientação empreendedora e o construto denominado grit. A pesquisa, em seu objetivo central, está inserida na descrição de indicadores bibliométricos do desenvolvimento científico nesse campo, desde os primeiros registros da base de dados Web of Science, on-line, correspondentes a 1º de janeiro de 1975, até 31 de dezembro de 2023. A metodologia relatada identificou autores, países, publicações, citações, periódicos indexados e instituições de acordo com a pesquisa na área de orientação empreendedora e perseverança no contexto de*

*uma discussão atualizada sobre estudos nesse campo. Os resultados mostraram evidências sustentadas sobre um desenvolvimento crescente de publicações relacionadas ao vetor temático, aumentando nos últimos anos, e uma concentração geográfica associada aos Estados Unidos. Além disso, as linhas de pesquisa observadas nas publicações mais influentes estão relacionadas às áreas de estratégia, desempenho e sucesso. Em suma, a principal contribuição desta pesquisa revelou uma síntese do conhecimento no contexto de uma análise cuantitativa sobre orientação empreendedora e coragem, oferecendo uma visão atualizada da pesquisa sobre orientação empreendedora e perseverança.*