

# Hot topics and frontier evolution of research on entrepreneurial intentions—Visual analysis based on the core collection of Web of science database

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**Abstract.** Since the Chinese slogan "Mass Entrepreneurship, Mass Innovation" was put forward, entrepreneurship has become a hot topic of research in academic circles and even people from all walks of life. Entrepreneurial Intentions is the best indicator to effectively predict entrepreneurial behavior. In order to understand the research status and trends of entrepreneurship intentions, based on the bibliometric method, this paper uses citespace software to visually analyze 1,038 core collections published in the Web of science database platform from January 1, 1997 to December 31, 2020. The results show that in the past 20 years, the research on entrepreneurial intentions has mainly focused on scholars from foreign universities. The distribution of research institutions is relatively concentrated, but the distribution of journals is relatively loose. Antecedent variables have become the focus of research. Future research should focus on outcome variables.

## 1 Introduction

Entrepreneurship level is very important to a country, it is related to economic efficiency, market innovation, employment opportunities and employment level[1]. Since the Chinese slogan "Mass Entrepreneurship and Innovation" was put forward, entrepreneurial activities have been highly valued by the government and society. "Entrepreneurship intentions" has become an important variable for understanding "entrepreneurial behavior"[2]. Entrepreneurship intentions can better predict the occurrence of entrepreneurial behavior and is the central starting point for mining entrepreneurial behavior[3]. In recent years, domestic and foreign scholars have carried out extensive research on entrepreneurial intentions. According to previous studies, the research on entrepreneurial intentions is mainly based on the theory of planned behavior[4] and entrepreneurial event theory[5]. The influencing factors of entrepreneurial intentions are mostly based on the two aspects of individual variables and environmental variables. So far, scholars have summarized the research on entrepreneurial intentions, but most scholars have only conducted qualitative review and analysis. Few scholars use a combination of quantitative and qualitative methods and visual analysis to present their research hotspots and development trends. In view of this, this article uses citespace software and takes the core collection journals in the Web of science database as samples to carry out quantitative and qualitative analysis of entrepreneurial intentions. By displaying the annual distribution of literatures, the knowledge map of research institutions, the co-occurrence map of keywords,

the number of articles published in the core journal area, etc., summarize the research hotspots of entrepreneurial intentions and analyze its evolution path in order to provide directions for further research on entrepreneurial intentions.

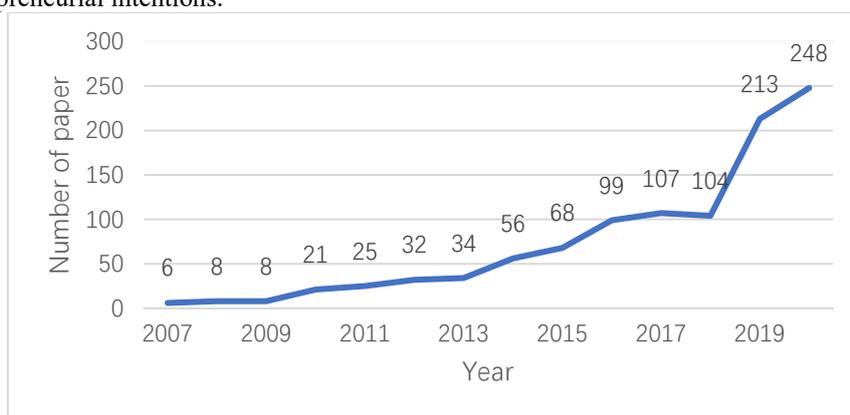
## 2 Quantitative trend analysis of research

Search the core collection in the Web of science database with "theme = entrepreneurial intentions" and the time start and end set to "January 1, 1997-December 31, 2020". Exported to the newly created folder in the format of "full records and cited references" and "plain text", data cleaning was carried out by citespace software, 536 invalid data were deleted, and a total of 1038 valid journal articles were finally obtained.

The annual statistical analysis of the above 1,038 journal articles with entrepreneurial intentions as the research theme is shown in Figure 1. From the perspective of time span, the research status of entrepreneurial intentions from 2007 to 2017 is on the rise, especially during the 2015-2016 growth trend evident, an increase of 45.59%. From 2017 to 2018, the number of literatures has dropped, but the gap is not big. From 2018 to 2019, it has shown a rapid growth, with the largest increase so far, which is 104.80%. On the whole, the research trend of entrepreneurial intentions is on the rise, indicating that entrepreneurial intentions has become the research focus of the theoretical and academic circles in recent years, but its research trend may become saturated in the future. Therefore, researchers should combine reality, continue to

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innovate, explore new hot spots and combine entrepreneurial intentions to promote a new breakthrough in the field of entrepreneurial intentions.



**Fig. 1** Literature age and quantity distribution

### 3 Author cooperation map

According to Price's law, in a certain research field, more than half of the published articles are written by high producers, which means that the concentration of authors in this field is relatively high. The calculation formula is:  $M=0.749\sqrt{N}$ .

NS: M is the minimum number of posts required by the core author, N represents the number of posts by the highest author in the field.

According to Citespace word frequency statistics, the maximum number of publications for a single person is 18, and  $M=3.18$  is calculated. According to the principle of rounding, the minimum number of publications required by core authors in this field is 4, a total of 18 people, and the total number of publications is 105. It accounts for 10.1% of the total number of posts, which is far below the 50% standard, indicating that the research authors in the field of entrepreneurial willingness are relatively scattered.

In the author's co-occurrence map generated by Citespace software, the size of the node generally indicates the amounts of articles published by the author, the line indicates the cooperative relationship between the authors, and the thickness of the line indicates the strength of the cooperation between the authors. From Table 1 and Figure 2, it can be seen that FRANCISCO LINAN (18 articles) and CHAOYUN LIANG (12 articles) rank the top two in turn. Among them, MARTIN OBSCHONKA (6 articles), GALINA SHIROKOVA (6 articles), CHING YIN IP (6 articles), ALAIN FAYOLLE (6 articles) all published 6 articles and tied for third place. Among them, MARTIN OBSCHONKA (6 articles), GALINA SHIROKOVA (6 articles), CHING YIN IP (6 articles),

ALAIN FAYOLLE (6 articles) have published 6 articles and tied for third place, TEEMU KAUTONEN (5 articles), JUAN A MORIANO (5 articles) Articles), EVAN J DOUGLAS (5 articles) published 5 articles and tied for fourth place. There is little difference in the amounts of articles published by the second two related authors, and both meet the standards of core authors in the field. The above ten authors are all researchers with good research results in this field. They all have their own research teams. FRANCISCO LINAN, ALAIN FAYOLLE, and TEEMU KAUTONEN belong to the same team, while CHAOYUN LIANG and CHING YIN IP belong to the same team. Among them, the team headed by FRANCISCO LINAN is the largest.

**TABLE 1** Authors With More Than 10 Posts

Author	Relevant information	
	Number	Frequency
FRANCISCO LINAN	1	18
CHAOYUN LIANG	2	12
MARTIN OBSCHONKA	3	6
GALINA SHIROKOVA	4	6
CHING YIN IP	5	6
ALAIN FAYOLLE	6	6
TEEMU KAUTONEN	7	5
JUAN A MORIANO	8	5
EVAN J DOUGLAS	9	5



Fig 2 Author's Cooperative Knowledge Graph

#### 4 Institutional cooperation map

In order to understand the cooperation of research institutions in this field, in the Citespace software, "Node Types" is set to Institution, and the "Pathfinder" and "Pruning sliced networks" in Pruning are used for optimization processing to obtain a cooperative co-occurrence map of institutions. In the institution cooperation map, the size of the node represents the amount of literatures issued by the institution, the connection indicates the cooperative relationship between the institutions, and the thickness of the line indicates the strength of the cooperation between the two institutions. Combining Table 2 and Figure 3, it can be seen that 7 companies have issued more than 9 articles, with a total of 97 articles, accounting for 9.3% of the total amount of articles. Among them, Univ Seville, Natl Taiwan Univ, and Erasmus Univ are among the top three, with 24 articles, 16 articles, and 15 articles in order. Appalachian State Univ and Queensland Univ Technol ranked fourth with 11 articles published, followed by Anglia Ruskin Univ and Univ Granada, both with 10 articles. On the whole, the research on entrepreneurial intentions is mainly based on foreign universities, and the distribution of research institutions is relatively concentrated, and two larger cooperation circles with Univ Seville and Erasmus Univ as the core have been formed. Universities such as

Alexandru Ioan Cuza Univ and Univ Jena participate in the academic cooperation circle with Univ Seville as the core, and universities such as Queensland Univ Technol, Chinese Univ Hong Kong, and Univ Desarrollo participate in the academic cooperation circle with Erasmus Univ as the core. UNED has a cooperative relationship with two academic cooperation circles.

TABLE 2 High Frequency Institution

Institution	Relevant information	
	Number	Frequency
Univ Seville	1	24
Natl Taiwan Univ	2	16
Erasmus Univ	3	15
Appalachian State Univ	4	11
Queensland Univ Technol	5	11
Anglia Ruskin Univ	6	10
Univ Granada	7	10

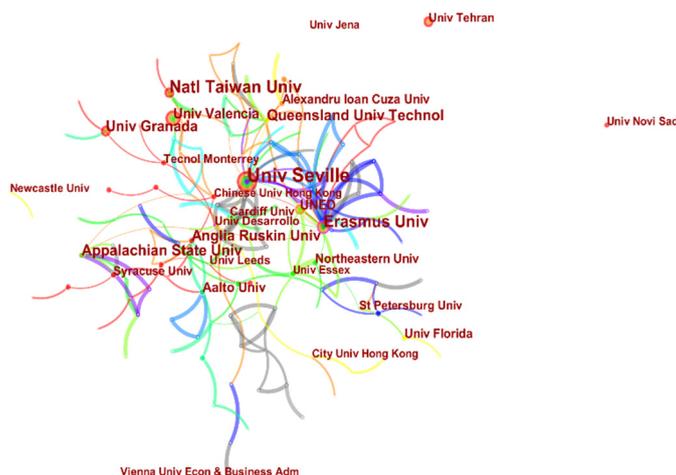


Fig 3 Knowledge map of research institutions

### 5 Journal distribution analysis

According to Bradford's law, this article divides 1,038 articles from 288 journals into core, related, and scattered areas, and the ratio of the number of journals in the three areas is 1:n:n<sup>2</sup>. It can be seen from Table 3 that the number of journals in each district is 7:38:134, which is further simplified to 1:5:25, that is, the Bradford dispersion coefficient n is about 5. At the same time, according to the Egghe formula, R=3 and Y=72 are used. The calculation shows that M is 5.04. The results of the approximation method and the Brinell method are basically equal, indicating that the publication distribution of "entrepreneurial intentions" conforms to Bradford's law of concentration and decentralization. However, the distribution of literature in this field is relatively loose, the number of journals in the core area and related areas is

relatively small, and the number of journals in the scattered area accounts for as high as 84.38%.

$$M = \left[ \frac{e^E \cdot Y_{max}}{R} \right]^{1/R}$$

NS: "M" is the Bradford coefficient, "R" is the number of partitions, "e" is the base of the natural logarithm (e=2.7183), "E" is Euler's coefficient (E=0.5772), and "Ymax" is the maximum The number of articles published in the journal.

In addition, the average article density of each journal in the core area is 49.29, and the relevant area and marginal area are 9.13 and 1.42 respectively. A total of 345 articles were published in the 7 core region journals in the core region, that is, 33.24% of the literature was published in 2.43% of the journals, indicating that the publication of articles in the field of entrepreneurial intentions is relatively concentrated and has a certain core effect.

TABLE 3 Partition Table

Area	Relevant information					
	<i>NPIJ</i>	<i>NJ</i>	<i>RJ</i>	<i>NP</i>	<i>RP</i>	<i>ADJ</i>
Core area	32-72	7	2.43%	345	33.24%	49.29
Relevant area	4-32	38	13.19%	347	33.43%	9.13
Scattered area	1-4	243	84.38%	346	33.33%	1.42

### 6 Keyword co-occurrence

Visualize the high-frequency keywords through Citespace, and finally derive the keyword co-occurrence map, as shown in Figure 4. Among them, the node size and font size reflect the frequency of keywords appearing, and the number of connections indicates the degree of close connection with other keywords. Combining the frequency statistics in Table 4, it can be seen that the node corresponding to the term "entrepreneurial intentions" is the largest, with 355 occurrences, and the densest connection with other nodes, which is the core research theme of the field. Secondly, words such as intentions (311 times), self-efficacy (286 times), entrepreneurship (234 times), and education (224) also have larger nodes and labels. Moreover, the centrality of "entrepreneurial intentions", "intentions", "education" and "entrepreneurship" is relatively high, indicating that the

research in the past 20 years has mainly focused on these fields. Among the top 10 keywords in the frequency ranking, keywords involving antecedent variables of entrepreneurial intentions accounted for 47.97%, indicating that antecedent analysis is the research focus of entrepreneurial intentions.

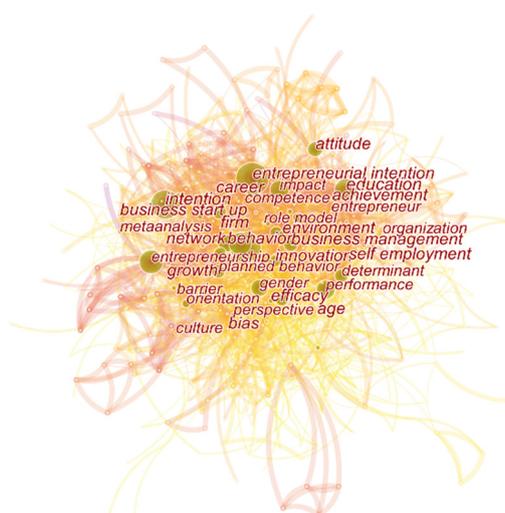
### 7 Research trend analysis

Burst words analysis is used to reflect the changes and activity of research hotspots in a certain field in a certain period of time. Generally, the higher the burst intensity, the more active the topic is currently, which is the focus of research. As shown in Table 5, the burst operation is performed through citespace, and finally 25 burst keywords are obtained. According to the time and type of burst words, the research on entrepreneurial intentions can be divided into the following three stages: 2005-2011, 2012-2015, 2016-2018.

The first stage is from 2005 to 2011. From the point of view of burst intensity, the burst intensity of "entrepreneur" and "firm" is the largest, respectively 3.89 and 3.17, indicating that the research in the field of entrepreneurial intentions at this stage mainly focuses on entrepreneurs and businesses. Explore the environment in which entrepreneurs and enterprises survive and develop.

**TABLE 4** Keyword Frequency Statistics

Key Words	Relevant information		
	Number	Frequency	Centrality
entrepreneurial intention	1	355	0.06
intention	2	311	0.06
self efficacy	3	286	0.03
entrepreneurs hip	4	234	0.06
education	5	224	0.07
impact	6	206	0.05
model	7	204	0.03
performance	8	174	0.04
gender	9	149	0.04
behavior	10	144	0.04



**Fig 4** Keyword co-occurrence map

The second stage is from 2012 to 2015, in which the burst intensity of "business start up" and "transition" is the largest, 3.61 and 3.52 respectively. It shows that at this stage, the relevant scholars mainly focused on the establishment of enterprises and the transitional stage of enterprise creation, indicating that the entrepreneurial environment at this time has improved.

The third stage is 2016-2018. In terms of burst intensity, the highest is "program" (2.94), followed by "prior knowledge" (2.91), "corporate entrepreneurship" (2.63), "innovativeness" (2.45), "entrepreneurial alertness" (2.45), etc. With the rise of entrepreneurial activity, entrepreneurship has become more and more important for economic development and solving employment problems. Therefore, the academic community's focus on entrepreneurial intentions focuses on influencing factors. Scholars mainly explore the influence mechanism of entrepreneurial intentions based on planned behavior theory and entrepreneurial event theory. The results found that engineering projects, prior knowledge, spirit of cooperation, innovation, and entrepreneurial alertness all affect individuals' intentions to carry out entrepreneurial activities.

Through the above analysis, it can be found that the research in the field of entrepreneurial willingness has gradually developed from entrepreneurs and founding enterprises to the analysis of the antecedents, from shallow to deep, with good levels, but the analysis of the consequences of entrepreneurial intentions needs to be strengthened. In the future, we will not only continue to explore the antecedent variables based on actual conditions, but also increase efforts to study the outcome variables to create greater value for the country, society, enterprises and individuals.

## 8 Conclusion

This article uses Citespace software to conduct a quantitative analysis of the entrepreneurial willingness literature from the Web of science database from 1997 to 2020, and summarize the research status and development path of entrepreneurial intentions in the past 20 years. On the whole, the academic circles are paying more and more attention to the field of entrepreneurial intentions. Among them, two scholars, FRANCISCO LINAN and CHAOYUN LIANG, have a higher volume of articles.

The research institutions are mainly foreign universities, and several larger academic core cooperation circles have been formed, and the research institutions are more concentrated. Secondly, the co-occurrence analysis of keywords found that most scholars mainly focus on the antecedent variables of entrepreneurial intentions. Finally, this article found that the evolution path and development

trend of entrepreneurial intentions can be divided into three stages: 2005-2011, 2012-2015, 2016-2018, and gave corresponding research topics for each stage. Future research should be based on the balance of antecedent variables and outcome variables, and provide valuable suggestions for scholars in the field for future research directions.

**TABLE 5** Burst intensity keywords

Keywords	Year	Strength	Begin	End	1997 - 2020
manager	1997	3.03	2005	2011	
achievement motivation	1997	2.77	2008	2013	
survival	1997	3.02	2010	2013	
performance	1997	2.78	2010	2012	
entrepreneur	1997	3.89	2011	2013	
firm	1997	3.17	2011	2015	
mechanism	1997	2.58	2011	2012	
self employment	1997	3.28	2012	2013	
entrepreneurialism	1997	3.2	2012	2013	
perception	1997	3.43	2013	2017	
gender	1997	2.49	2013	2014	
business start up	1997	3.61	2014	2015	
transition	1997	3.52	2014	2016	
venture creation	1997	2.77	2014	2015	
prior knowledge	1997	2.91	2016	2017	
corporate entrepreneurship	1997	2.63	2016	2017	
program	1997	2.94	2017	2018	
innovativeness	1997	2.45	2017	2018	
entrepreneurial alertness	1997	2.45	2017	2018	

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## References:

1. Shane, S. and S. Venkataraman, The promise of entrepreneurship as a field of research. *Academy of management review*, 2000. 25(1): p. 217-226.
2. Bird, B., Implementing entrepreneurial ideas: The case for intention. *Academy of management Review*, 1988. 13(3): p. 442-453.
3. Krueger Jr, N.F. and D.V. Brazeal, Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship theory and practice*, 1994. 18(3): p. 91-104.
4. Ajzen, I., The theory of planned behavior. *Organizational behavior and human decision processes*, 1991. 50(2): p. 179-211.
5. Shapero, A. and L. Sokol, The social dimensions of entrepreneurship. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, 1982.