

# The Evolution of Organizational Citizenship Behavior —— Based on the Visualization Analysis of the WOS Core Database (2000-2020)

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**Abstract**—with the intensification of competition in modern society, the organization continues to change, the organizational structure gradually tends to be flat, and organizational citizenship behavior has attracted more and more attention, which has gradually become a hot issue in the research of human resource management, organizational behavior and psychology. Therefore, in the face of information overload, providing visual analysis has become an essential link. Using 4652 papers included in WOS from 2000 to 2020, this study takes "organizational citizenship behavior" as the research object, and uses the visualization software Citespace to draw the author, institutional cooperation map and keyword co-occurrence map. This study analyzes the hot topics and development trends in this field, and points out the future development direction and research direction in the field of organizational citizenship behavior.

**Keywords**-Organizational citizenship behavior; Visualization; Citespace

## 1. Introduction

At present, the world is in a fierce economic competition, uncertain market environment, emphasizing change and innovation, and great changes have taken place in the work process, work environment and work responsibilities. In order to cope with the changes of the market, the organization makes the organizational structure flatter and flatter through change. The flattening of the organization requires the employees' higher initiative, and employees' initiative has naturally become an important variable in the organization. From the perspective of human resource management, the organizational citizenship behavior has an important impact on organizational performance. In recent years, organizational citizenship behavior has attracted extensive attention [1]. Therefore, this paper uses the Citespace visualization research method to analyze the research hotspots and summarize the future development trend, so as to provide a basis for the follow-up research on the direction of organizational citizenship behavior.

## 2. Visual analysis of Organizational Citizenship Behavior Research

### 2.1 Data Source

This paper takes the core data of the web of science as the data source and "organizational citizenship behavior" as the subject search term. The time span is 21 years from 2000 to 2020. By refining the source, excluding documents such as architecture and engineering, a total of 4825 documents are downloaded. The data download time is September 3, 2021. After the second deletion by Citespace, the title of the paper is 4652, which is exported in text format. Each title includes the title, author, excerpt, keyword, year and organization.

### 2.2 Methods

The main research methods of this study are bibliometrics and information visualization. By using the Citespace visual analysis software, key information such as the author, organization and keywords are analyzed by the frequency, co-occurrence analysis and cluster analysis. The Citespace is a document visualization information analysis tool. The software developed by American Professor Chen Chaomei based on Java can measure and analyze the research literature in specific fields, so as to obtain the corresponding research hotspots and research trends.

### 2.3 Annual Distribution of the Number of Literatures

The annual distribution of the number of research literatures in this field in the WOS core database is shown in Fig. 1. The number of papers on organizational citizenship behavior has been rising slowly from 2000 to 2011, and basically stable from 2012 to 2016, between 300-330. It began to rise rapidly after 2016, reaching 549 in 2020. On the whole, the research on organizational citizenship behavior has been on the rise, indicating that the research on organizational citizenship behavior has been in the development stage.

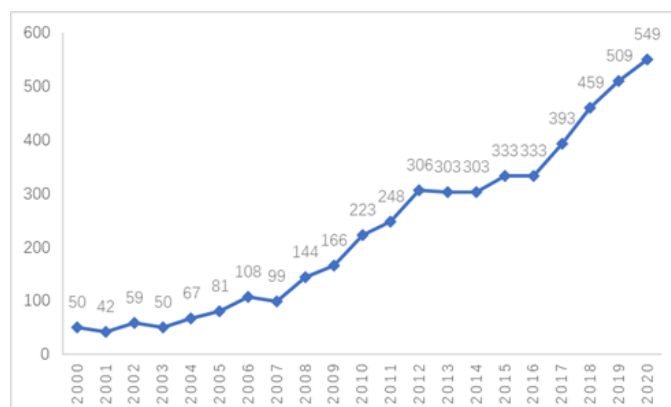


Figure 1. Annual distribution of the number of literatures

### 2.4 Analysis of Author Cooperation Network

According to the price law, when 50% or more of the total number of articles published by the core author's publishing station indicates that the concentration of authors in this field is high,

and the calculation formula is (1), where M represents the minimum number required by the core author, and N represents the maximum number of articles published by the authors in the field [3].

$$M=0.749*N^{1/2} \quad (1)$$

According to the Citespace word frequency statistics, this figure is determined by the maximum number of publications issued by a single person. It can be seen from table 1 that if n is 24, M = 3.67 is calculated. According to the principle of rounding, the minimum number of articles is 4 papers published by the core authors in this field. The statistics show that 382 people published 2447 articles, accounting for 52.60% of the total number of articles, higher than the standard of 50%, indicating that the research authors in the field of organizational citizenship behavior are relatively concentrated.

Table 1 Authors with More Than 18 Posts

Author	Relevant information	
	Number	Frequency
Pascal Paille	1	24
Russell E Johnson	2	23
Anit Somech	3	20
Deanne N Den Hartog	4	20
Jin Nam Choi	5	20
Dan S Chiaburu	6	19
Michel Tremblay	7	19

In the co-occurrence graph of the author's Citespace software, the node size represents the number of articles published by the author, the connection between nodes represents the author's cooperative relationship, and the connection thickness represents the strength of the author's cooperation. As can be seen from the Table 1 and Fig. 2, Pascal Paille (24 articles) and Russell E Johnson (23) ranked the top two in turn, and Anit Somech, Deanne N Den Hartog and Jin Nam Choi ranked third, all with 20 articles. Although there is little difference in the number of articles published, according to the standard of core authors in this field, the above five authors are researchers with good achievements in this field and have formed their own teams.



Figure 2. Author cooperation network map

## 2.5 Analysis of Agency Cooperation Network

As can be seen from the Table 2, a total of 15 institutions have published more than 53 articles, a total of 602 articles, accounting for 12.94% of the total number of articles. Among them, Michigan State Univ, Univ Illinois and Univ Georgia ranked among the top three, publishing 104, 72 and 70 articles respectively. Followed by 68 articles published by Hong Kong Polytech Univ and 64 articles published by Univ Haifa. Generally speaking, the research on the organizational citizenship behavior mainly focuses on universities, mainly focusing on management schools and business schools.

Table 2 High Frequency Institution

Institution	Relevant information	
	Number	Frequency
Michigan State Univ	1	104
Univ Illinois	2	72
Univ Georgia	3	70
Hong Kong Polytech Univ	4	68
Univ Haifa	5	64
Univ N Carolina	6	58
Univ S Florida	7	57
Univ Alabama	8	55
Erasmus Univ	9	54

## 2.6 Statistics of Publication Distribution

According to the Bradford's law, 4652 literatures from 769 journals in this study will be divided into the core area, relevant area and decentralized area. The number ratio of journals in the three areas meets 1: n: n<sup>2</sup> [4]. It can be seen from Table 3 that the number of journals in each region is

11:86:672, which can be approximately regarded as 10:80:640. Finally, it can be simplified to 1:8:64, that is, the Bradford dispersion coefficient  $n$  is about 8.

According to Egghe formula (2) [4, 5],  $r = 3$  and  $y = 264$ ,  $M$  is 7.78. The results of the approximation method are similar to those of the Brinell method, indicating that the distribution of "organizational citizenship behavior" publications conforms to the Bradford law of concentration and dispersion, and both results are large, indicating that the literature in this field is relatively scattered and the intelligence density is "diluted".

$$M = (e^{E \cdot Y_{\max}})^{1/R} \quad (2)$$

NA: "M" is the Bradford coefficient, "R" is the number of areas, "e" is the base of the natural logarithm ( $e=1.781$ ), "E" is the Euler coefficient ( $E=0.5772$ ), and  $Y_{\max}$  is the number of articles in the journal with the most articles.

In addition, a total of 1327 articles were published in 11 journals in the core area, with an average density of 120.64, 18.14 in the related area and 2.63 in the marginal area. It can be seen from the Table 3 that 28.52% of the literature was published in 1.43% of journals, indicating that the articles on organizational citizenship behavior were relatively concentrated and had a certain core effect.

Table 3 Partition Table

Area	Relevant information					
	NPIJ	NJ	RJ	NP	RP	ADJ
Core area	>69	11	1.43%	1327	28.53	120.64
Relevant area	2-69	86	11.18%	1560	33.53	18.14
Scattered area	<2	672	87.39%	1765	37.94	2.63

## 2.7 Keyword Co-occurrence and Clustering Analysis

### 2.7.1 Keyword frequency statistics

In this study, the  $Q$  is 0.3204, greater than 0.3;  $S$  is 0.6933, greater than 0.6, which meets the requirements of a significant and reliable structural map. Calculate high-frequency keywords through Citespace, and then merge the same keywords, such as "civizenship behavior", "OCB", "organizational civizenship behavior" and "organizational civizenship behavior" into "organizational citizenship behavior"; "Performance" and "job performance" are merged into "performance", etc. The top 18 high-frequency keywords are shown in the Table 4. Among them, the highest frequency of organizational citizenship behaviors are 2963, followed by 1918 performances, 1465 satisfactions. Through the keyword analysis in recent 20 years, it can be found that the organizational citizenship behavior, performance and satisfaction have always been the research hotspot of human resource management.

Table 4 Keyword Frequency Statistics

Key Words	Relevant information	
	Number	Frequency
organizational citizenship behavior	1	2963
performance	2	1918
satisfaction	3	1465
Impact	4	913
work	5	861
commitment	6	800
model	7	708
antecedent	8	662
justice	9	640
leadership	10	590
social exchange	11	514
perception	12	502
Meta-analysis	13	428
leader member exchange	14	414
personality	15	394
mediating role	16	367
behavior	17	358
predictor	18	347

### 2.7.2 Keywords co-occurrence analysis

Through the visual analysis of high-frequency keywords by the Citespace, the co-occurrence map is finally obtained, as showed in the Fig. 3. As can be seen from the Fig. 3, in recent 20 years, “organizational citizenship behavior”, “performance” and “job satisfaction” are several large nodes with high centrality, indicating that these keywords have been the research hotspots in this field in recent 20 years.

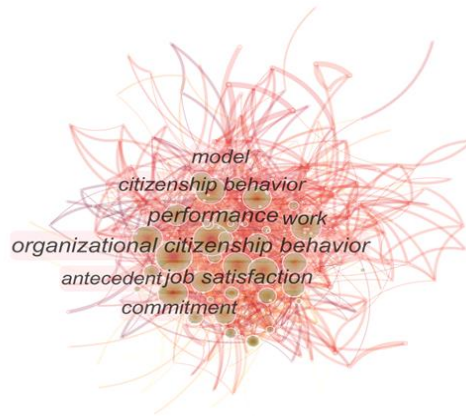


Figure 3. Keywords network cooccurrence map

### 2.7.3 Keyword clustering analysis

The cluster analysis finally formed eight cluster tags, as showed in the Table 5. The cluster tags include “attitude”, “job performance”, “qualified organizational support”, etc. by classifying these cluster tags, it can be found that the research in the field of organizational citizenship behavior can be divided into three categories.

The first category is the antecedents of organizational citizenship behavior, mainly including “attitude”, “competent organizational support” and “person organization”. Researchers' research on the organizational citizenship behavior mainly focuses on two influencing factors: individual factors and organizational factors.

The second is the result of organizational citizenship behavior, mainly including “job performance” and “consequence”. The key to organizational citizenship behavior can improve the organizational performance is that it acts as the "lubricant" of organizational operation, reduces the friction between various "parts" of the organization, and promotes the improvement of the efficiency of the whole organization.

The third category is the boundary conditions of organizational citizenship behavior research, mainly including “job” and “work engagement”. Organizational citizenship behavior is a voluntary cooperative behavior, which can consciously maintain the normal operation of the whole organization.

Table 5 Clustering Information

ID	Size	Year	Clustering Terms
0	52	2003	attitude
1	46	2004	job performance
2	42	2005	perceived organizational support
3	41	2004	job
4	37	2005	work engagement
5	29	2005	person organization
6	28	2003	consequence
7	22	2005	ocb

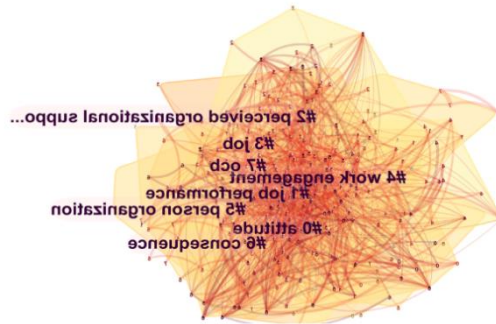


Figure 4. Keywords clustering map

### 3. Research Trend Analysis

Emergence analysis is one of the main tools of literature mining, which can reflect the hot spots of active or cutting-edge research. There are 18 emergent words of organizational citizenship behavior, as showed in the Table 6. According to the time and category of keywords, this paper divides the research on organizational citizenship behavior into three stages: 2000-2003, 2004-2016 and 2017-2020.

From 2000 to 2003, the intensity of decisive (18.79) was the largest, and it was the first hot research field on the organizational citizenship behavior. At this stage, scholars mainly discuss the determinants of organizational citizenship behavior and how to effectively make employees form organizational citizenship behavior. Among them, the labor union plays a key role in regulating the relationship between organizations and employees.

From 2004 to 2016, the intensity of work engagement (19.03) was the highest, followed by good soldier (13.25). At this stage, the focus of the research is to focus on the individual factors and organizational factors, emphasize the self-esteem required by individuals, and the need to build the psychological contract and psychological empowerment in the organizational environment.

From 2017 to 2020, the moderating role (24.96) reached the biggest trend of organizational citizenship behavior research. This stage focuses on the boundary conditions of organizational citizenship behavior, and scholars pay more attention to the regulatory role of organizational citizenship behavior. It includes the internal motivation, moral leadership and other regulatory factors.

Combined with the research trends of the three stages, it is not difficult to find that the research on organizational citizenship behavior has traces to follow. The focus on the validity lasted the longest, up to 12 years. From the research trend from 2017 to 2020, the research on the regulatory factors of organizational citizenship behavior continues and will continue for a longer time.

Table 6 Burst Terms Information

Key Words	Strength	Begin	End
determinant	18.79	2000	2009



validity	13.06	2000	2012
contextual performance	10.76	2000	2011
labor union	10.44	2000	2006
moderator	10.19	2000	2012
task	12.36	2002	2011
suggestion	10.58	2002	2010
psychological contract	11.79	2004	2012
self esteem	10.01	2011	2014
good soldier	13.25	2012	2017
work engagement	19.03	2015	2020
psychological empowerment	10.18	2016	2020
abusive supervision	14.02	2017	2020
intrinsic motivation	10.92	2017	2020
moderating role	24.96	2018	2020
engagement	21.97	2018	2020
ethical leadership	17.38	2018	2020
corporate social responsibility	11.84	2018	2020

#### 4. Conclusion

Based on Bibliometrics and knowledge map research methods, this paper makes a visual analysis of 4652 English documents on organizational citizenship behavior included in the WOS core database. Firstly, this paper reveals the measurement criteria of core authors in the study of organizational citizenship behavior. Second, this paper summarizes the main body of literature publishing institutions on organizational citizenship behavior, mainly university publishing. Third, the distribution of journals in this field conforms to Bradford's law and has a certain core effect. Fourth, this study found that the evolution of organizational citizenship behavior research can be divided into three stages, and summarized the corresponding keyword mutation information. Finally, this study discusses the future development trend, the hot spots and trends of data mining research. They are divided into three categories and three stages. The future research mainly focuses on "modeling role", "ethical leadership" and "corporate social responsibility", which need to focus on the boundary conditions caused by organizational citizenship behavior.

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