

BOOK REVIEW

Providing Chinese scholars' solutions for international informetrics development

—Review of Professor Qiu Junping's *Informetrics: theory, methods and applications*

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ABSTRACT

Informetrics: theory, methods and applications records the research contents of informetrics in different periods, reveals the development motivation of "Three Metrics" to "Five Metrics", and is of great significance to the future trend of informetrics. This article reviews the research and development history of Professor Qiu Junping's team of "Three Metrics" and "Five Metrics", and analyzes and summarizes their academic influence and contribution to the field of international informetrics in combination with the chapter content, innovation, and practicality of the books. It can be seen that *Informetrics: theory, methods and applications* not only explains the complete research paradigm of informetrics, but also showed to the world the multi-dimensional breakthrough and innovation of Chinese informetrics research, and provided new ideas for the development of international informetrics.

KEYWORDS

Informetrics; Three-Metrics; Five-Metrics; *Informetrics: theory, methods and applications*

The book *Informetrics: theory, methods and applications* (hereinafter referred to as *Informetrics (English Version)*) written by Professor Qiu Junping's team was published by Springer Publishing Company in 2017 (Qiu et al., 2017). Founded in 1842, Springer-Verlag is one of the largest Science and Technology Press in the world, known for publishing scholarly and the first publisher to make paper journals available electronically (Springer, n.d.). The book *Informetrics (English Version)* was selected for the publication of Springer-Verlag, which shows the attention paid to the theoretical research of Chinese scholars in the field of international informetrics. This book is the first time that Chinese scholars have given a comprehensive and complete discussion of informetrics in English with the framework of "theory-methodology-application", and the publication of this book also fills the gap of English monographs in the field of informetrics for Chinese scholars.

1 Tracing the Origin: Laying the Foundation for "Three Metrics" and Improving the "Five Metrics"

The publication of the English edition of *Informetrics* is undoubtedly the culmination of

Professor Qiu's team in teaching and researching in the fields of bibliometrics, informetrics and scientometrics over the past 30 years. We searched for Professor Qiu Junping's metrology-related literature published in China in the CNKI database with the keywords "Bibliometrics", "Informetrics", "Scientometrics", "Webmetrics", "Knowledgometrics", and "Five Metrics", and retrieved a total of 814 Chinese journal literature. One of the earliest literature related to metrology is the article *Historical development of chemical literature and its trends* published by Professor Qiu Junping in the *Journal of Document, Information & Knowledge* in 1983.

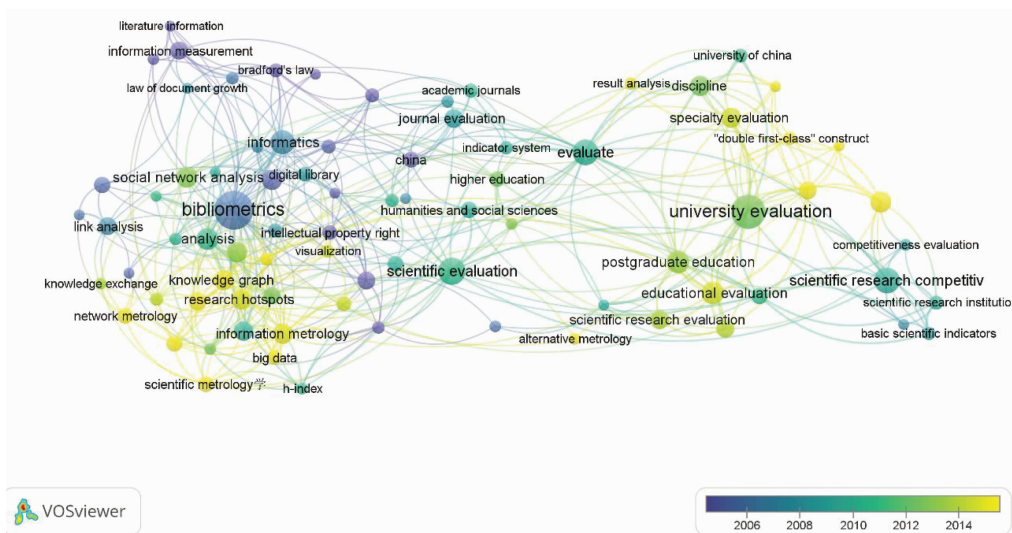


Figure 1 Professor Qiu Junping's research focus on the field of Five-Metrics

From the 1980s to 2005, Professor Qiu Junping mainly focused on the field of intelligence and bibliometrics, in which a large number of research results on the basic laws of bibliometrics can be seen. As shown in Figure 1, through the visualization of the literature, we can see that Professor Qiu has been consolidating the foundation of the "Three Metrics" in the field of metrology, while gradually developing new research directions in the field of "Five Metrics". From 2006 to 2008, he focused on research related to informetrics, computer-aided analysis, content analysis and other issues began to explore the research related to scientometrics, H-index, knowledge graph and webmetrics; from 2009 to 2011, he focused the research related to scientific evaluation, human and social science evaluation and journal evaluation; In 2012, he researched on education evaluation, university evaluation, and top universities evaluation. After 2014, he began to explore "Five Metrics" in depth.

With the development of science and technology and the continuation of "Bibliometrics", "Informetrics" and "Scientometrics", there is a convergence between them. With the rapid development and popularization of computer and network technology, the emergence of the knowledge economy and knowledge management, digitalization, networking and knowledge have become significant features of the information society and knowledge economy era. The characteristics of 'Three Metrics' have developed in breadth and depth. Webmetrics, based on web information and data, and Knowledgeometrics, based on knowledge units, have led to the development of the concept of "Five Metrics". "Five Metrics" includes documentation, data, information (protection of web information), knowledge, and scientific be-

havior. There are many similarities and significant differences between the disciplines, and they are becoming increasingly important in the field of information management in measurement research. The development of "Five Metrics" shows the sustainable development of metrological research in the field of information management, and "Five Metrics" is also related to the continuation and development of bibliometrics and scientometrics. Therefore, the book *Informetrics (English Version)* is undoubtedly a high summary and overview of scientific research and educational practice in the past 30 years, and it is also an important work developed from "Three Metrics" to "Five Metrics".

2 Development: Ten years of tempering, The sword into a sharp edge

Since the early 1980s, Professor Qiu Junping's team has been researching and teaching in the field of bibliometrics. In 1983, Professor Qiu took the lead in opening a course in bibliometrics at Wuhan University and compiled the teaching materials of Bibliometrics. After mimeograph and letterpress printing and several years of teaching, *Bibliometrics* was officially published by Beijing Science and Technology Literature Publishing Company in 1988 (Qiu, 1988). For the first time, *Bibliometrics* provides a detailed discussion of the disciplinary system of bibliometrics from the perspectives of theory, methodology, and application, which has been widely recognized and praised by the academic community. The textbook *Bibliometrics* has also been applied in more than a dozen universities, and the citation rate has been maintained the highest. In 2013, the China Social Science Evaluation Research Center of Nanjing University published the *A report on the academic impact of Chinese books in the humanities and social sciences*, which released the ranking of the academic influence of domestic and foreign academic works (Su, 2012). In the ranking of domestic academic works cited by domestic library intelligence papers, Professor Qiu Junping's bibliometrics was ranked the 4th. The book *Bibliometrics* laid the academic status of Professor Qiu Junping as one of the founders of bibliometrics in China.

Under the new social and technological conditions, Bibliometric research has also undergone new developments. Professor Qiu's team started to further research on "Three Metrics", leading the development of informetrics and webometrics research in China and published a series of research papers on informetrics and webometrics in 2000-2001. In 2007, *Informetrics (Chinese Version)* written by Prof. Qiu was published by Wuhan University Press (Qiu, 2007). The book is written on the basis of long-term teaching and research on "Three Metrics", showing the development characteristics of "Three Metrics" in the information age. As the "21st-century curriculum textbook" of the Ministry of Education, *Informetrics (Chinese Version)* is the first textbook named after *Informetrics* in China.

After ten years of accumulation, the team led by Prof. Qiu keeps focusing on new growth points and research hotspots in informetrics and keeps enriching Informetrics, completing and publishing *Informetrics (English Version)* in 2017, which is of epoch-making significance for informetrics research both at home and abroad. The publications have great influence and a high citation rate in academic circles. Up to now, according to CSSCI (Chinese social science citation index) and Springer databases, *Informetrics (Chinese Version)* has been cited 449 times and the *Informetrics (English Version)* 23 times. As shown in Figure 2, numerous scholars have expanded and analyzed in the metrics fields of scientometrics, bibliometrics, and knowledge metrics by citing the relevant contents of *Informetrics (Chinese and Eng-*

lish Version). It shows that the influence of *Informetrics* (English Version) is gradually expanding.

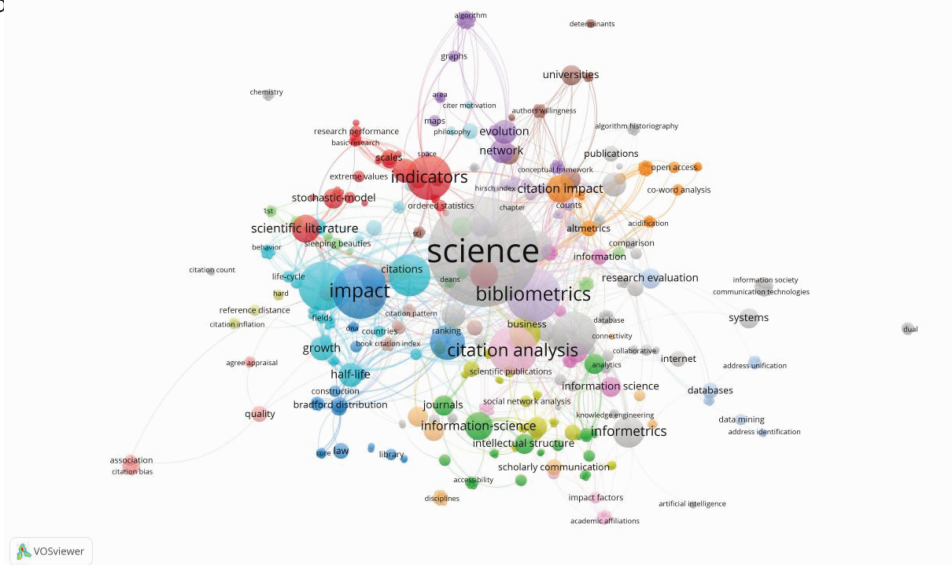


Figure 2 Literature keyword co-occurrence mapping of cited books

3 the content: based on the frontier hotspots, taking into account the basic issues

Informetrics (English Version) is divided into 11 chapters with clear logic, comprehensive content, innovative ideas, and detailed information. Overall, the book has the following characteristics.

3.1 The system is perfect, showing a complete research picture of informetrics

The whole book takes the theory-methodology-application as the main line, which is clear thinking and reasonable structure. In the first introductory chapter, the origin and development of Informetrics are highlighted. The relationships between disciplines are analyzed, between informetrics and mathematics and statistics; informetrics and bibliometrics; informetrics and scientometrics; informetrics and webmetrics; and informetrics and scientific evaluation.

Chapters 2 to 6 cover the basic theories of informetrics. Chapter 2 focuses on the growth law of literature information, introduces the exponential growth and logical growth models of literature information, analyzes the growth mechanism and introduces the application of literature growth law by taking intelligence research, science and literature information management as examples. Chapter 3 introduces the metrics, research contents and mathematical models of the aging law of literature, and introduces the application of the aging law in literature and intelligence management and science. Chapter 4 introduces Bradford's law of literature concentration and decentralized distribution, sorts out the process and main content of Bradford's law, and lists the application of Bradford's law from the aspects of core journals, literature search, and collection maintenance. Chapter 5 introduces Zipf's law on the word frequency distribution of literature information. The formation and development of

Zipf's law are reviewed, and the application of Zipf's law is introduced in terms of literature citation, information retrieval and scientific evaluation, etc. Chapter 6 introduces Lotka's law on the distribution of authors in literature information. The formation and main contents of Lotka's law are introduced, and the development of Lotka's law in China is introduced.

Chapters 7 to 9 deal with informetrics methods. Chapter 7 introduces the principles, indicators and steps of literature information statistics, and introduces the application of literature information statistics methods by taking information resource management and discipline development as examples.

Chapter 8 focuses on the citation analysis method, starting from the concept and steps of the citation analysis method, introducing in detail the main tools and indicators of citation analysis and journal citation reports, and focusing on citation network and cluster analysis, taking agricultural science journals as an example, and introducing the application of citation analysis. Chapter 9 introduces computer-aided information measurement and analysis methods. The continuous development of information technology and the electrification of information resources have given information measurement a rare opportunity for development, so the basic principles of computer-aided measurement analysis are introduced in this chapter, and the establishment of citation databases and the application of citation analysis are introduced with the CSSCI as an example.

Chapters 10 to 11 are applications of informetrics. Chapter 10 focuses on the application of informetrics in information resource management and research, starting from the determination of core journals, literature and intelligence collection management, information retrieval, and user research, and analyzes the application areas of informetrics with the discrete law and utilization law of literature and information as examples. Chapter 11 focuses on the application of information econometrics in science and technology management and forecasting, and analyzes the application fields and methods of informetrics, starting from scientific research, talent evaluation, scientific research evaluation of regional institutions and scientific prediction.

3.2 Strong innovation, showing the research ideas and achievements with Chinese characteristics

Informetrics is expanded and evolved on the basis of bibliometrics and scientometrics and is also an objective need and inevitable product of the development of informatics in the direction of quantification. In theory, it has greatly improved the scientificity and accuracy of informetrics and provided a reference basis and guidance for practical work such as information management and library intelligence. Therefore, informetrics is the product of the development of the times and the inevitable development of the discipline. The book combines theory and practice, inheritance and innovation, taking into account traditional statistical tools and emerging information technology methods, reflecting and absorbing the latest advances in triple counting at home and abroad, as well as incorporating its research results, with a strong scientific and innovative nature.

The first is the structural innovation. The book is structured and rich in content with theory, methodology and application as the main lines. In his evaluation of bibliometrics, Prof. Qiu Junping pointed out that the book has pioneered the structural model of theory, methodology and application for academic creation. In conceptualizing informetrics, Professor Qiu Junping continues to follow the structural model of bibliometrics, and innovates and develops the model. More case studies are introduced, and a combination of methods and

tools, cases and applications is used to illustrate and analyze the relevant theories, methods and applications of informetrics in a hierarchical and focused way.

The second is the innovation of perspective. In China, the research of informetrics will not only focus on international progress, but also have Chinese characteristics, and will not only follow the international trends but also continuously absorb the international professional characteristics. In recent years, more and more scholars and students have been studying and earning degrees abroad, information measurement-related institutions have been established, and many universities have offered relevant courses and research student education. Chinese scholars have assumed an increasingly important role in the research of international econometrics journals and have published many professional articles. However, due to the limitation of publication policy and language, there are still many shortcomings in the publication of related academic works in China. Adopting a large number of theoretical results and cases with Chinese characteristics, *Informetrics (English Version)* fully introduces and demonstrates the research and teaching contents of informetrics with Chinese characteristics to the international field of metrology, and undoubtedly provides Chinese scholars' solutions to the development of international metrology.

Again, it is content innovation. Professor Qiu Junping has proposed that information metrology should be divided into "generalized information metrology" and "narrow information metrology". The former mainly discusses the measurement of information in the broad sense based on information theory, and its scope is very broad. The so-called "narrow information metrology" is what we usually call "Informetrics", which mainly studies the measurement of intelligence information (documentary intelligence). Its main content is to apply mathematics, statistics and other quantitative methods to analyze and deal with the contradictions in the information process, analyze and study the dynamic characteristics of information from a quantitative point of view, and find out the inner laws. This book builds an analytical framework and structure based on the definition of information metrics in a narrow sense, and introduces new tools and techniques, such as computer-aided informetrics analysis and webmetrics-related methods while concentrating on the traditional laws of bibliometrics.

3.3 Strong practicality, suitable for multi-field and multi-level personnel to learn and reference

Informetrics (English Version) is suitable for students of Information Management and Information Systems, Management Science, Information Resources Management, Electronic Commerce, Information Science, Library Science, Archives, Publishing Science, Science and Science and Technology Management; it can also be used as a study and reference for information workers, knowledge workers, researchers, evaluators and managers. The book lists a large number of Chinese cases, all of which are more mature and effective research results and solutions in the fields of journal evaluation, science and technology evaluation, and talent evaluation in China, all of which have strong guiding significance for practical work.

We believe that the book will be widely recognized by the academic community at home and abroad, and will contribute to the development of international metrology in China. We also expect that Professor Qiu Junping will bring more books of the series "Five Metrics" to the international market, so as to promote Chinese metrology research to the world and make international metrologists more aware of Chinese metrology research results!

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