

Preface

Since 1960s, three similar terms: Bibliometrics, Scientometrics, and Informetrics have appeared in the fields of library science, philology, information science, and science of science. These similar quantitative branches are called three-metrics. After decades of efforts on research and promotion, these disciplines all progressed at different degrees and became widely recognized by academia. Although these areas have different research objects and purposes, they have the same origin and share common principles, methods, and tools. Therefore, academia refers to these subjects as three-metrics. With development of science and technology and continuation of these three metrologies, convergence among them has developed, and International Society for Scientometrics and Informetrics (ISSI) was formed. Since 1990s, with rapid development and popularization of computer and network technologies and rise of knowledge economy and knowledge management, digitalization, networking, and knowledge have become remarkable characteristics of information society and knowledge economy era. Three-metrics is characterized by expanding breadth and depth of studies. Webometrics is based on network information and data, and Knowledgometrics is based on knowledge units; these subjects emerged in field of information management, prompting people to coin the term five-metrics. Five-metrics include literature, data, information (including network information), knowledge, and scientific activities. Subjects share many similarities but also have significant differences; they became important works on measurement research in information management field. Development of five-metrics reflects continuous innovation of quantitative research on information management and tracking of evolution with changing times and social background. Five-metrics also only involves legacy and development of bibliometrics and scientometrics.

Informetrics uses quantitative methods to describe and research phenomena, processes, and laws of information. This area is a new quantitative discipline of information science, and it is based on mathematics and statistics. Informetrics was initially presented as the German word “Informetrie,” which was proposed by German scholar Otto Nacke. Corresponding English term “Informetrics” soon appeared in subsequent literature works. Nacke expanded concept of informetrics on first Seminar on Informetrics (including Scientometrics) in Frankfurt in September

1980. German and English terms also appeared in Chinese journals in 1981. Informetrics did not only spread rapidly in English-speaking countries but was also recognized by International Federation for Information and Documentation (FID), marking the rise of a new branch of discipline. As early as 1980, FID established informetric communications (FID/IM). In 1987, Belgium held the first International Conference on Bibliometrics and Theoretical Aspects of Information Retrieval. The well-known information scientist, Brookes, suggested at the meeting that term informetrics should be added to name of second International Academic Conference, which would be held in Canada in 1989; participants were generally supportive. However, conference was not renamed until June 1995 on Fifth International Conference on Scientometrics and Informetrics held in Chicago, USA. Informetrics was replaced with Bibliometrics in conference name. At present, the conference is known as ISSI. Given that “Informetrics” has been used in the titles of numerous proceedings published by international academic conferences since 1987, a number of well-known foreign information scientists regard 1987 as time when informetrics was recognized formally by international information academia. Chinese academic community responded accordingly to Informetrie (German) and Informetrics (English) and the disciplines they represented and introduced. As early as 1981, related papers were published. My monograph < Bibliometrics(Chinese) >, published in 1988, not only discussed in detail relationship among three-metrics but also proposed systematic framework of informetrics.

Our team has been teaching and researching on bibliometrics, informetrics, and scientometrics at Wuhan University since early 1980s. We led in offering Bibliometrics course in Chinese colleges in 1983 and compiled Chinese teaching material under the same name. Materials were published officially by Scientific and Technical Documentation Press (Beijing) in 1988 after being featured in mimeograph in 1983, letterpress in 1985, and few years of teaching. This book was the first to comprehensively structure content system of bibliometrics from the perspective of theory, method, and application, and it was praised and welcomed by academic community. This textbook is used in more than 10 colleges and universities, and its citation rate is among the best. Yang Peiting, a famous information scientist, said, “This is undoubtedly a positive contribution to the study and teaching of Information Science in China, and this can be said to be a ground-breaking research.” Afterward, our team carried out studies on three-metrics, which significantly influence people both in local areas and abroad. With rapid development of information technology and information science and with popularization of information resources, electronic, digital, and network, information resources are becoming more popular. Information resources greatly influenced and resulted in profound changes in development of human society, economy, science and technology, culture, and other fields. Under new social environment and technical conditions, new developments transpired in bibliometrics research. Facing this new situation, trends, and topic, our team led development of informetric and webometric research in China and published series of research papers with “Informetrics” and “Webometrics” on their titles in *Information Studies: Theory and Application* in 2000–2001; these publications had great repercussion and high

rate of citation in academia, locally and abroad. These papers became classic series of articles in research of informetrics and webometrics. <Informetrics (Chinese)> by Qiu Junping was published by Wuhan University Press in January 2007. This book was crystallization of long-term teaching and research on three-metrics and reflected development characteristics of three-metrics in information age. The material-oriented teaching and research on library science, information science and information management, and other related disciplines are included in “Ministry of Education for the 21st century curriculum materials” and “information management college and university core course textbook.” The book was selected as part of national quality courses and national Twelve Five planning materials. In recent years, we focused on trends in metrology research, undertook series of research projects, such as national social science major and the National Science Fund Project, and published series of research results. On this basis, under Science Press, we published “Metrology Research Series in Information Science,” which included <Scientometrics>, <Knowledgometrics>, <Webometrics>, and other related monographs in Chinese version.

With development of social economy and science and technology in China, research on information metrology rapidly progressed. China hosted ISSI meeting in Beijing (2003) and Wuhan (2017) and many other relevant meetings related to informetrics. Our country and other nations, such as the United States and some European countries, developed exchanges and cooperation. We published numerous related works and set up corresponding university courses and direction of graduate education. Many professional students and scholars go abroad to pursue degrees. Research institutions on informetrics also emerged; some of these organizations include National Professional Association and Chinese Society for Scientometrics and Informetrics. In China, informetrics adheres to dual development principle of internationalization and localization, with both closely following pace of foreign countries and having their own characteristics. Under the guidance of “bringing in and going out” strategy, Chinese scholars played increasingly important role in international professional organizations and extensively absorbed achievements of foreign professional treatises. These academics published more academic papers in foreign informetric professional journals with increasing influence. However, owing to the influence of policy orientation and language, international publications inadequately released relevant works of Chinese professionals. To introduce informetric research and to teach contents with Chinese characteristics, we published <Informetrics—Theory, Methods and Applications> in Springer-Verlag. We believe that publication of this book will provide basis for foreign countries to understand informetric research in China and will promote further development in research and practice of informetrics.

We always believed in close linkages and differences among bibliometrics, informetrics, and scientometrics. These disciplines have more interconnections, cross-connection, and overlapping than differences. Some foreigners regarded such areas as synonymous or advocated to use different names of subjects in different situations. We used the title “Informetrics—Theory, Methods and Applications” with following considerations in mind: first consideration is wider scope of

informetrics, which may include bibliometrics and scientometrics and also appeared in the name of ISSI meeting. Second consideration is that informetrics is based on research and is also recognized as branch of academic discipline. Third, with in-depth application of computer network technology, rise of Web 2.0 and big data technology, and popularization of open access and digital publishing, popularity of social networking and We-Media and rapid development in 4G mobile services and e-research profoundly influenced all aspects of information communication and technology innovation and provided necessary conditions and possibilities for information metrology and rare opportunity for development of informetrics. Fourth consideration is to arouse interest of people and to promote further research and development of informetrics. Future research and development should focus on informetrics. In this book, three-metrics is inevitably involved as basis of bibliometrics, and focus of discussion is metrology problem of literature information; this problem is influenced by present research situation and facts. To facilitate narrative, we also used “Informetrics” in the book.

The book consists of 11 chapters. Main content can be summarized into theory, method, and application. Research on theory of informetrics is found in Chaps. 1–7. Research on informetrics method spans Chaps. 8–9. Chapters 10–11 discuss application of informetrics. Law applications are also discussed in some chapters. This book retains some of typical application examples in <Bibliometrics> because they are classic cases and can still explain the problem; representative new cases cannot replace them. Though content is not updated, novelty of the book should not be affected. During compiling, we attempted to construct disciplinary system of informetrics from angles of theory, method, and application: attention was provided to combination of theory and practice, inheritance, and innovation; traditional statistical tools were combined with new information technology methods; no effort was exerted to ensure clear thinking, reasonable structure, comprehensive explanation, rich content, novel idea, and detailed material for this book. Material should not only reflect and absorb latest development on three-metrics both at home and abroad but also add our research results to make study of included disciplines more scientific, innovative, systemic, and practical. The book is suitable as teaching material in information management and information system, management science, information resource management, e-commerce, information science, library science, archives science, publishing science, science of science and management of S.&T., and evaluation and prediction of science in colleges. This work also serves as learning reference for majority of information workers, knowledge workers, researchers, evaluators, and managers.

Qiu Junping chaired revision of the book. The following people participated in revision and translation work: Qiu Junping, Zhao Rongying, Yang Siluo, Dong Ke, Tan Chunhui, Ma Ruimin, Ding Jingda, Song Yanhui, Zhang xinyuan, Yang Jinli, and Yuan Qingli. Finally, Qiu Junping and Yang Siluo made some additions, deletions or modifications, and completed English proofreading and drafting works. This book is legacy and innovation of <Informetrics> (Chinese version), <Bibliometrics> (Chinese version), <Scientometrics> (Chinese version), and

<Knowledgometrics> (Chinese version), and is completed based on <Informetrics> (Chinese version) with modification, supplementation, updates, and expansion.

Given that chapters of this book were written separately by different authors, mistakes may inevitably exist. We sincerely ask readers for criticisms and corrections.

Wuhan, China

Junping Qiu

Informetrics

Theory, Methods and Applications

Qiu, J.; Zhao, R.; Yang, S.; Dong, K.

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