Preface

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Growth and characteristics of scientometric study in Taiwan

Scientometric research in Taiwan had begun since 1989, when M.-Y. Tsay published her paper entitled "Bibliometric study of the application of computers in synthetic organic, physical inorganic and analytical chemistry literature abstracted by Chemical Abstracts in 1986" in *Journal of Chemical Information and Computer Sciences* in 1989 and then two papers in 1995 and 2000, respectively. Since then, the number of journal papers on scientometric research in Taiwan has grown exponentially, as shown in Fig. 1. Tsay also published a textbook on informetrics in Chinese in 2003, which may also be a significant driving force for the scientometric study in Taiwan. Therefore, Professor Tibor Braun, editor-in-chief of *Scientometrics* thought that it is the time to publish a special issue on "Scientometric Research in Taiwan" in the summer of 2011.

From 1989 to 2011, the total number of paper, authored by 241 Taiwan researchers from 104 institutes is 156. Figure 1 demonstrates that the number of scientometric paper produced in Taiwan has really grown exponentially in the last two decades. The average annual growth rate is 35.9 %.
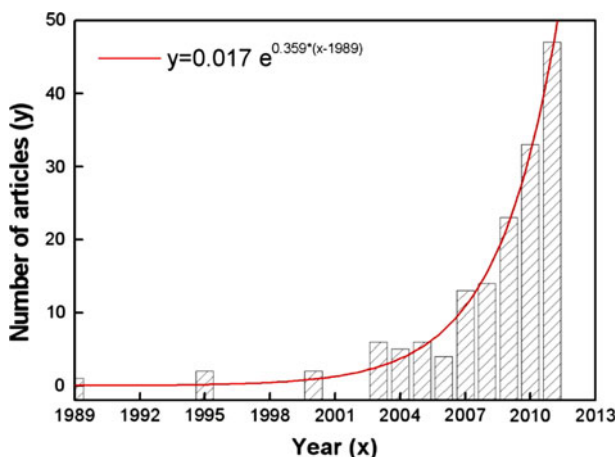
Scientometric researches in Taiwan accumulated have covered a broad range of subject areas, as listed in Table 1. Among them, the information science and library science is the major subject category followed by computer science, business economics, engineering, operations research management science, environmental sciences ecology, chemistry, public administration, respectively.

The author keywords of these papers, as shown in Table 2, also reflect the broad scope of scientometric study in Taiwan until now. In total, there are 334 keywords. Table 2 indicates that scientometrics, bibliometric analysis, bibliometrics, citation analysis, research trend and patent citation are among the top of the list. This may suggest that the scientometric research in Taiwan focus on scientometric or bibliometric study, and is consistent with the distribution of subject areas, as discussed previously.

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Fig. 1 The growth of journal papers on scientometric research in Taiwan. The data was collected based on the keyword, i.e., "bibliometric*" or "citation analysis" or "informetric*" or "scientometric*" with truncation search on the topic from WOS, plus papers published in the *Scientometrics* by the Taiwan researchers

Table 1 Subject area of scientometric research in Taiwan, 1988–2011

Subject area	No. of papers[a]
Information science library science	99
Computer science	96
Business economics	17
Engineering	12
Operations research management science	9
Environmental sciences ecology	4
Chemistry	4
Public administration	4
Others (in total)	39

[a] A paper may be categorized in multiple subject areas

Summary of the studies in the special issue

The response to the call-for-papers on the special issue was very positive and enthusiastic, though the time frame was really very short. After peer review, 13 full-length papers were accepted for publication in the special issue on "Scientometric Research in Taiwan". These papers may be divided into four major categories: general bibliometric study, patent analysis, research assessment and the use of bibliographic tool. The content for each paper is summarized as follows:

General bibliometric study in Taiwan

1. Title: Bibliometric characteristics of highly cited papers in Taiwan from 2000 to 2009. The study, based on the Thomson Reuters' essential science indicators[SM] (ESI), explores the top 1 % of the most highly cited papers in Taiwan based on the citation thresholds for each subject category and publication year. The authors analyze

Table 2 Distribution of author keywords with number of appearance >2 times

Rank	Descriptor	Times
1	Scientometrics	15
2	Bibliometric analysis	13
3	Bibliometrics	12
4	Citation analysis	11
5	Research trend	9
6	Patent citation	8
7	Science citation index (SCI)	8
8	Patent analysis	6
9	Web of Science	6
10	Bibliometric	5
11	Social network analysis	4
12	Taiwan	4
13	Co-authorship	3
14	*h*-index	3
15	Intellectual structure	3
16	Keyword	3
17	Network theory	3
18	Research	3
	Other author keywords	215

Taiwan's progress in "world class" research by normalizing the number of highly cited papers against the total output in two consecutive 5-year windows. They also analyzed the distribution of Taiwan's highly cited papers among disciplines, and surveyed co-authoring countries to observe any changes in Taiwan's international research collaborations in the world-class research.

2. Title: Collaboration patterns of Taiwanese scientific publications in various research areas.
   This study employs bibliometric methods to investigate the collaboration patterns of scientific publications in biotechnology, information and computer technology, future energy, and nanotechnology among different institutions in Taiwan. The research scope includes primary domestic and international collaborative patterns, the effect of collaborative papers on the world-wide average, collaborative networks, and the distribution of institutions on global map.

3. Title: Research status and characteristics of library and information science (LIS) in Taiwan: a bibliometric analysis.
   This work studies how LIS research in Taiwan has changed between 2001 and 2010. The major research contents addressed in the paper include the research status of LIS in Taiwan, how the Taiwanese government supports the field, and the collaborative authorship of LIS journal articles in Taiwan. Bibliometric and content analysis methods were adopted to analyze journal articles, theses, and research projects on LIS in Taiwan between 2001 and 2010.

4. Title: Scientific publications by anesthesia departments in east Asia.
   In this study, the databases of Web of Science and PubMed were used to assess the academic productivity and distribution of research diversity of anesthesia departments from four major countries in east Asia, including Japan, China, South Korea and Taiwan, and compared those with the USA, from 2001 to 2010.

Patent analysis

1. Title: Measuring the use of public research in firm R&D in Hsinchu Science Park (HSP), Taiwan.
   The HSP is the so-called the silicon-valley in Taiwan and the major park for high-tech industries. Based on patent citation, non-patent citation, and public–private co-authorship of scientific publications, this work employs a bibliometric approach, to measure the use of public research in HSP in Taiwan, to explore the knowledge flow between public and private sectors to stimulate innovation and regional development, particularly in science parks.

2. Title: The effects of related and unrelated technological diversification on innovation performance and corporate growth in the Taiwan's semiconductor industry.
   This study employs the entropy-based patent measure to discuss the effects of related technological diversification (RTD) and unrelated technological diversification (UTD) on innovation performance and corporate growth in the Taiwan's semiconductor industry.

3. Title: Strategic partnership and its effect on external learning of technology descendants.
   This paper examines how strategic partnership affects external learning of technology descendants from emerging markets under the context of Taiwan's flat panel display industry. The study takes patent citation as a trail of knowledge flow, and incorporates 1,726 pairs' relations of the cited and citing firms.

4. Title: Patent litigation precaution method-analyzing characteristics of U.S. litigated and non-litigated patents from 1976 to 2010.
   This study proposes an early precaution method which allows predicting probability of patent infringement as well as evaluating the value of a patent. A large-scale analysis on both litigated patents and non-litigated patents issued between 1976 and 2010 by USPTO is conducted in terms of different variables to find the early precaution method.

Research assessment

1. Title: Assessing improvement in management research in Taiwan.
   The performance improvement in management research in Taiwan between 2006 and 2010 is evaluated in this work using the Malmquist productivity index (MPI). The criteria for measuring research performance are journal publications, which the journals are classified as social science indexed (SI)-, Taiwan social science indexed (TI)-, other international-, and other local-types. The areas of management covered in

the present study include management information systems, production and operations management, and marketing.

2. Title: A comparative study on world university rankings: a bibliometric survey.
   This study investigates the correlation of different ranking systems based on a bibliometric approach. Four significant issues regarding world university rankings are examined in the study: (1) the inter-correlation among different ranking systems; (2) the intra-correlation within ranking systems; (3) the correlation of indicators across ranking systems; and (4) the impact of different citation indexes on rankings.

3. Title: A reassessment of Asian Pacific excellence programs in higher education: the Taiwan experience.
   The authors compare the selection criteria of excellence programs in China, Japan, Korea and Taiwan and assess analyses the academic achievement of their top ranked universities in three areas: research output, globalization, and academic excellence based on the data from the Shanghai Jiao Tong, QS, and HEEACT rankings.

Use of bibliographic tool

1. Title: The development and empirical study of a literature review aiding system.
   A citation-based literature analyzing and structuring system is developed in this study to facilitate literature analysis and review for general users.

2. Title: Structure and pattern of social tags for keyword selection behaviour.
   Using a dataset of 4,215 tags attributed to 1,600 scholarly articles from 15 LIS journals in Cite ULike, this work establishes a network to study users' information organization behavior. Moreover, the authors employ social network analysis (SNA) and the frequent-pattern (FP) tree method investigating the implicit patterns and structures embedded in social tags as well as in their use.

This special issue reveals part of current scientometric research in Taiwan. I would like to take this opportunity to thank Professor Tibor Braun for his initiating this special issue, all authors for their timely contributions that making the special issue prosperously and all reviewers for their excellent jobs maintaining the high quality of this special issue. Special thank also goes to Paohua Chen for her assistance searching the bibliographic data for the journal articles of scientometric study in Taiwan in the last two decades.