Bibliometrics evaluation of research performance in pharmacology/pharmacy: China relative to ten representative countries

Zuo-Qi Ding · Jian-Ping Ge · Xiao-Ming Wu · Xiao-Nan Zheng

Abstract Pharmacology/pharmacy is an important scientific field and plays a pivotal role in new drug research and development. China has steadily increased investment in drug development. This study aimed to evaluate the productivity of China in the field pharmacology/pharmacy in the past decade in relation to ten representative countries. The publications in the field pharmacology/pharmacy of China and ten representative countries in the past decade (2001–2010) were retrieved from Web of Science database, and studies were conducted on the immediacy index of articles published in 2011. Multiple bibliometric indicators were obtained from the "InCites" analysis. Most of the bibliometric indicators for the developed countries including the USA and the European countries remained stable in the past decade. The number of publications by the Asian countries, especially China, increased dramatically in the past decade year by year; however, the Asian countries improved little in the indicators assessing the scientific quality of publications including the citation behaviors and the impact relative to either country and subject area. It may need a long time to fill in the gap, in terms of the scientific quality, between the developing countries and the developed countries. In view of the dramatic increase in the financial investment, our findings suggest that the development of the field pharmacology/pharmacy worldwide is not optimistic, which may partially explain the decreased R&D productivity of pharmaceutical industry since the last decade.

Keywords Bibliometrics evaluation · Research performance · Pharmacology/pharmacy · InCites

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Introduction

Bibliometrics is a discipline that quantitatively analyzes scientific and technological literature (Rip 1997; Vitzthum et al. 2010). Bibliometrics is not a new discipline; however, it became really practicable and widely accessible after the foundation of Science Citation Index by Eugene Garfield (Garfield 1964, 1972). Since then, this discipline has been greatly spurred as evidenced from the development of many novel bibliometric indexes, models, and metrics, as well as the wide application of bibliometrics approach to assessing research performance/productivity of scientists, institutions, journals, and countries. Although bibliometric methods have been criticized because of its limitations in assessing scientific outputs on a narrow scale (e.g., individual scientists) (Smith 2006; Campanario and Molina 2009), bibliometric approach is widely believed to be capable of providing reasonable and useful assessments on a macroscale. In particular, bibliometric results for assessing the national contributions to a certain scientific field have been widely accepted. Indeed, the bibliometric analysis of countries' contributions to various scientific fields becomes a very hot field and many publications have been witnessed.

New drug research and development is of vital importance in the whole human health care system. In view that new drug development involves knowledge of multiple disciplines and also relies on the level of economic development, the productivity in this aspect indeed reflects the comprehensive developing level of a country in the science, economy, and society. Although biomedical research has been greatly advanced in the past decades, it still seriously lacks effective drugs to combat many diseases, especially chronic and severe diseases such as cancer and HIV infection. Worse still, the increased R&D pharmaceutical investment has not witnessed parallel increase in the production of new drugs (Scannell et al. 2012). China launched a new drug development supporting program called "The national major new drug creation program" in 2008, aiming to comprehensively enhance the national capacity and level in novel drug development (Hughes 2010). Because the development of a new drug may span a period of more than ten years, it is impracticable to evaluate the productivity of such a program based on the newly developed and marketed drugs, although this may represent the golden standard in assessing a country's performance in new drug development. As discussed above, bibliometric analysis may represent an alternative approach that can assess the immediate productivity of financial investment.

Bibliometrics have been widely applied as a complementary approach to the expert review of scientific performances (Vieira and Gomes 2010; Derrick et al. 2011). Pharmacology/pharmacy is an inter-disciplinary field and spans throughout the whole pipeline of new drug development including the new target verification, the screen of target hits, the preclinical and clinical evaluation of drug candidates, and finally the verification of clinical benefits and risks of drugs. In addition, the journal list in the field of pharmacology/pharmacy in Web of Science (WoS) actually covers most of the disciplines involved in the drug development such as medicinal chemistry, natural products, pharmaceutical analysis, pharmaceutics, pharmacology, toxicology, metabolism, and pharmacokinetics. Moreover, papers retrieved from WoS in pharmacology/pharmacy are intersected with many fields such as chemistry, molecular biology, genetics, neuroscience, immunology, and microbiology. Therefore, bibliometric analysis of pharmacology/pharmacy may provide a comprehensive insight to assessing the performance (especially at the pre-clinical stage) in new drug development of certain countries. For this consideration, we attempt herein to perform an intensive bibliometric analysis of the field pharmacology/pharmacy to evaluate the productivity of the representative counties in new drug development. Multiple indicators

have been applied to assessing the advancement of China in relation to ten other countries in the field of pharmacology/pharmacy from 2001 to 2010 and the immediacy index of articles published in 2011 was also studied.

The selection of authoritative databases is an important concern in bibliometrics analysis. The ISI databases (Institute for Scientific Information, Thomson Scientific, Philadelphia, Pennsylvania) is such an authoritative database that has been widely applied by numerous bibliometric analyses in an international perspective (Moed 2002). In addition, the ISI database provides a comprehensive list of most, if not all, of the high impact journals in the field of pharmacology/pharmacy. InCites, which is based on the platform of WoS in ISI Web of Knowledge, can provide multiple indicators and international comparisons including outcome quantity, academic influence, subject feature, and research cooperation. In the database, many advanced indicators are adopted and the multiple dimensional profiles of analytical results are also displayed visually in a dashboard so that researchers can quickly understand the research status quo of a certain institution. Thus we chose the ISI database and its InCites platform to perform the bibliometric analysis of the field pharmacology/pharmacy.

Data source and method

Publications in the field of pharmacology/pharmacy from 2001 to 2011 were retrieved from InCites and Web of Science (WoS); the data retrieval time was on August 1, 2012. We selected a total of eleven countries for detailed comparisons by using multiple bibliometric indexes. Countries were selected on the basis of two main standards: the well developed countries, especially those with well acknowledged high level of drug development, and the countries that are comparable with China. The finally selected countries include China, India, Canada, France, Germany, Italy, Japan, South Korea, Switzerland, USA, and England. In order to provide a comprehensive assessment, multiple indicators were incorporated to analysis. Four general indicators including the numbers of publications, times cited, cites per document (impact), and % documents cited (number of cited documents divided by the total number of documents) were initially selected for assessing both the quantity and quality of publications. Furthermore, all the four basic indicators were referenced to that in country and in subject area and thus providing a clear comparison among countries and subject areas; such extended indicators are defined as follows.

% Documents in country, number of articles produced by a country in one subject area divided by the total number of documents produced by that country in all subject areas.

% Documents in subject area, number of articles in a subject area produced by a country divided by the total number of documents in the subject area.

Impact relative to country, impact in a particular subject area relative to the impact for the entire country in all subject areas; a value greater than one indicates that the impact of the country in the selected subject area is better than the average impact of the country across all subject areas.

Impact relative to subject area, impact (cites per document) of a country or institution in a subject area relative to the impact all countries or all institutions in the subject area overall; a value greater than one indicates that the impact in the subject area is greater than the impact in all subject areas.

% Documents cited relative to country, percentage of cited papers for a country in a subject area divided by percentage of cited papers for a country as a whole; a value greater

than one indicates that the impact of the country in the selected subject area is stronger than the impact of the country/territory across all subject areas.

% Documents cited relative to subject area, percentage of cited documents for a country in one subject area divided by percentage of cited papers for the world in the same subject area; a value greater than one indicates a better-than-average impact relative to subject area.

A new indicator, adjusted IF of publishing journals, was proposed to further evaluate the quality of publications of various countries. Top ten journals which published the most of the papers in the field of pharmacology/pharmacy for each country were selected for calculating the adjusted IF by the equation, Adjusted IF $= \sum ($IF of a journal $\times$ number of publications in this journal/total number of publications in the top ten journals$)$.

Results and analysis

The number of publications and correlated indicators

The number of publications is the most unambiguous indicator of scientific output. Figure 1 shows the number of publications of the 11 countries in the field of pharmacology/pharmacy during 2001–2010. USA, with a total of 8,972 publications in 2010, has been the highest-ranking country in terms of overall publications for the consecutive ten years. China has got a rapid increase in the number of publications from 633 in 2001 to 3,480 in 2010. In contrast, the number of publications in this field remains stable for most of the other countries studied in a period of ten years. It is thus not of surprise to find that the rank of China increased from the 8th during 2001–2002, only ahead of India, South Korea, and Switzerland, to the 2nd during 2009–2010, only behind of USA. For the 11 selected countries, the number of publications in the field of pharmacology/pharmacy during 2009–2010 ranked as the USA > China > Japan > Germany.

Given that the number of total scientific publications of China increased rapidly in the past decade, it is of concern to assess whether the increase of the publications in the field pharmacology/pharmacy is just parallel to or even surpasses the averaged increase of publications from China. The ratio of the publications in a certain field to the nation's overall publications provides an insight into the developing trends of this field in this country and thus can address this concern. As shown in Fig. 2, the ratio of China's publications in pharmacology/pharmacy to the nation's overall publications increases from 1.85 % (2001) to 2.57 % (2010), indicating that pharmacology/pharmacy is one of the leading fields contributing to the rapid growth of the total scientific publications in China. India also witnessed an increased ratio in the past decade. In contrast, there was a slight decrease in Canada, France, and Switzerland while other countries kept a steady state.

The analysis of the world share of a country's publications in a certain field can represent the contribution and strength of a country in this field in an international scale. Figure 3 demonstrates that the world share of China's publications in pharmacology/pharmacy increases dramatically from 2.89 % (2001) to 7.33 % (2006) and further to 11.04 % (2010) when China stands only behind the USA. This data strongly indicates that China has become to be one of the major contributors in the field of pharmacology/pharmacy, at least in terms of the number of publications. India and South Korea also show an increased contribution, whereas there was a decrease for other countries except Italy,
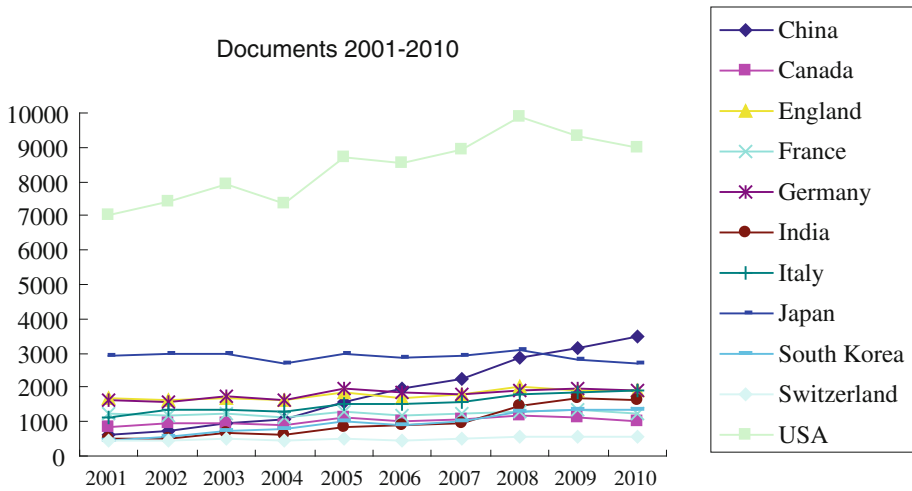
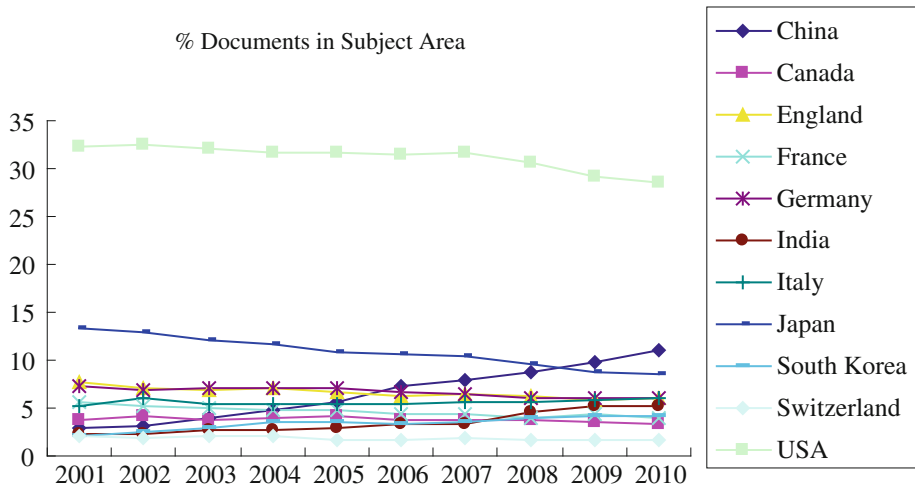Fig. 1 Number of publications in pharmacology/pharmacy for the 11 countries 2001–2010
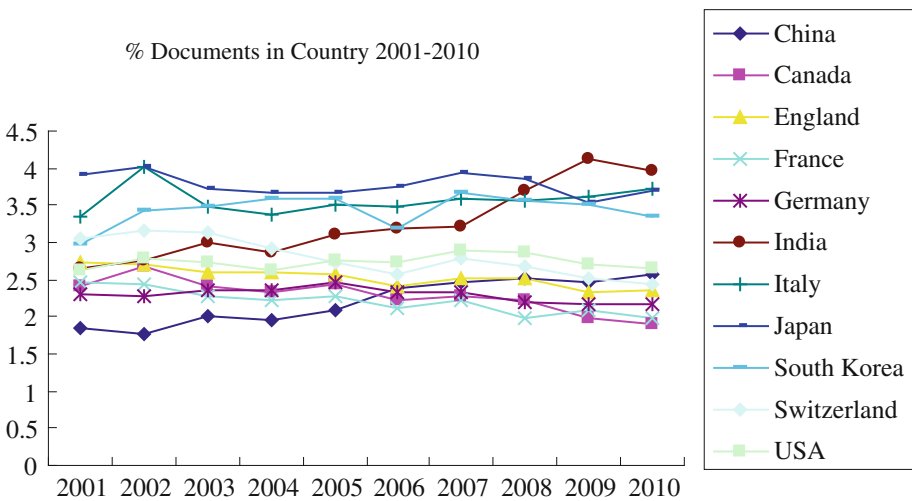
Fig. 2 Ratio of the publications in pharmacology/pharmacy to the nation's overall publications 2001–2010

which kept a steady state. The summed ratio for the 11 countries selected in this study reaches 85 %, supporting our selection is appropriate and of representative.

Citations and correlated indicators

Citation count is an important measure for assessing the usage, quality, and impact of scientific researches. Citations can be counted for papers, journals, scientists, scientific fields, institutions, and even countries. Therefore, the analysis of citation performance has been widely performed for assessing the quality of scientific research for various comparisons in both the microscale and macroscale (Aksnes and Rip 2009; Radicchi and

Fig. 3 World share of a country's publications in pharmacology/pharmacy 2001–2010
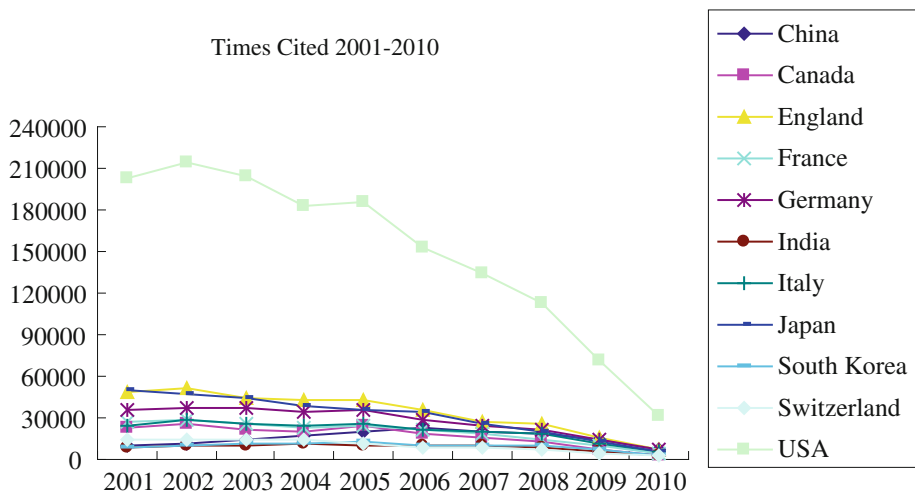
Fig. 4 Total citation counts in pharmacology/pharmacy of the 11 countries 2001–2010

Castellanoc 2012). Figure 4 displays the total citation counts in pharmacology/pharmacy of the 11 countries during 2001–2010. Consistent with the number of publications, the USA ranks the highest throughout all the years studied from 2001 to 2010; China's ranking moves from the 9th (2001) to the 5th (2006) and further to the 3rd (2010) only behind of the USA and England, indicating that the total citation counts kept increasing along with the total number of publications. The relative ranks of other countries remained stable from 2001 to 2010.

The average number of citations per paper (CPP) is an indicator that is often used to compare scientific impacts of publications among countries, institutions, and journals. CPP
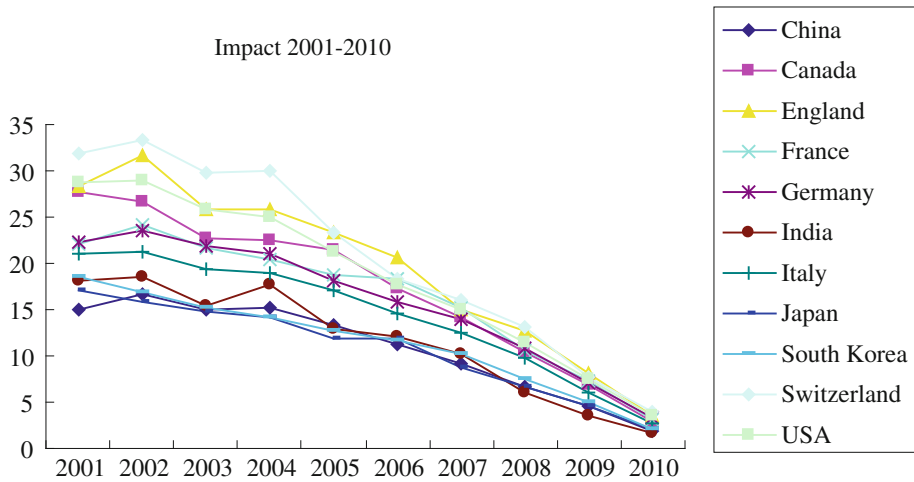
Fig. 5 Citation per article of the 11 countries in pharmacology/pharmacy 2001–2010

is defined as the number of citations divided by the number of publications (Fu et al. 2012). Because the total counts of citations are influenced by the number of publications, we next analyzed the average number of citations per paper (Fig. 5) to provide a more comprehensive insight to scientific quality of researches. By this index, the 11 countries studied here rank as Switzerland > England > USA > Germany > France > Can-
ada > Italy > Japan > South Korea > China > India in 2010. Unlike the total numbers of publications and citation counts, the USA was not the top one while Switzerland and England alternated the top two positions from 2001 to 2010. For China, no significant advance was observed by this index representing the averaged scientific quality of publications. In 2001, China had a lowest rank among the 11 countries and the rank moved upward to the 8th in 2005 but decreased to the 10th in 2010. In view of the fact that the citation usually has an at least 2 years' delay (Price 1965), it is difficult to assess the citations of the publications in the recent 2 years. Therefore, the decrease of China's rank in this list in 2010 may not indicate the averaged scientific quality of publications from China relative to other countries was even poorer than that in previous years. However, as compared with the number of publications and total counts of citations, it is apparent that China has gotten little advance in improving the averaged citation performance of its publications in the field pharmacology/pharmacy.

To assess the contribution of one certain field to the overall scientific citations, we analyzed the impact ratio of pharmacology/pharmacy in relative to country during 2001–2010 (Fig. 6). The value of China is bigger than one during 2001–2009, indicating that pharmacology/pharmacy in China is an advantageous field. The same is true with Canada, England, France, India, and South Korea. It is a big surprise to find that all 11 countries dropped below by this index in 2010, indicating that the immediate citations of publications in pharmacology/pharmacy may be poorer than that of the averaged perfor-mance of scientific publications. However, it is also important to note that a general downward trend was observed for most of the countries from 2001 to 2010.

The impact relative to subject area is a very useful index to assess a country's impact in a certain field on an international scale. We calculated this index of 11 countries in the field pharmacology/pharmacy during 2001–2010 (Fig. 7). It was found that the four Asian
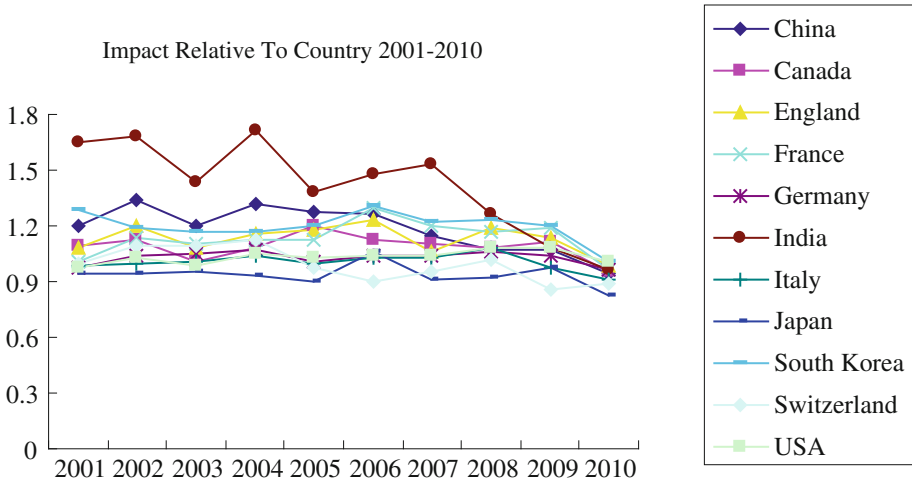
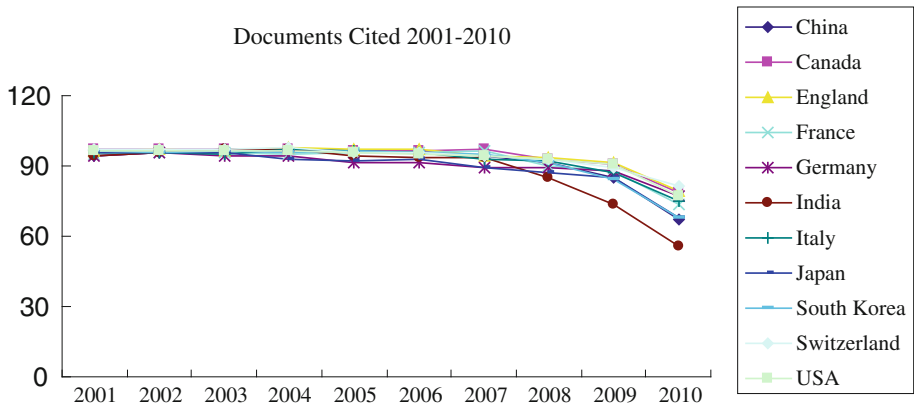Fig. 6 Impact relative to country in pharmacology/pharmacy 2001–2010
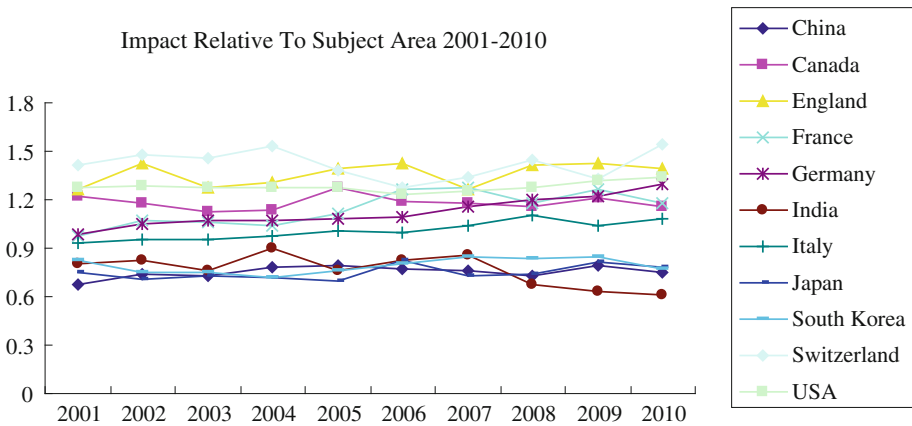
Fig. 7 Impact relative to subject area in pharmacology/pharmacy 2001–2010

countries, i.e., Japan, South Korea, India, and China, all fall below the average level of the subject. China ranks only ahead of India in 2010. The USA ranked the 2nd position in 2001 but decreased to 3rd or 4th from 2002–2010. Switzerland, England, Germany and France were among the top five countries for most of the years and alternated their relative ranks from 2001 to 2010. In general, the well developed western countries by this index across the past decade were much better than that for the Asian countries.

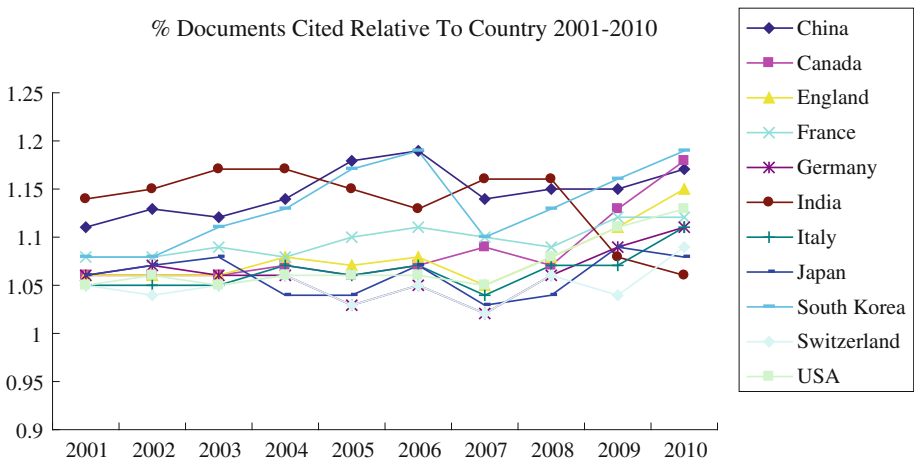Percentage of documents cited and correlated indicators

Percentage of documents cited is commonly used for assessing the impact of individual authors, institutions, and journals on the scientific community (Larcombe and Voss 2011). Figure 8 presents the percentage of documents cited in pharmacology/pharmacy during 2001–2010. Of interest, there is no significant difference among various countries; the

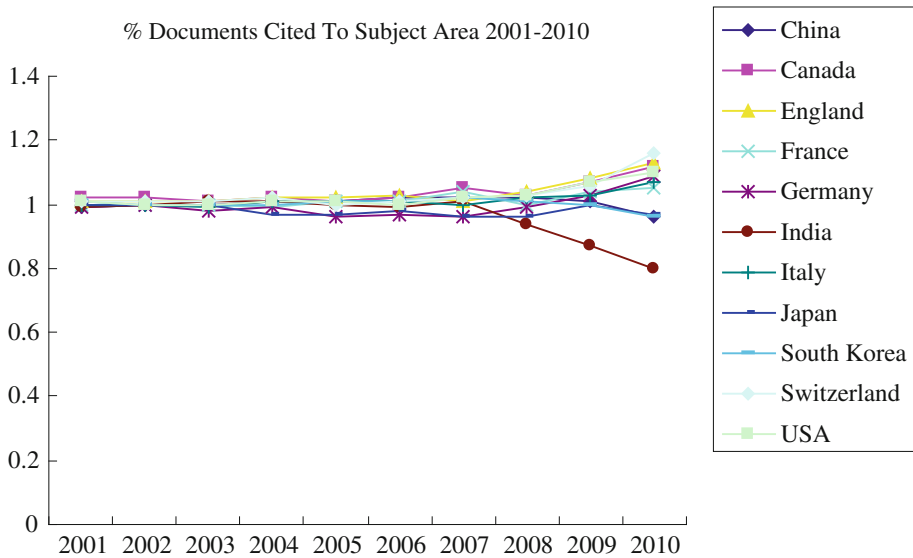**Fig. 8** Citation rates in pharmacology/pharmacy 2001–2010

Fig. 9 Citation rates in pharmacology/pharmacy relative to country 2001–2010

percentage of documents cited of China has been over 90 % during 2001–2008, indicating that most of the publications by Chinese authors/institutions received certain citations. However, large difference was found for this parameter in the latest 2 years; the percentage of documents cited for China and other Asian countries is relatively lower than that for the western countries. This result indicates that the publications by Asian countries are somewhat difficult to receive prompt citations.

We further analyzed the percentage of documents cited relative to country during 2001–2010. It was found from Fig. 9 that the percentage of documents cited in the field pharmacology/pharmacy is higher than the averaged level for all the eleven countries, which indicates that the citation rates of articles in pharmacology/pharmacy are higher than that in most other scientific areas. In particular, the Asian countries including China, India, and South Korea are the leading countries by this parameter.

The citation rates in pharmacology/pharmacy relative to subject area during 2001–2010 are shown in Fig. 10. China exceeds the average level during and no apparent difference

Fig. 10 Citation rates in pharmacology/pharmacy relative to subject area 2001–2010

was found among various countries during 2001–2009 in this aspect. However, dramatic difference was witnessed from the data of 2010; the Asian countries possess relatively lower level than that for the western countries, further suggesting that the publications in pharmacology/pharmacy by Asian countries are much slower to receive citations than those by the western countries.

Adjusted average IF

Studies reveal that when scientists choose where to publish, reputation of the journal and the impact factor are given high priority. Scientists tend to publish their innovative and representative research works in journals of high impact factor. The publication in high-impact journals is also widely believed capable of representing high quality of the research (Rowlands and Nicholas 2006). Ratio of papers in high-impact journals has been used as an important index to evaluate the research performance of authors and institutions (Guan and Ma 2004). Herein, we selected the top ten journals with the most papers published for each country and the adjusted average IF of such journals in 2006 and 2011 was then calculated (Table 1). For China, the adjusted IF of 2011 is higher than that of 2006, characterized by a 19.1 % increase as compared with that of 2006; this value is higher than that of France, Germany, India, Japan, and South Korea, suggesting that China has got a good improvement of the publications in high-impact journals. For India and South Korea, there is a paper boom in 2011; however, most of the papers are published in journals of relatively low IF, which causes the fact that the adjusted IF in 2011 decreases a lot compared with that of 2006. The data of France in 2011 decreases dramatically, and the data of Japan in 2011 decreases a little while other countries keep a high level with some small changes. It was also of interest to find that China published the most paper (1,186) in 2006 in a local journal *Acta Pharmacologica Sinica* that had a relatively lower impact factor at 1.953, while the numbers of publications in this journal were dramatically decreased to 157 in

Table 1 Adjusted average IF in pharmacology/pharmacy of the 11 countries in 2006 and 2011

	China	Canada	England	France	Germany	India	Italy	Japan	South Korea	Switzerland	USA
2006	2.265	3.851	3.227	3.046	2.781	2.364	2.918	2.222	3.063	3.559	4.583
2011	2.697	3.560	3.653	2.125	2.687	1.276	3.334	2.036	2.311	3.036	3.938

Adjusted IF $= \sum$ (IF of a journal $\times$ number of publications in this journal/total number of publications in the top ten journals)

2011, which is a strong evidence that Chinese researchers prefer to published their works in international journals with high impact factor. Because the journal impact factor is believed to be an immediate index representing the averaged scientific quality of its publications, the increase of China by this index may indicate that China has been on the road in improving the scientific quality of its publications.

The immediacy indices of 2011

In order to provide a more updated view to the developing trend of the field pharmacology/pharmacy, we further analyzed some immediacy indices in 2011. As shown in Table 2, the number of publications by China is still increasing and ranks the 2nd only behind of the USA in 2011; this continuously increasing trend suggests that there is still a long time for China to reach a plateau in the number of publications while all of the developed countries have already reached a plateau since the last decade. Consistent with the data in 2010, the immediate citations measured by the citation rate, citation per article, and comparative impact in the field still remain at a low level for the publications by China. The same is true for other three Asian countries, i.e., India, Japan, and Korea, whereas other seven countries kept a high level (more than average) in the subject influence, further supporting the view of that the publications in pharmacology/pharmacy by Asian countries are less likely to receive immediate citations than that by the well developed western countries. The causes for this can be complex but the lack of originality and not within the hot topics may be the major explanations for the poor immediate citations of publications by China and other Asian countries.

Discussions

Bibliometric analysis of the productivity in a certain scientific field is an important measure to evaluate the development of scientific progress in a certain time framework. Data obtained from such analyses are very helpful for judging the developmental level and trend and then can be used as indicators and evidence for better design and program of developing plans via various kinds of investment strategies. Indeed, bibliometrics researches have been performed in the analysis of the development of various scientific fields; however, little analysis has been conducted for the pharmaceutical development. New drug development plays an important role in the whole human health care system and pharmaceutical industries are one of the mainstays of the economy. However, the pharmaceutical economy in the western well developed countries has not witnessed an originally expected increase in the past decade; the R&D productivity has even been declining. It has been reported that the output of new molecular entities (NME) dropped by 50 % from 1998 to 2008 and the late stage of attrition rates increased sharply in the past decade (Pammolli et al. 2011). Although the underlined causes for such a decline could be complex, bibliometrics analysis of the developing status in pharmaceutical relevant science and technology may shed a light.

Herein, we performed a bibliometric analysis of the research performance in the field pharmacology/pharmacy 2001–2011 of 11 representative countries. The published output analysis showed that pharmacology/pharmacy research in China steadily increases over the past 11 years, the annual publication of article in 2011 is more than six times than that in 2001, and the growth rate is the highest among all the countries. The annual publication of article has been among the top of the list since 2006. The ratio of publication of article in

Table 2 Immediacy indices in pharmacology/pharmacy of the 11 countries in 2011

	Documents	% Documents in country	% Documents in subject area	Times cited	Cites per document	Impact relative to country	Impact relative to subject area	% Documents cited	% Documents cited relative to country	% Documents cited relative to subject area
China	3,840	2.44	11.27	1,082	0.28	0.80	0.64	18.83	1.02	0.76
Canada	1,106	1.93	3.25	556	0.50	0.82	1.14	29.57	1.09	1.20
England	2,023	2.40	5.94	1,446	0.71	1.00	1.61	35.59	1.19	1.44
France	1,366	2.06	4.01	1,366	0.61	1.00	1.39	30.09	1.10	1.22
Germany	2,022	2.16	5.93	2,022	0.60	0.88	1.36	32.44	1.08	1.31
India	1,948	4.28	5.72	1,948	0.26	0.87	0.59	15.81	0.91	0.64
Italy	1,972	3.69	5.79	1,972	0.48	0.83	1.09	25.61	0.96	1.04
Japan	2,728	3.58	8.01	2,728	0.38	0.84	0.86	23.09	1.03	0.93
South Korea	1,427	3.19	4.19	1,427	0.27	0.77	0.61	18.36	1.01	0.74
Switzerland	683	2.83	2.00	683	0.63	0.74	1.43	34.26	1.03	1.38
USA	9,391	2.65	27.56	9,391	0.58	0.91	1.32	30.23	1.06	1.22

pharmacology/pharmacy to the whole country's publication of article increases annually and the world share of publication of article in the field of pharmacology/pharmacy also rise year by year. Similar developing trends have also been observed for India; however, the increasing rate is much less evident than that of China. For all the western countries studied here, most of the bibliometric indicators remain stable and change very little throughout the past decade, suggesting that their research in pharmacology/pharmacy had already reached a plateau at least a decade before. On the one hand, the result indicates that the well developed countries have been at a high level in the field pharmacology/pharmacy; on the other hand, it may pose a challenge to those countries as whether they lack innovative and revolutionary idea to further boost the development of this field. Indeed, pharmaceutical scientists have recognized that the currently applied novel drug developing paradigm may not be in accordance with the actual requirements for the therapy of most chronic diseases (Lu et al. 2012). On the basis of the currently applied "one-drug, one-target, and one-gene" drug development paradigm (Hopkins 2008), the science and technology in pharmacy/pharmacology generally becomes more and more mature and is thus difficult to make a breakthrough. This result may also mirror the declined R&D productivity in pharmaceutical industries.

For most of the developing countries such as China, who focuses on the production of generic drugs and invests very little in the novel drug development, there is still a long way to reach the level the well developed countries currently stand. This proposition is supported by more detailed citation analytical results. We found that although the total citations of China's papers increased dramatically along with the number of publication of article, the ranking of citation per article does not change significantly. With regard to the impact relative to subject area in pharmacology/pharmacy 2001–2011, the four Asian countries, i.e., Japan, South Korea, India, and China, are all below the average level of the subject. China ranks only ahead of India and South Korea in 2011. Given that the citation metrics is a good indicator of the scientific quality of published works, this evidence indicates that the scientific quality, judged by the currently accept paradigm, of papers in field pharmacology/pharmacy by Asian countries may be much lower than that by western well developed countries. However, it is also important to note that the citation metrics has its limitations in that it has an at least 2 years' delay (Price 1963). Some scientific paper reaches its citation peak in the 6th year following publication (Aversa 1985). We found in our previous studies that the citation summit of Chinese SCI-articles in pharmacology/pharmacy comes later than that of European and American countries. Therefore, taking time duration into consideration for defining a proper method of citation analysis is crucial (Bharathi 2011). Thus, it may need time to make a definitive evaluation in the improvement of the scientific quality of publications by China and other Asian countries.

The impact factor of journals is believed to be another indicator assessing the scientific quality of publications; the work with high quality always goes to the journals with high impact factor. Therefore, we calculated the adjusted average impact factor of journals which published the papers in pharmacology/pharmacy of these 11 countries. Among the four Asian countries, only China has seen an increase in this index. The improvement in the adjusted journal impact factor may suggest that the scientific quality of publications by China in the recent 2 years have been improved to a more or less extent, along with the dramatic increase in the number of publication.

The distance between Asian countries and the well developed western countries may also be evidenced from the immediate citation performance of publications in the recent years. As shown in Fig. 10 and Table 2, the percentage of documents cited relative to subject area before 2009 has no significant difference among these eleven countries;

however, large difference was observed in 2010 and 2011, which suggests that the publications by the western developed countries receive more immediate citations than that by the Asian countries.

In 2008, China launched "The national major new drug creation program" and plans to invest over RMB 20 billion in the next 15 years, in the hope of spurring the rapid development of both the pharmaceutical science and industry. The government of China hopes that this program will guide a national transfer of drug R&D from the previous "generic" to the future "innovative". It still needs time to prove the impact of this program; however, the rapidly increased numbers of publications in the recent years and the improvement of most bibliometrics indicators studied herein, especially the upsurge in the ratio of publishing in high-impact journals, may indicate a promising future of pharmaceutical science and industry of China. However, for China and other Asian countries, it is important to note that there is still a large distance between them and the western well developed countries in pharmaceutical science, and it may require a long time for them to reach the level that the developed countries currently stand.

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