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Focus on China: the trajectory of Chinese research

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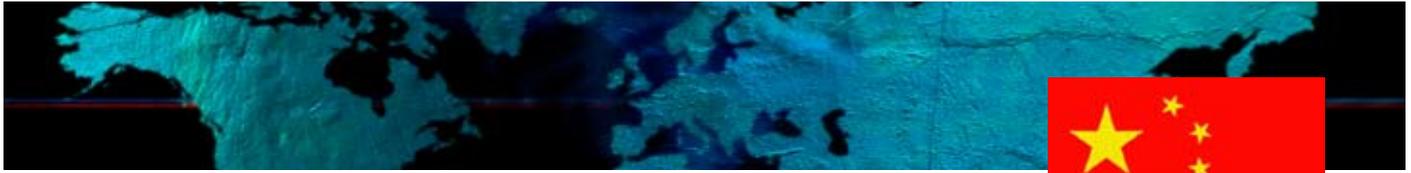
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Country trends



Focus on China: the trajectory of Chinese research

Since the invention of movable type printing by Bi Sheng almost 1,000 years ago, China has had a long tradition of disseminating the printed word. In the 21st century, the growth in scholarly journal articles by Chinese authors has been nothing short of prodigious. How can we track this growth, and what has its effect on the global research landscape been?

“China has pursued a program of modernization for over 30 years, in particular by increasing the contribution of scientific innovations to the economy,” says Sharon Ruwart, Managing Director of Science & Technology for Elsevier China. “This is helping the country move beyond agriculture and manufacturing into higher value-added production with more indigenous innovation.”

This policy focus has contributed to an exponential increase in Chinese article output of 18% per annum over the last 10 years (Figure 1). As a result, the share of global articles with at least one Chinese author has grown from 3% in 1997 to almost 13% in 2006. In 2006, 49% of these articles were published in English and 51% in Chinese, a ratio that has remained more or less stable over the last decade.

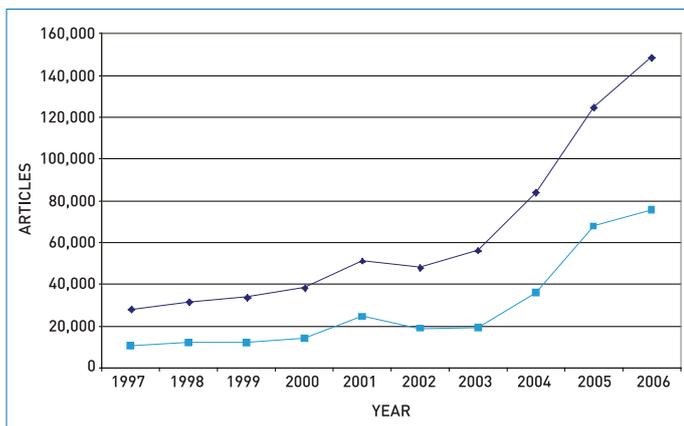


Figure 1 – Number of articles published by Chinese researchers in all languages (dark blue) and those in the Chinese language (light blue) 1997-2006. Source: Scopus.

According to Ruwart, this rapid growth seems likely to continue: “The government clearly signalled the high priority it places on science by unveiling a 15-year plan (2006-2020) to systematically invest in designated fields of science and technology, with associated goals for each. One of the plan’s key benchmarks is an increase in R&D expenditure from 1.4% to 2.5% of GDP. Underlying GDP growth is estimated to quadruple between 2000 and 2020.”

Other factors contributing to the dramatic increase in scholarly output in the last decade include government and university

incentives to publish in international journals, increased exposure to the journal literature via online platforms since the late 1990s and expanded enrolment in higher research degrees since 2000.

The influence of Chinese research on the rest of the world can be gauged by looking at the most influential articles authored solely by authors based in China. The top 14 have collectively been cited more than 6,000 times to date (Table 1, see page 5). However, according to Martin Tanke, Managing Director of Science & Technology Journals Publishing at Elsevier, “This table masks the quality gap we currently see between well-established international research and the typical low impact of many Chinese papers. But this is starting to change as China moves away from its focus on quantity alone.”

China’s traditional research strengths have been in Physics, Chemistry, Materials Science and Engineering, but recently its developing expertise in the Health and Life Sciences has begun to emerge (Figure 2). Tanke continues: “In China there is an enormous emphasis on applied science rather than pure science, as research is expected to deliver tangible benefits to society such as highways, dams, hybrid crops, satellite systems and vaccines.”

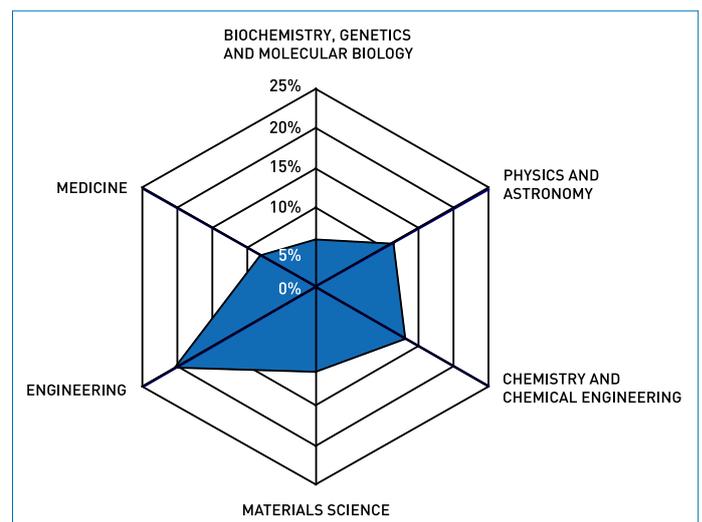


Figure 2 - Proportion of journal articles in selected subject areas published by Chinese researchers in 2006. Source: Scopus

Given the high hopes that science will help sustain the country’s continued development, the coming years will continue to see China expand and deepen its research capabilities. This is not a temporary phenomenon; as a science power, China is here to stay.

To see the citation report of six countries, including China and Australia, please click [here](#).

Country trends

First author	Main affiliation	Article title	Year	Journal	Cites to Feb 2008
Yu J.	Beijing Genomics Institute, Center of Genomics and Bioinformatics, Chinese Academy of Sciences, Beijing	A draft sequence of the rice genome (<i>Oryza sativa</i> L. ssp. indica)	2002	Science	987
Han W.	Department of Physics, Center of Atomic and Molecular Sciences, Tsinghua University, Beijing	Synthesis of gallium nitride nanorods through a carbon nanotube- confined reaction	1997	Science	806
Shen Z.-X.	Shanghai Institute of Hematology, Ruijin Hospital, Shanghai Second Medical University, Shanghai	Use of arsenic trioxide (As ₂ O ₃) in the treatment of acute promyelocytic leukemia (APL): II. Clinical efficacy and pharmacokinetics in relapsed patients	1997	Blood	576
Guan Y.	Department of Microbiology, University of Hong Kong, Queen Mary Hospital, Hong Kong	Isolation and characterization of viruses related to the SARS coronavirus from animals in Southern China	2003	Science	451
Kong Y.C.	Department of Physics, Mesoscopic Physics National Laboratory, Peking University, Beijing	Ultraviolet-emitting ZnO nanowires synthesized by a physical vapor deposition approach	2001	Applied Physics Letters	391
Liu L.	State Key Laboratory of Engineering Plastics, Institute of Chemistry, Chinese Academy of Sciences, Beijing	Studies on Nylon 6/Clay Nanocomposites by Melt-Intercalation Process	1999	Journal of Applied Polymer Science	385
Fan E.	Institute of Mathematics, Fudan University, Shanghai	Extended tanh-function method and its applications to nonlinear equations	2000	Physics Letters Section A	370
Chen G.-Q.	Shanghai Institute of Hematology, Ruijin Hospital, Shanghai Second Medical University, Shanghai	Use of arsenic trioxide (As ₂ O ₃) in the treatment of acute promyelocytic leukemia (APL): I. As ₂ O ₃ exerts dose-dependent dual effects on APL cells	1997	Blood	349
Lin B.	Structure Research Laboratory, Academia Sinica, University of Science and Technology, Hefei	Green luminescent center in undoped zinc oxide films deposited on silicon substrates	2001	Applied Physics Letters	331
Lo C.-M.	Center for the Study of Liver Disease, University of Hong Kong Medical Center, Queen Mary Hospital, Hong Kong	Randomized controlled trial of transarterial Lipiodol chemoembolization for unresectable hepatocellular carcinoma	2002	Hepatology	313
Luo H.	Department of Chemistry, Peking University, Beijing	Investigation of the electrochemical and electrocatalytic behavior of single-wall carbon nanotube film on a glassy carbon electrode	2001	Analytical Chemistry	311
Zheng S.-B.	Department of Physics, University of Science and Technology of China, Hefei	Efficient scheme for two-atom entanglement and quantum information processing in cavity QED	2000	Physical Review Letters	300
Feng L.	Center of Molecular Sciences, Institute of Chemistry, Chinese Academy of Sciences, Beijing	Super-hydrophobic surfaces: From natural to artificial	2002	Advanced Materials	289
Wang J.	College of Chemistry and Molecular Engineering, Peking University, Beijing	Direct electrochemistry of cytochrome c at a glassy carbon electrode modified with single-wall carbon nanotubes	2002	Analytical Chemistry	276

Table 1 – Top-cited articles published solely by Chinese researchers 1997-2006, with citations received to date. Source: Scopus