

The Growth Rate of Science and the Coverage of Databases

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We have compared the number of records in SCI for 1955-2005 with the number of records in Chemical Abstracts (1907-2007), Medline (1959-2007), Physics Abstracts (1909-1969), INSPEC Section A, Physics 1969-2007), and the Sections in INSPEC (1969-2007).

In 1963 Derek de Solla Price determined the growth rate of science based on data from Chemical Abstracts, Biological Abstracts, Physics Abstracts and Mathematical Review. Price found a doubling time of 15 years corresponding to an annual growth rate of 4.7 per cent.

Our data show that the growth rate from 1970 to 2005 has been between 3.0% and 3.8%, corresponding to a doubling time between 19 and 23 years. Possible reasons for this decline are discussed and the question whether publication numbers are representative for the output of science is addressed.

The records in Science Citation Index (SCI) are often assumed to represent the scientific literature and the output of science. However, the growth rate in SCI is lower than in all the other databases studied, indicating that SCI is covering a decreasing part of the scientific literature. Therefore, the universal use of SCI-data in output and growth studies is unjustified.

However, no other and more reliable output indicators are available at the macro level. Also the mostly used input indicators for scientific research, manpower and expenses are unreliable for measurement of quantities or size.