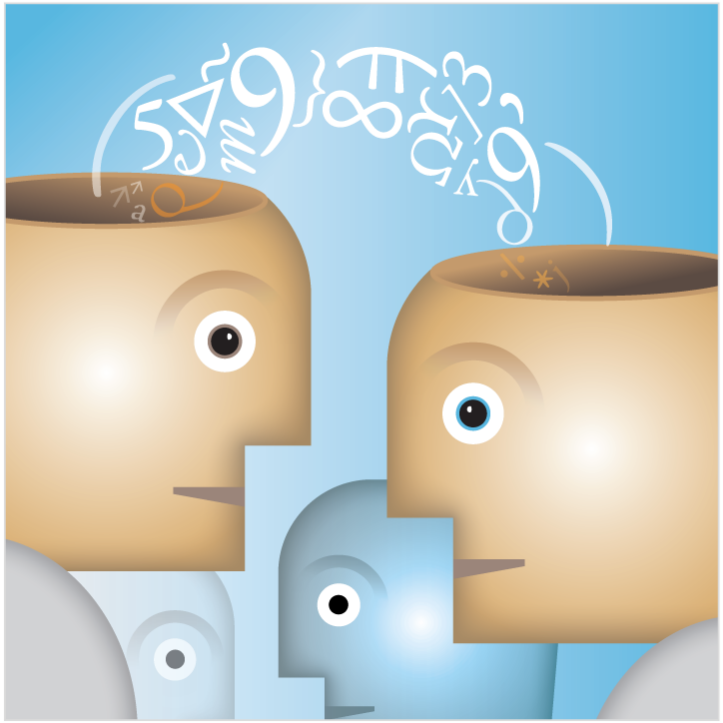

Origin, history and development of bibliometrics

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Structure of the presentation

- Historical background
- The evolution
- The situation
- Closing remarks

Historical background

- The roots
  - Scientometrics, as an inter-disciplinary field, has its roots in several fields of the sciences and socials sciences.
- The 'Perspective Shift'
  - During the last four decades, scientometrics evolved from sub-discipline of information science to an evaluation tool for science policy and research management.

Historical background

- Challenges and present tasks
  - New challenges force the development of new techniques and methodologies, the exploration and creation of new data sources and the foundation of regional and national research and service centres.

Historical background

- In order to understand the present situation of scientometrics we have to go back to the roots of the field:
  - History of science (D. de Solla Price)
  - Philosophy (V.V. Nalimov)
  - Information science (E. Garfield)
  - Sociology of science (R.K. Merton)
  - Mathematics (S.D. Haitun, A.I. Yablonsky)

Historical background

- Bibliometrics represented a statistical approach to master the growing flood of scientific information and to analyse and to understand the cognitive characteristics of ”big science” by measuring quantitative aspects of communication in science and by providing the results to scientists and users outside the scientific community.

Historical background

- Monitoring, describing and modelling of the production, dissemination and use of knowledge was originally in the foreground.
- First scientometric applications were developed to improve use of bibliographic databases and to extend information services.

Historical background

- Citations were considered documented use of information, and have consequently applied first in the context of librarianship, scientific information and information retrieval.
- The journal Impact Factor (Garfield & Sher, 1963) was used to help select journals for the Science Citation Index (SCI).

Historical background

- The co-citation based Atlas of Science developed and issued by the Institute for Scientific Information (ISI) was considered a new kind of "review literature" which is also suited to help students in choice of career in science (Garfield, 1975).

The evolution

- A consequence of the growth of knowledge and the evolution from little science to big science: The need for supplementing traditional research evaluation by quantitative methods.
- Application to science policy has brought a new perspective, and resulted in re-interpreting bibliometric conceptions.

The evolution

- The ’science indicators’ movement in the US with the discussion about the possible use of bibliometrics in science policy in the 1970s.
- Bibliometrics evolved from a sub-discipline of library and information science to an instrument for evaluation and benchmarking. I called this perspective shift.

The evolution

- As a consequence of this perspective shift, new fields of applications and challenges opened to bibliometrics; but many tools were still designed for use in scientific information, information retrieval and libraries. Those became used in a context for which these were not designed.

The evolution

- Data sources have to be improved and extended, new methods have to be developed to make bibliometrics fit for present-day and future tasks.
- Garfield himself recognised the power of the IF for journal evaluation and considered it later also a journal performance indicator.

The evolution

- Sociology of science laid the theoretical groundwork for the paradigmatic perspective shift.
- However, advancement of bibliometric methodology could not always keep pace with the demands and the breathtaking development in data processing.

The evolution

- Further changes in bibliometric application could be observed.
  - The level of aggregation decreased from the national level over the institutional level down to the level of the evaluation of research groups or even individual scientists.
  - The role of bibliometrics changed from a "passive" monitoring/ reporting to an "active" one by using bibliometric indicators in research funding and promotion.

The evolution

- A necessary requirements are high quality of data and watertight methodology (cf., Glänzel, 1996).
- Consequences are possible repercussions on the scientists' publication and citation behaviour (Glänzel & Debackere, 2003).

The situation

- The new situation implies new tasks and challenges for bibliometric research and technology requiring new methods and instruments as well.
  - Extending bibliometrics to the technical sciences, social sciences and humanities
  - Exploring and building new ("bibliometrics-ready") databases

The situation

- Development of advanced subject-delineation techniques and subject classification
- Inclusion of bibliometrics in funding formulas
- Using bibliometrics in the evaluation of institutes, departments and research groups
- Ranking issues *vs.* "multi-dimensional bibliometrics"

The situation

- In order to take on these challenges, also new centres for science, technology and innovation research have been founded world wide.
- Nowadays both public and commercial institutes are searching for new solutions in bibliometrics and related fields.

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Closing remarks

- Bibliometric professionals at these institutes and other research groups and centres world wide have taken on the challenge of making bibliometrics fit for its present and future tasks.
- Some of the tasks and solutions will be outlined in the following presentations.