

Part I

Science and Society. Research Organizations and Assessment of Research

In this part, we present a minimum amount of basic knowledge needed for understanding indexes and mathematical models from the following two parts of the book. This part contains one chapter, which begins with a discussion of the complexity of science: science is considered an open system that needs numerous inflows in order to remain in an organized state. In addition, two important concepts connected to science are described. The triple helix concept shows the place of science and academic research in the modern knowledge-based economy. The second concept (academic diamond) is closely connected to the important question of competition and especially to scientific competition among nations.

The text continues by presenting basic information about assessment of research production. The discussion begins on a technical level from process indicators and continues to latent variables and scales of measurements. The non-Gaussian nature of many processes in science and research is emphasized, since this has implications for the methodology of modeling research dynamics and for the methodology for assessment of research production. Further, a minimum basic knowledge about scientometrics, bibliometrics, informetrics, and webometrics is presented, and an impression about the quantities that may be used in the process of research evaluation is given. The role of knowledge landscapes for the study of research systems is briefly discussed. The importance of the study of research publications and their citations for the assessment of research is emphasized. A method for quantification of research performance (based on qualitative and quantitative input information) is presented.