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Abstract

Understanding the earth system is essential for the investigation of global climate change feedbacks and the corresponding impacts on the socio-economic system. Spatial data is a key component of earth system research and is therefore essential for enhancing awareness of environmental and global changes. For this reason, spatial data is increasingly recognized as a national resource and basic infrastructure. Building systems for spatial data can assist framing policies, standards and procedures which promote more efficient use, co-ordination and production of spatial data. This, however, requires a substantial amount of resources often associated with high government spending. Accordingly, an extensive number of cost-benefit assessments attempts to justify the associated costs of Spatial Data Infrastructure (SDI) and Global Earth Observation System of Systems (GEOSS) investments. Previous research applied different approaches to evaluate the costs and benefits of SDIs and GEOSS so that results on the Return On Investment (ROI) vary considerably among studies, regions and sectors. The objective of this study is to explain the variation in the average ROI of SDIs and GEOSS. For this purpose, a meta-analysis of 40 studies on cost-benefit assessments is conducted. Meta-analyses provide a
method to combine results from different studies so that a general effect size can be calculated. In a first step, the studies are systematically reviewed and relevant information is extracted. Particular emphasis is given to the influence of the cost-benefit methodology, the metrics, the investing organisation and the influence of qualitative benefits. In a second step, a random effects model is estimated while controlling for the differences between the studies. Preliminary results suggest the expected return on investment highly depends on the characteristics of the study.

Keywords: Cost, benefit, meta-analysis, SDI