

28th SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS (E3)

The space economy: what are the socio-economic impacts? (3)

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ECONOMIC EVALUATION OF BENEFITS OF THE KNOWLEDGE DERIVING FROM SPACE
EXPLORATION THE CASE OF HIGH HENERGY ASTROPHYSICS MISSIONS IN WHICH ITALY IS
INVOLVED

Abstract

Our research has as objective the measurement of the economic benefits deriving from knowledge produced by scientific missions in the field of High Henergy Astrophysics, namely the Italian national mission AGILE and the Italian participation in other six international missions. We start by the assumption that the acquisition of new scientific knowledge is reflected in scientific literature with its impact on the international scientific community. In order to estimate the value of knowledge included in scientific papers, we make use of the concept of willingness to pay, which is used in the economic literature to estimate public goods or services. Knowledge is in fact a public good. Based on data of Euroconsult and National Science Foundation, the international willingness to pay a scientific publication is the average of the national indices of willingness to pay of the firsts ten space-faring countries. The national index of the willingness to pay - calculated for the period 2006-2011 - is the ratio of the annual average value of Space Science Exploration budgets and the annual average number of scientific papers produced in the sector Astronomy and Astrophysics. The modern scientometrics helps us to assign different weights to the scientific papers, according to the quality of publication (in refereed Journals or not), number of received citations and h-index. As a result, we determine a measure of the total economic value of the knowledge created by a single mission. Through a costs-benefits analysis, we calculate the index of scientific productivity of the national mission AGILE and of the following High Henergy Astrophysics missions in cooperation: BeppoSAX, INTEGRAL, SWIFT, PAMELA, Fermi, AMS. A comparison among such indices provides us with remarkable indications of policy.