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EXAMINING THE IMPACT OF SPACE RESEARCH: THE CASE OF PUBLICLY FUNDED
RESEARCH INSTITUTES (PFRIS)

Abstract

Increasing resources and policy attention have been devoted to supporting the emergence of the space economy.¹ Concurrently, pressures on the use of public funding to generate impact for society have also substantially grown.² We match these two megatrends and, hence, aim to increase our understanding of the potential socio-economic impact that publicly funded research efforts in the space domain can generate. Specifically, this paper aims to examine the impact of the research generated by a key group of public research actors, namely Publicly Funded Research Institutes (PFRIs) operating in the space domain. While being supported by large public investment, PFRIs have also provided major contributions to technological change in a range of sectors.³ By examining the impact of PFRIs in the space domain, we conceive impact as a multidimensional concept that includes knowledge spillover processes (within vs. across the space domain) as well as the alignment with pressing societal needs (e.g. as represented by the UN SDGs).

Our analysis relies on longitudinally mapping the research outputs generated by ten NASA centres as reported by the “NASA Technology Transfer Program”. This includes examining a relatively large dataset of patents, software, and spinoffs generated by NASA centres and the impact associated with these outputs. Preliminary results obtained from the analysis of one NASA centre, namely the Jet Propulsion Lab (a joint NASA-Caltech centre), reveal a relatively extensive activity of software development and spinoff generation – the patenting activity is less visible since this is likely to be included in the patent portfolio of the academic partner, hence revealing challenges of the measuring impact of PFRIs. The longitudinal analysis of the JPL software portfolio and spinoffs provided evidence that the largest majority of software packages have been open source and focussed data and imaging processing, while spinoffs have been mostly in the area of energy and environment, health and medicine, and industrial productivity.

We anticipate that our findings across all ten PFRIs, although limited to the United States, will provide critical insights into the development of managerial practice and policy instruments for decision-makers involved in the emergence of the space economy.

¹OECD (2022), OECD Handbook on Measuring the Space Economy, OECD Publishing, Paris.

²Ciarli, T., Ràfols, I. (2019). The relation between research priorities and societal demands: The case of rice. *Research Policy*, 48(4), 949–967.

³Siegel, D. et al. (2023). Technology transfer from national/federal labs and public research institutes: Managerial and policy implications. *Research Policy*, 52(1), 104646.