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"WHAT IS NEWSPACE?" - A SECTORAL INNOVATION SYSTEMS APPROACH

Abstract

The purpose of this study is to answer "what is NewSpace?" from the perspective of innovation studies. Can this phenomenon be meaningfully characterized in this way? It tries to understand the characteristics of sectoral innovation in the US space sector recently, and how they have evolved. Is "NewSpace" a sharp break or continuity? It seeks to create a narrative of sectoral innovation in the spirit of Franco Malerba and David Mowery, and to identify key factors & policies which led to recent changes. Finally, it will recommend strategies & policies to encourage innovation in the space sector.

Thus, the space sector's innovation and R&D history was mapped, focusing on the US. Historical, innovation, and grey literature were used, e.g. tracking R&D expenditures. Characteristics of innovation in successive phases of the space sector were identified, using a proposed framework classifying by: *Governance style*, *Attributes of the goal*, *Organization of the effort*, and *Deployment considerations*. Innovation characteristics associated to NewSpace were then identified, and long-term trends and changes of the sector analyzed.

Results include that characteristics related to *governance style* of the R&D effort capture many of the large-scale changes seen over the decades: the dramatic funding volatility & cuts of the 70s and 90s, the gradual decentralization of the effort and customers. Changing *attributes of the goal* are likewise insightful. NewSpace is meaningfully described by changing innovation characteristics, which are often understood in context as representing historical continuity. NewSpace can be described as the reconstitution of the ecosystem of small firms, and increased "inputs": another R&D funding upswing - with much of it "uncaptured" by the military-industrial complex; far cheaper technology; and more available labour, due to university satellites. Coupled with the changing mission of institutions, there is a loosening of traditionally tight links between government and industrial R&D.

In conclusion, innovation policies for the US should include continued work to reduce the effect of "capture" of government R&D goals by industry, partly by rebalancing towards basic research. There are parallels with US agricultural sector R&D. To emulate NewSpace, other countries may consider strong signalling via irreversible investment, extension mandates, and demand-side policies.