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MEASURING AND LEARNING FROM SUCCESS AND INNOVATION IN EARLY STAGE TECHNOLOGY DEVELOPMENT: A CASE STUDY OF NASA'S CENTER INNOVATION FUND

Abstract

This paper will report on methods for improving space technology innovation, based on multiple years of study of technology programs and researchers. Technology development organizations in space face significant challenges relative to other domains. Four factors contribute to these challenges broadly across the domain: (1) the high cost of access to space can provoke participants to try to develop highly reliable and long-lasting technologies; (2) the unique constraints of the extreme space environment pose challenges to leveraging technologies from other domains or to transferring developed technologies to other domains; (3) the relatively nascent new space market implies a smaller pool of experts in space technologies, and fewer participants attempting to meet all the needs of the market, and; (4) a smaller and less diverse set of funding sources provides a constrained competitive environment to secure funding.

A key distinction between government organizations and companies is the ability to effectively use return on investment (ROI) as a metric. Since commercialization generally isn't a primary goal of government research and development, ROI is usually not applicable. This at once frees government organizations to consider efforts that may yield mid- to long-term benefits, and also challenges them to find valuable metrics for success in innovation and technology development. While companies tend to primarily focus on short- to mid-term ROI in their internal research and development, some corporate innovation companies may have the resources and incentive to consider investments with longer-term benefits.

This paper will provide insight that can be used by government innovation organizations across the world, especially space technology organizations, allowing them to consider metrics to measure performance, methodologies to draw meaningful connections, and policy to positively affect innovation and success. Corporate innovation organizations may also find these metrics relevant, providing insights into performance that can augment or predict financial performance/commercialization results. All innovation organizations can benefit from improving their internal programmatic processes to support innovative research.

The Center Innovation Fund (CIF) Program at NASA – a program focused on stimulating innovation in technology development – is the case study focus for this paper. Continued funding by others is an indicator of auspicious and relevant work, thus the study focuses on factors that contribute to this result in CIF.