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ASSESSING THE IMPACT OF SPACE PROGRAMS THROUGH MULTI-LEVEL BEHAVIORAL
ADDITIONALITY**Abstract**

Recent literature on innovation policy brings out three main rationales for policy intervention – market failures, systemic failures, and transformative failures. The neoclassical market failure doctrine prescribes a rather limited range of policy instruments. Governments should increase investments in knowledge production in the economy towards the socially optimal level. The evaluation of a policy intervention based on the market failure rationale focuses on input and output additionalities to estimate whether the public intervention increases inputs devoted to innovation and results in outputs that would not occur without the intervention. A notable share of evaluations of public space programs focus on input and output additionalities, such as indicators measuring extra turnover of space companies derived from extra spending to a space program. As impacts generally result from multiple causes, such studies suffer from the attribution problem.

The national systems of innovation approach stresses the role of institutions and deliberate state coordination in the creation and coordination of knowledge, and interactive learning processes in which different types of agents are involved. Rationales for innovation policy intervention stem from the notion that the basic structural elements of the innovation system and multiple links that connect the actors may not function efficiently serving their purpose with respect to knowledge generation and diffusion. Along this line of thinking, governmental intervention focuses on capability building and facilitating links between different agents to support innovation. In empirical policy evaluations, the concept of 'behavioral additionality' has been introduced to assess effectiveness of policy interventions. Behavioral additionality, i.e. persistent change in the conduct of policy beneficiaries, is generally not covered explicitly in evaluations of public space programs, but occasionally addressed implicitly.

Transformative failures prevent processes of transformative change, necessary to tackle contemporary societal challenges, from occurring in a socially desirable way. Transformative change involves changes in technological, institutional, economic, organizational, and socio-cultural dimensions. For transformative change, the government should actively create new markets to give an economy a desired direction, not merely intervene to fix market and systemic failures. The paper argues that the current tradition of impact assessments of public investments to space programs overlooks these market-creating and market-shaping roles of space programs. The paper proposes the concept of 'meso-level behavioral additionality' that complements the existing evaluation approaches by monitoring the institutional changes that are directly induced by projects funded from public space programs. The concept is applicable to track institutionalization of emerging new space markets.