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INSTANTIATIONS OF GOVERNMENT SPACE INNOVATION SYSTEMS: A COMPARATIVE ANALYSIS

Abstract

As long as government/intergovernmental agencies remain the primary patrons of advanced space capabilities, the onus of specifying innovation[1] will fall disproportionately to civil servants. As elucidated in ongoing work by the authors,[2,3] this market structure creates a number of challenges with respect to generating innovation. They are as follows: 1) generating the requisite bottom-up initiative in a predominantly top-down acquisition process; 2) representing the needs of a disaggregated buyer; 3) integrating fragmented sell-side knowledge from the top-down; 4) matching the innovation environment to the stage of development; and 5) balancing risk aversion and the need for experimentation. While none of NASA's, ESA's (European Space Agency) or the DoD's (Department of Defense) innovation systems were explicitly designed to address these specific challenges, they all address each challenge to some degree. This is because at some level, all three organizations are addressing the same fundamental problem: how to continuously generate and encourage complex product innovation for the space environment in a monopsony-oligopoly market.

In order to deal with the inherent challenges of innovating in the space sector, each of NASA, ESA, and the DoD have developed complex innovation systems within their organizations. While they share important similarities, they also exhibit significant differences. In part because of their historical roots and political entanglements the three organizations have evolved relatively independently. NASA was created as a civil entity, separate from the DoD, ostensibly to demonstrate the United States' peaceful intentions in space .[4] European nations, wishing to assert their autonomy from the US, created ESA, to serve both military and civil space needs.[5] As a result of this history, the DoD is quite different from both NASA and ESA; and while the latter two do share some similarities, different cultural contexts and objectives have led to important structural distinctions.

Leveraging this natural experiment – different organizational instantiations addressing the same fundamental problem – this paper will serve two objectives. First, it will create a conceptual map of the innovation architectures employed by each of the organizations. This will facilitate a critical comparison of the relative strengths of each. Second, it will seek to triangulate the intrinsic challenges of innovating in the space sector. Using the five challenge hypothesis discussed above as a starting point, the paper will assess whether they in fact characterize the key challenges faced by space agencies, or if the list needs to be expanded/adapted. Together, these analyses will serve as a basis for future work addressing the overall question of how best to encourage innovation in government space.

References

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