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Is Space R&D Truly Fostering A Better World For Our Future? (2)

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ROCKET SCIENCE AND INNOVATION SPILLOVERS – DOES SPACE RESEARCH BENEFIT THE  
ECONOMY AND SOCIETY?

**Abstract**

Amid countless news stories about record-breaking venture capital deals in space start-ups, it is often forgotten that about one-third of the total funding in the space sector still comes from governmental budgets. Politicians thus have to convince their electorate that it is worthwhile spending billions of taxpayers' money on space projects. In this context it is often argued that investments in space technologies do not solely benefit the space industry, but also related industries through spillover effects. The existence of spillovers in the space industry has been investigated before. However, existing research focuses on individual projects or countries. A comprehensive and global analysis of the space industry's spillover potential is missing.

Our paper conducts a global analysis of over 35,000 space-related patent applications and granted patents over the last ten years. Patents are a particularly suitable metric for this analysis, because filing a patent application is a sign of a potentially marketable innovation that is worth protecting.

We answer three research questions using network analysis and statistical hypotheses testing. First, we investigate which industries benefit most from space-related technologies and patents. We find that in particular the aircraft and communication sector are building upon space-related technologies. We also find strong links to technologies such as batteries or solar cells. Thus, space research potentially contributes to societal goals like a sustainable environment. Second, we examine which countries are leading in the space sector. Our results indicate a decline in the innovative power of European space nations, with the U.S. still being the leader in space related innovations. China's position in space research has so far not been measurable in terms of marketable innovations, which could indicate an under-commercialized space sector. In addition, we will analyze the direction of knowledge flows between different countries. Third, we compare the space sector with other high-tech industries, drawing on over 1.1 million additional patent applications. Before the conference, we plan to assign the patent applications in our data set to individual players in the traditional and new space industry. This way, we can compare the innovation power of the traditional and new space sector.

Our findings help policymakers to understand which non-space industries benefit from space research funding. As a result, programs promoting technology transfer in the space industry can be better targeted. Finally, we show which nations are leading in marketable space innovations, which is of strategic and geopolitical interest for all space nations.