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Author: Mr. Alessandro Paravano
Politecnico di Milano, Italy

Mr. Brendan Rosseau
Harvard Business School, United States
Prof. Giorgio Locatelli
Politecnico di Milano, Italy
Prof. Matthew Weinzierl
Harvard Business School, United States
Prof. Paolo Trucco
Politecnico di Milano, Italy

DEVELOPING NEW COMMERCIAL SPACE STATIONS: HOW DO POTENTIAL USERS PERCEIVE THEIR VALUE?

Abstract

In 2021, NASA established the Commercial LEO Development Program to encourage established and new private-sector actors to design commercial space stations (CSS) that could replace the International Space Station (ISS). The response has been enthusiastic, and hopes are high that CSS will be powerful platforms for expanding the New Space Economy. But for these hopes to be realised, CSS should not only cover their costs, but generate attractive returns on investment and deliver sufficient value to potential users, such as pharmaceutical, energy, and manufacturing companies.

Our research answers the question: *"How do potential users perceive the value of leveraging CSS for developing their businesses?"*. We adopted an explorative research approach and sensemake our results with the Resource-based View. We first interviewed 13 senior managers of asset and service providers on the ISS. We identified 30 primary value propositions (e.g., vaccine development) that may create value for users (e.g., pharmaceutical companies), and we linked the value propositions with 20 potential user customer bases (e.g., health organisations). Second, we performed semantic web scraping of potential users' websites and public documents to extract further information on their strategic and tactical value perception in leveraging CSS for developing their business. For example, pharmaceutical companies may find tactical value in developing vaccines in microgravity to improve their processes on Earth and find strategic value in becoming vaccine service providers on the CSS. Third, we interviewed 20 user managers to deepen and triangulate secondary data and assess the current degree of alignment between their value perceptions and CSS providers' designs.

Our results are simple and striking: we find that CSS providers' designs are currently failing to convince potential users of their value. While users understand the appeal of experimenting in microgravity, they are sceptical that it would deliver a competitive advantage quickly enough to justify the high costs. Users prioritise tactical value from CSS, as they do not see a clear strategic value for their business.

Our research provides CSS developers with users' perspectives, helping them develop compelling value propositions by highlighting short- and long-term opportunities and challenges. Our findings suggest that developers should design CSS around clear and specific user needs, with an integrated as-a-service supply

chain and tight cost control, including minimising or avoiding the human role on CSS. We also hope that potential CSS users will benefit from this study's insights on potential CSS value propositions and possible future application domains.