

CHINA'S SPACE ECONOMY: PIONEERING INNOVATION AND OVERCOMING CHALLENGES

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China has emerged as a significant player in the global space economy, with technological innovation at its core. The state plays a pivotal role directly through its institutions, including public research institutions and state-owned enterprises (SOEs), and indirectly with long-term development plans like the 863 Programme and Medium-to-Long-Term Plan for Science and Technology (2006-2020). Since 2018, escalating China-US tensions have impacted China's space innovation capabilities, with technology access sanctions restricting progress. In response, China has reemphasised the Whole-of-Nation approach, mobilising resources to support innovation. This includes increased funding for scientific infrastructure, leveraging financial market resources through government guidance funds and fostering collaboration among SOEs, private enterprises, the military and research institutes. Efforts also focus on the commercial space sector, encouraging firms to collaborate with research institutes and universities to acquire new technologies. The emergence of spin-off companies from SOEs marks a growing commercial space industry. Civil-Military Integration promotes innovation in space infrastructure, enhancing connectivity between military and civilian enterprises. Despite these efforts, tensions between private and state-owned enterprises and a lack of supportive institutions for innovative firms prevail. Misaligned incentives among government departments, private companies, SOEs and local governments also pose significant hurdles.

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Chinese:

中国的太空经济：开创性创新与克服挑战

以技术创新为核心的中国已成为全球太空经济中的重要参与者。政府通过其机构直接发挥推动创新的关键作用，包括公共研究机构和国有企业，同时通过“863 计划”和《国家中长期科学和技术发展规划纲要（2006-2020 年）》等长期发展计划间接推动技术发展。自 2018 年以来，不断升级的中美紧张关系影响了中国的太空创新能力，技术访问制裁限制了进展。作为回应，中国重新强调全民参与的方针，动员资源支持创新。这包括增加对科学基础设施的资金投入，通过政府引导基金利用金融市场资源，并促进国有企业、私营企业、军队和研究机构之间的合作。努力还集中在商业航天领域，鼓励企业与研究机构和大学合作以获取新技术。从国有企业衍生出的初创公司标志着一个日益增长的商业太空产业的出现。军民融合促进了太空基础设施的创新，加强了军民企业之间的联系。尽管有这些努力，私营企业与国有企业之间的紧张关系以及缺乏对创新型企业的支持机构仍然存在。政府部门、私营公司、国有企业和地方政府之间不一致的激励也构成了重大的障碍。

French:

L'ÉCONOMIE SPATIALE DE LA CHINE : INNOVATION DE POINTE ET DÉFIS A RELEVÉ

La Chine est devenue un acteur majeur de l'économie spatiale mondiale, avec l'innovation technologique au cœur de ses activités. L'État joue un rôle central, directement à travers les institutions de recherche et les entreprises publiques (EP), et indirectement via des plans de développement à long terme comme le Programme 863 et le Plan à Moyen et Long Terme pour la Science et la Technologie (2006-2020). Depuis 2018, les tensions croissantes entre la Chine et les États-Unis ont impacté les capacités d'innovation spatiale de la Chine. C'est notamment le cas des sanctions sur l'accès à la technologie venant ralentir les avancées. En réponse, la Chine a réitéré l'approche de la nation tout entière (Whole-of-Nation) mobilisant davantage de ressources pour soutenir l'innovation. Cela inclut l'augmentation du financement pour les infrastructures scientifiques, l'exploitation des ressources du marché financier par le biais de fonds d'orientation gouvernementaux et la promotion de la collaboration entre les EP, les entreprises privées, l'armée et les instituts de recherche. Les efforts se concentrent également sur le secteur spatial commercial, encourageant les entreprises à collaborer avec des instituts de recherche et des universités pour acquérir de nouvelles technologies. L'émergence d'entreprises dérivées des EP souligne la croissance de l'industrie spatiale commerciale. L'intégration civile-militaire favorise l'innovation dans les infrastructures spatiales, renforçant la connectivité entre les entreprises militaires et civiles. Malgré ces efforts, les tensions entre les entreprises privées et publiques et le manque d'institutions de soutien pour les entreprises innovantes persistent. Les problèmes

de coordination des incitations entre les départements gouvernementaux, les entreprises privées, les EP et les gouvernements locaux posent également des obstacles significatifs.

Spanish:

LA ECONOMÍA ESPACIAL DE CHINA: INNOVACIÓN PIONERA Y SUPERACIÓN DE DESAFÍOS

China se ha convertido en un actor significativo en la economía espacial global, con la innovación tecnológica como núcleo. El estado desempeña un papel fundamental directamente a través de sus instituciones, incluidas las instituciones de investigación pública y las empresas estatales (SOEs), e indirectamente con planes de desarrollo a largo plazo como el Programa 863 y el Plan a Mediano y Largo Plazo para la Ciencia y la Tecnología (2006-2020). Desde 2018, las crecientes tensiones entre China y EE. UU. han afectado las capacidades de innovación espacial de China, con sanciones de acceso a tecnología que restringen el progreso. En respuesta, China ha vuelto a enfatizar el enfoque de toda la nación, movilizando recursos para apoyar la innovación. Esto incluye un aumento en la financiación para la infraestructura científica, aprovechar los recursos del mercado financiero a través de fondos de orientación gubernamental y fomentar la colaboración entre SOEs, empresas privadas, el ejército e institutos de investigación. Los esfuerzos también se centran en el sector espacial comercial, alentando a las empresas a colaborar con institutos de investigación y universidades para adquirir nuevas tecnologías. La aparición de empresas derivadas de las SOEs marca una industria espacial comercial en crecimiento. La Integración Civil-Militar promueve la innovación en infraestructura espacial, mejorando la conectividad entre empresas militares y civiles. A pesar de estos esfuerzos, persisten tensiones entre empresas privadas y estatales y una falta de instituciones de apoyo para empresas innovadoras. Los incentivos desalineados entre departamentos gubernamentales, empresas privadas, SOEs y gobiernos locales también plantean obstáculos significativos.

Executive Summary

1. China has emerged as a major player in the global space economy thanks to its emphasis on technological innovation. Additionally, new actors such as private aerospace companies contribute substantially to commercial space activities.
2. The innovation system of China's space economy comprises government departments, research institutes under the Chinese Academy of Sciences, state-owned enterprises (SOEs), universities and private enterprises.
3. The state's development plans for space technology, such as the 863 programme and "Medium-to-Long-Term Plan for the Development of Science and Technology (2006-2020)", set missions for innovation in this sector.
4. Since 2018, escalating China-US tensions over technology have significantly impacted China's innovation in the space economy. Restricted access to these technologies has restrained China's capacity for innovation in this sector.
5. These geopolitical shifts have driven China to re-emphasise its Whole-of-Nation approach to mobilising resources in support of innovation.
6. Since 2018, the state has increased its funding to support basic research. It also mobilises resources through government guidance funds to leverage resources from the financial market.
7. Aside from resource allocation, the interactions among SOEs, private enterprises, the military and research institutes are supported under the current Whole-of-Nation approach. Collaboration between SOEs and private enterprises is allowed in the areas of commercial space programmes.
8. Firms are encouraged to work with research institutes and universities to acquire new technologies. The emergence of spin-off companies from SOEs signifies the establishment of a commercial space sector.

9. Civil-Military Integration is strategically extending its focus to the space economy, with the Chinese government advocating for the promotion and innovation of space infrastructure to enhance connectivity between military and civilian enterprises.
10. Despite these efforts, tensions between private and state-owned enterprises in the space economy and lack of institutions supporting innovative firms persist. Another significant challenge is the misalignment of incentives among government departments, private companies, SOEs and local governments.