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THE PROMISES AND PERILS OF LEVERAGING BLOCKCHAIN FOR THE FUTURE OF MOON GOVERNANCE

Abstract

Blockchain, as a distributed ledger technology, is considered one of the ground-breaking technologies of the last decade. The Bitcoin blockchain and its consensus has even been referred as being a "technological tour-de-force" by Bill Gates, back in 2014. Today, surpassed in utility by blockchains such as Ethereum, Polygon or Cosmos Network, it enables disintermediated transactions, in addition to the automation of complex business logics in peer-to-peer interactions. A variety of sectors and domains are currently implementing this emerging technology. Examples include healthcare, cyber security, IoT, supply chains etc.

In addition to its earthly applications, blockchain has recently gained interest for its potential benefits in outer space applications. Major space stakeholders, representing both the public and private sector are starting to adopt this technology. For example, NASA and ESA are studying ways to use blockchain for designing future missions, as well as for the management and governance of satellite constellations. Several space missions (SpaceX, SpaceChain) will place blockchain nodes in orbit and on the Moon. Blockchain is also considered in relation to space sustainability (Copernic Space), including management of authority (Minerva Space), mitigation of space debris, as well as providing marketplaces of data and services for Earth Observation applications, such as predictive humanitarian responses (Parametry.ai).

Given the ambitions of humanity to establish permanent habitats on the Moon, the sovereignless nature of space could become an impediment. In such context, the purpose of this paper is to investigate the promises and perils of leveraging blockchain in the context of Moon governance. In doing so it analyses, among others, if the composability of blockchain smart contracts, allowing to build decentralized autonomous organizations, can lead to a new governance model, aiming to balance the needs of both public and private sector, while observing international space law. The provisions of the Outer Space Treaty, the Liability Convention and the Moon Agreement are further analyzed through the lens of various blockchain ideologies, such as the libertarian schools of thought.