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MSc Dissertation

Blockchain Technology Adoption in Aviation - An analysis of the industry's systemic technological support structure

Since the launch of the cryptocurrency Bitcoin in 2008, the underlying technology, Blockchain, has attracted much interest among economists, and has sprawled out towards different industries that try and make use of it. Its decentralised nature and control over one's own data make advocates believe that Blockchain's innovative character will transform and revolutionise industries and societies. One of the industries in which Blockchain has sparked interest is aviation. Whilst aviation is normally a late adopter of new technologies, Blockchain technology was depicted as a saviour to the industry. Facing significant growth rates in terms of passengers, but limited capacity and capability, using Blockchain to create a transparent immutable record generated interest around aircraft maintenance documentation, spare parts lifecycles, and improving the airline ticket process, as it streamlines and speeds up processes.

The objective of this dissertation is therefore to provide insights into the specific innovation support structure for Blockchain technology in the aviation industry to assess the likelihood for industry-wide adoption in the next years.

Using a multi-method qualitative approach, the research includes a patent analysis with subsequent network analysis, an event analysis, as well as expert interviews to validate the findings.

The findings of this research project show that two main communities are evolving around applying Blockchain for engineering and maintenance, where the main interest stems from incumbent firms; and around applying Blockchain for improving passenger experience, where the main interest stems from new entrants and industry outsiders. Furthermore, the research brought forth that whilst knowledge development and experimentation is high, legitimation through the development of standards and approvals is underdeveloped, which weakens Blockchain adoption in the industry. Blockchain was found to develop and be mainly applied in new areas emerging in the industry, such as UAV management, as well as areas involving external cooperation, such as digital IDs. Whilst these nursing markets may spill-over to other areas as the technology matures, industry-wide adoption appears unlikely, as the industry structure is closed with strong official control and therefore no urgency exists for implementing a decentralised system.

This research contributes to the literature on Blockchain in aviation by providing a first holistic assessment of the innovation support structure for the technology in the industry. In addition, by combining different analytical frameworks to a new multi-layer construct, a novel theoretical approach in assessing innovation support structures was created that can be used to analyse a system in other industries.

Keywords: Blockchain, Innovation, Aviation, Innovation Systems