

SOCIAL OR BUSINESS IMPACT

first function of the vaccine distribution blockchain solution is to produce a vial record for each manufactured vaccine. Vial record information would include the date manufactured (timestamp), vial QR code, and the manufacturer's signature confirming they produced the vaccine.

Vaccine Tracking-Transparent has the potential for profound social and business impacts. From a social perspective, it can significantly enhance public health by ensuring the efficient and transparent distribution of vaccines, which is crucial in the fight against infectious diseases. This technology can help boost vaccination coverage rates, reduce vaccine wastage, and mitigate the risks of counterfeit vaccines entering the supply chain. This, in turn, leads to improved disease prevention and overall community well-being. On the business front, the implementation of such systems can streamline vaccine supply chain operations, reduce costs associated with vaccine distribution, and enhance the reputation of vaccine manufacturers and healthcare providers. Moreover, the transparency and trust established through Vaccine Tracking-Transparent can foster stronger partnerships and collaborations within the healthcare ecosystem, ultimately benefiting both public health and the vaccine industry.

Data privacy access and collection are also a challenge when handling COVID-19 data. Blockchain technology provides various features such as decentralization, anonymity, cryptographic security, smart contracts, and a distributed framework that allows users and entities to handle COVID-19 data better.

COVID-19 has changed almost all aspects of our lives. Governments around the world have imposed lockdowns to slow down the transmissions. Fortunately, we have found the vaccine, in fact, a good number of them. However, managing the testing and vaccination process of the total population is a mammoth job. However, there are always delays or data silo problems in multi-organizational work. Therefore, streamlining this process is vital to improve efficiency and save more lives.

Because of its effective data sharing mechanism among different entities with a number of security features, blockchain can be an effective tool for different applications in the health sector. Furthermore, blockchain provides a distributed system along with greater privacy, transparency, and authenticity. In this article, we have presented a blockchain-based system that seamlessly integrates testing

and vaccination systems, allowing the system to be transparent. The instant verification of any tamper-proof COVID-19 test result has been developed, which will serve as “Test Certificates”. A transparent and efficient vaccination system has also been exhibited and implemented as the “Digital Vaccine Passport” (DVP) system. The infection rate-based prioritization will ensure a transparent and fair vaccination process as well as tackle the distribution issue of the limited amount of vaccine. The comparative review with other existing works is also discussed, highlighting a clear difference from the existing works. Our proposed system is distinctive on the basis of prioritization of vaccines and seamless integration of test certificates and vaccine passports, which will aid in controlling the pandemic situation. This system will also be handy in the case of tackling any future pandemics initially.

