Blockchain in Life Sciences Analysis By: Michael Shanler; Andrew Stevens Page 38 of 79 Gartner, Inc. | G00450345

**Definition:** A blockchain is an expanding list of cryptographically signed, irrevocable transactional records shared by all participants in a network. Each record contains a time stamp and reference links to previous transactions. A blockchain is one architectural design of the broader concept of distributed ledgers. Blockchain in life sciences is contextualized for the pharmaceutical and medical device industries in which value exchange transactions (in bitcoin or other token) are sequentially grouped into blocks.

**Position and Adoption Speed Justification**: Today, the primary potential applications include serialization, track-and-trace, genomic and clinical data sharing. It has become an extremely popular topic and strategic conversation with Gartner clients. In 2020, there are a growing number of active blockchain projects within the life science industry. Even though “blockchain” is a top search term by clients at Gartner, less than 10% of life science organizations have blockchain in their roadmaps and even fewer are working on funded projects today. Gartner clients still express some uncertainty in blockchain’s fit in maturing supply chain strategies but they are preparing for their own use cases. The majority of the interest is in blockchain projects for anti-counterfeiting efforts. Lower levels of supply chain maturity in the life science sector provide more opportunities for blockchain exploration around applications. Some clients are exploring concepts where blockchain would streamline clinical trials, extended regulatory filings, exchange genomic information, manage intellectual property generation, handle payments to drug distributors, conduct health record and exchange transactions, and more. Today, there are very few vendors, IT consultant firms and sponsor organizations that have a deep life science capability (for example, supply chain and R&D) and that also understand a wide array of blockchain models and underlying technologies. There have been a handful of recent successes with scaling blockchain pilots for track and trace, verification services, and wholesalers, much of which is driven by Drug Supply Chain Security Act (DSCSA).

Blockchain is extremely hyped across many industries, and life sciences is no different. However, the life science industry continues to be slower than others to develop use cases. **Blockchain is accelerating through the Peak of Inflated Expectations phase.** While the technology shows promise and continues to refine, we expect to see technology pilots encountering new challenges. These challenges will come up while moving into full scale POCs for areas such as counterfeits, healthcare reimbursement, diversion and parallel trade in the pharma supply chain.

**User Advice:** CIOs and functional IT leaders supporting blockchain strategies should: ■ Recognize that the terminology surrounding blockchain is in flux. This uncertainty masks the potential suitability of technology solutions to meet business use cases. Consequently, use extreme caution when interacting with vendors that have ill-defined/nonexistent blockchain offerings. ■ In your planning efforts, ensure you are clearly identifying how the term “blockchain” is being used and applied, both internally and by providers, to better understand the return on capital employed, especially compared with existing, proven technologies.

Gartner, Inc. | G00450345 Page 39 of 79 This research note is restricted to the personal use of [dom.wilkins@gartner.com](mailto:dom.wilkins@gartner.com).

■ Take this opportunity to proactively understand the differences between the four implementation options as part of your organization’s strategic planning efforts, especially as they relate to specific business use cases and operational risk assessments. ■ Closely monitor the evolution of blockchain across industries, including related initiatives, such as consensus mechanism development, sidechains and distributed ledger, as well as DSCSA and other consortium activities. ■ Monitor the vendors that are marketing their solutions. Vendors are currently peddling concepts with few active proofs of concept. Business Impact: Blockchain and distributed-ledger concepts are gaining interest because they hold the promise of transforming industry operating models; however, multiple business use cases are yet to be proven. This is an opportunity for life science industry stakeholders to learn and to refine existing models as they evolve. The potential of this technology to radically transform economic interactions should also raise critical questions across the health value chain, including regulators, suppliers, patients and consumers, for which there are few clear answers today. As life science companies get more serious about blockchain, it will become critical to ensure that the right type of governance is applied to drive innovation, collaboration and more efficient supply chains. The benefits, if the technology can be applied correctly, are very clear. **Blockchain will enable efficiencies for reaching new customers, extending relationships with supply chain partners, better quality and more complete links between events, and it should expand the boundaries of traditional life science businesses**.

**Benefit Rating**: Transformational Market Penetration: 1% to 5% of target audience

**Maturity**: Emerging

**Sample Vendors**: Blockpharma; **Bloqcube;** EncrypGen; EXOCHAIN; Genecoin; Hyperledger; iSolve; IBM; Nebula Genomics