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Introduction to Distributed Ledger Technology, Blockchain and Cryptocurrency

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Distributed Ledger Technology

While we can't know for sure, we can guess that ledgers have been around since the time that humans first learned to write. In fact, keeping account of local animal populations, crop production, weather patterns and other key information important to life on this planet may have been the primary motivation for humans to start writing in the first place. Early ledgers were simple markings on rocks, which evolved to indents on clay tablets and then to writing on papyrus and eventually paper. In the computer age, written ledgers migrated to electronic records kept in spreadsheets like Lotus 123 and Microsoft Excel that were native to a single computer or stored on a local network.

For nearly all of human history, ledgers were centralized, i.e. a single author created the ledger, maintained it and was responsible for keeping it accurate and current. These gatekeepers, whether individuals or corporate entities, played an important role in record keeping and profited directly or indirectly as a result of their hard work and diligent effort. Let's consider the example of the Encyclopedia Americana, which completed and published its first 13 volume set in 1833.[i] At its height, the Encyclopedia Americana published a 30 volume set annually, with each set containing approximately 45,000 articles. Each article was attributed to its author or contributor. The rise of internet-based research and free resources like Wikipedia that are continuously updated challenged the annual publishing model embraced by Encyclopedia Americana, which ceased production of its distinctive bound volumes in 2006.

The Encyclopedia Americana is the epitome of a centralized ledger. Each year, its staff would research, update and write articles for that year's edition. Encyclopedia Americana's brand stood for well written and thoroughly researched articles that were as current as possible at the time they were published. A bound set of encyclopedias was a significant investment, but purchasers

knew that the information they contained was reliable and a trustworthy source of data and statistics because of the publisher and its reputation for quality. Encyclopedia Americana served as a gatekeeper and was paid for its work in writing, editing, fact-checking and publishing its multi-volume opus. As a centralized ledger, no one else could alter, correct or update the information contained in these sets. Encyclopedia Americana held the keys to the kingdom and charged a pretty penny for entry.

Recent years have seen ledgers migrate to electronic spreadsheets or databases where a larger community has access to the ledger and the ability to make corrections, updates or edits. Our children are now using Google Docs to work on group projects in school so that they can collaborate on the same paper from a different locations. They are able to make changes contemporaneously and, since these are cloud-based programs, their work is maintained even if they forget to save before they close or they suddenly lose electric power at home or at school. Similarly, Wikipedia has nearly single handedly wiped out the published encyclopedia market. It did this by introducing a model of openly editable content that anyone with a computer can read, review and edit – all at no charge! The New York Times reports that as of February 2014, Wikipedia had 18 billion page views and nearly 500 million unique visitors each month.[ii] This volume of traffic and communal participation has resulted in entries that are generally acknowledged as accurate by the general public. Within five years of its debut, Wikipedia's level of accuracy approached that of the Encyclopedia Britannica.[iii] No wonder printed competitors with high overhead like Encyclopedia Americana were forced out of the market at about the time of the study finding that printed encyclopedias were no better than a free alternative.

Wikipedia is a prime example of distributed ledger technology and one that most of us have experienced first-hand, at least as readers. Amazingly, only about 33 million of Wikipedia's 500

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