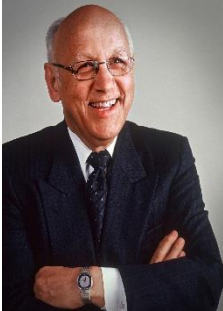


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## The Blockchain Steamroller

*In 2017, 59% of global consumers said they had never heard of blockchain technology. So be it. According to a Deloitte survey, 39% of U.S. business leaders indicated that they had little or no knowledge of blockchain technology<sup>1</sup>. That is a concern. Last August, this newsletter forecast a serious future for blockchain<sup>2</sup>. Thus, it seems obvious that today we need to clarify to our readers what blockchain is and where it appears to be going.*

### **Blockchain**

To start, blockchain and Bitcoin are often used in the same breath. It is important to separate the cart from the load in the cart; blockchain is the cart (and Bitcoin is the load).

Blockchain is a ‘distributed ledger’ of transaction that is validated, in a way that is tamper-proof, including being time-stamped. It is sometimes described as a tool under peer-to-peer control rather than by centralized control. No blockchain transaction can be repeated (or duplicated or counterfeited). The most commonly-known user of blockchain is Bitcoin, a digital form of currency. We will turn to the details of Bitcoin later, but for the moment think of that money as being the item applied onto the blockchain network. ‘Distributed ledger’ means that anyone in the world can use it – just as anyone can use the Internet<sup>3</sup>.

Because blockchain is secure and non-repeatable, people can have confidence in it. Because it is distributed (Internet wide) no central body is controlling it. The fact that it is written in open-sourced computer code, means that any person can see how it has been developed and no one can maintain control over its development. Because it is a ledger, it has a record of all the transactions over its entire history. Since it is ‘distributed’, anyone can access any of the transactions (but not the identity of the users). Since blockchain is re-set (synchronized) every 10 minutes, it is always up to date.

Governments have repeatedly made the little guy poorer by diluting its obligations through inflation, i.e. spending and printing more money than these institutions actually possess. Blockchain’s digital currencies prevents such disastrous controlling.

The power of blockchain lies in its three characteristics: secure, readily accessible, and not under third-party control. Secure means you can carry on blockchain transactions with confidence that they will not be copied, or hacked, or improperly used. A future blockchain application might be the issuing of graduate degrees from universities. Thus, you would be able to check if a job applicant really had a Master’s from M.I.T., confident that if the degree is recorded there, it will be valid, and that no phoney degree holder will be so registered. Thus, the universities, the degree holders, and those inspecting the degrees would be well served.

If money is using the blockchain cart to carry its load, the transactions are safe and immediately accessible to any designated party in the world and without cost of a third party (a bank, Western Union, or MoneyGram, say). Since 2 billion people in the world do not have bank accounts, think of the future potential of this medium – such as a factory worker in Canada sending money to his impoverished mother in Bangladesh, every payday.

### **How Blockchain Works**

Let us start with the Canadian factory worker wishing to send \$500 to his mother in Bangladesh. Of course, he arranged for her to have access to the Internet, as a starter. There are several digital currencies available today, but, let us say he chooses the most common one, Bitcoin, for his transaction. First, the transaction is broadcast Internet wide to all the ‘nodes’ set up for this kind of transaction (there are thousands of such ‘nodes’). All (that is, every one of) the nodes are equipped to validate the transaction, first by determining if the sender has \$500 worth of Bitcoins to send. Once a majority of the nodes have reached a consensus of validity, a digital block is created for this transaction.

<sup>1</sup> *Scientific American, January 2018*

<sup>2</sup> *An updated version of the August newsletter is available on request.*

<sup>3</sup> *Access to blockchain is via the Internet; so, blockchain and Internet are not completely separate beasts. But email is accessed by the Internet too; yet, email is not the Internet. That is, blockchain is not the Internet but merely a user of the Internet.*

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A special software inscribes a unique fingerprint (called hashing<sup>4</sup>) for the transaction consisting of three parts: the transaction itself, a check on the immediate previous block in the blockchain for its validity, and the creation of a random coded block (called a nonce). These three blocks make up the new transaction. The trio go to a very complex network of validating nodes to notarize the transaction. (With Bitcoins, this is called 'mining'.) Once validated, the transaction is added to the blockchain with its digital fingerprint that mathematically encodes the validated fingerprints of every block preceding it. Realize (i) the security level, because altering a single bit (1/0) of information anywhere on the blockchain would drastically change every block in the blockchain; (ii) that every entry will update the entire world's blockchain. The mother in Bangladesh now collects her money via intermediaries who convert the Bitcoins to \$500 or whatever paper currency is desired.

Economic experts advise us that blockchain will allow humans to monitor and analyze transactions at such a granular level that we would finally understand the entire monetary circuit so that events as in 2008 could not happen again. The unfair bargain<sup>5</sup> of banks and government against ordinary people will be neutralized. The current financial skewing (1% of business/financial bodies control 40% of the world's wealth) stand to be relieved.

**Bitcoins**

The failure of banks and government in 2008 related to the Great Recession, fostered the demand for an economic alternative and so the evolution of Bitcoins in 2009 was, in all probability, more than a coincidence. The number of Bitcoins is fixed at 21 million; no one can print more so it will not inflate except against falsely inflating currencies such as the U.S. dollar. Today, alternative digital currencies exist, such as Ether and Tradecoin. Bitcoin has three major faults that are clear: a) its value is volatile<sup>6</sup>, creating uneasiness among serious users. b) It is slow; it can only engage in 7 transactions per second. Future predictions are that digital money will need to get up to 2,000 transactions per second. c) Bitcoin's 'mining' aspect, while effective, and do-able by anyone, is a power hog; today's Bitcoin mining usage is equivalent to the electricity usage of all of Ireland (27 million megawatt-hours per year). d) It is theoretically hackable, although this seems unlikely with its present design. (Blockchain, the cart, is not hackable.) As we move to the future, these Bitcoin disadvantages will not be tolerated, so working alternatives will replace Bitcoin, since it appears that Bitcoin is unable to adapt to the needed changes because of its fundamental design.

**The Steamroller**

Get ready for the ride, because once we start thinking of things we personally want to share; and have confidence that they will not be toyed with, the mind boggles at what lies ahead. Besides the neutrality of non-inflatable money, or readily available verifiable university degrees, voting itself becomes a prime candidate for blockchain use. How about Ripple, a blockchain system that has been settling international transactions among banks since 2012? How about journalism to get credit for filing a news story first and to avoid plagiarism? How about your personal solar cells or windmills generating and selling electricity to anyone in the world who wants to buy it? How about Mycelia that tracks data associated with creative works, cutting out the middle-man such as iTunes? How about renting out your self-driving car to anyone (putting Uber out of business)? How about renting out time of your laptop while you sleep to help create a global supercomputer? In a few words, blockchain is poised to become as universal as Internet, to steamroll over our whole societal structure.

I can hardly wait!

Bill

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<sup>4</sup> Bitcoin's hashing involves 10 million trillion calculations per second.

<sup>5</sup> Unfair in that banks and governments insist on having all your inner data while giving you none of theirs.

<sup>6</sup> It is volatile because people, who know nothing about the real purpose of digital money are speculating with Bitcoins.