



Bitcoin and blockchain

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Introduction

Bitcoin is a cryptocurrency. It functions in a manner similar to a conventional currency in that it performs the two traditional roles of money: means of exchange and store of wealth.

The means of exchange is only effective if both parts are prepared to use bitcoins. A growing number do. By 2015, more than 100,000 suppliers did accept bitcoin.

Bitcoins pass between users directly with no intermediary such as a bank. This is known as a peer-to-peer network, and is untraceable. Because of this, bitcoins have been used for illegal activities such as ransoms, drug dealing and terrorism.

As a store of wealth, bitcoin is unreliable as its value depends on other parties being willing to accept it. Bitcoin has seen massive increases and decreases in value, far greater than seen for national currencies.

Increasingly bitcoins may be exchanged for conventional currencies. Research in 2017 suggests that there are between 3 million and 6 million users of the currency worldwide.

It has no physical form in that does not exist as notes or coins. It exists as computer code recorded in a public ledger known as a blockchain.

It is also not backed by assets. Nor is it administered or overseen by any central bank, government or single administrator. Some commentators have compared it to a Ponzi scheme or to tulipmania or South Sea bubble. In 2014, the World Bank concluded that bitcoin was not a Ponzi scheme.

Bitcoins are divisible into units as small as one billionth.

Bitcoins are created by a process known as mining. An absolute limit of 21 million bitcoins has been set, with the limit designed to hold the value. Bitcoins are divisible into small units. They are held in wallets.

Bitcoin was invented by Satoshi Nakamoto and released as open-source software in 2009. It is now known whether Nakamoto is a person or group of people.

Blockchain

The blockchain is the heart of the bitcoin system, in that it validates and records transactions without any central authority.

The blockchain is maintained by a network of communicating nodes using special software. Transactions in the form of payer X sends N bitcoins to payee Y are broadcast to the network using readily available software. Network nodes validate transactions, add them to the ledger, and broadcast them to other nodes.

The blockchain is a distributed database that independently verifies the chain of ownership. About six times an hour, a new group of transactions is created known as a block. This is added to the blockchain and published to all nodes. This determines when bitcoins have been spent and avoids the same amount being spent twice.

Bitcoin operation

Bitcoins are created by a process known as mining, computers solving puzzles. This is controlled by software to ensure that not too many bitcoins are created. Otherwise bitcoins are acquired by being bought from an exchange that charges a fee for doing so.

In practice, bitcoins are usually acquired in one of three ways:

- conversion from another currency at a bitcoin exchange
- accepting bitcoin for goods and services you sell
- using a bitcoin ATM. In March 2018, there were 108 such terminals in the UK.

The website <https://bitcoin.org/en/spend-bitcoin> gives details of traders and ATM terminals that use bitcoin.

Bitcoins are stored in wallets. As these are already stored on a ledger, a wallet is better seen as storing the digital credentials for the bitcoins, rather than storing the bitcoins themselves. There are different types of wallet. Wallets can be accessed using a mobile phone. Touching a mobile phone against a bitcoin terminal transfers bitcoins.

Online bitcoins have been hacked and currency stolen. For this reason, some users store their bitcoins on a memory stick.

Bitcoins are not tied to real-world entities but to bitcoin addresses that cannot be explicitly identified. All transactions on the blockchain are public. This means that anyone can see the transactions and balance of any bitcoin address. What they do not know is who owns that bitcoin address.

This anonymity makes bitcoin popular for illegal activities. Bitcoin exchanges, where bitcoins are exchanged for traditional currency, can legally be required to collect personal information. To avoid this, a new bitcoin address may be created for each transaction.

The lack of bank involvement means that bank charges and exchange controls are avoided. It becomes economic to send small amounts internationally. Bitcoin is popular in China as it avoids that country's strict government controls.

Bitcoin payments are irreversible once made. Once paid there is no way the sender can reverse the payment or ask a central authority to do so. The sender may ask the person receiving the funds to remit them back, but there is no means of compelling this. Each bitcoin transaction is given a confirmation score indicating how hard it is to reverse during an initial period. The numbers range from 0 to 30, representing periods that range from a few seconds to 90 minutes.

In January 2015, *The Economist* said that bitcoin has three useful qualities:

- hard to earn
- limited in supply
- easy to verify.

Merchants accepting bitcoins usually make a charge for doing so. This is usually less than 2%, making it cheaper than conventional cards.

Banks are reluctant to deal with bitcoins. Several banks have closed accounts with ties to bitcoins. Lloyds will not allow bitcoins to be bought from its accounts.

In countries like Argentina with high inflation, bitcoin is seen as a safe method for individuals to protect their wealth. It also protects individuals from wealth tax, quantitative easing and any form of seizure of bank deposits.

Some people have bought bitcoins as an investment as its value has seen dramatic rises. There have also been some dramatic falls. In 2011, the value of a bitcoin was as low as \$2. By the end of 2017, it had exceeded \$10,000. Its volatility is seven times greater than gold and 18 times greater than the US dollar. The wild fluctuations make it more of a gamble than an investment.

Accounting and tax

In the UK, bitcoin is usually regarded as a currency, though there is no accounting standard on the subject. That means that balances must be converted to sterling on the same basis as any other foreign currency. In January 2017, Eddy James writing on an ICAEW blog suggested that bitcoin was similar to gold, in being like a commodity.

This differs from US accounting practice where bitcoin is regarded as property, similar to a commodity.

Another problem is the extreme volatility of bitcoin makes traditional bookkeeping problematic. Stock acquired for £1,000 expressed in bitcoins could make that stock later worth

£10,000 or £100. Such valuations, when translated into a reporting currency, would not comply with accounting standards.

If bitcoin is a significant element of any entity's finances, that must be specifically stated in the accounts.

Transactions in bitcoins are still transactions that need to be accounted for. These transactions can create a tax liability in the same way that a liability can be created if an established currency is used.

Some commentators have gone so far as to suggest that bitcoin is a Ponzi scheme or even a latter day tulip mania whose value is based on little more than wishful thinking. The former is not realistic as there is no intrinsic fraud in bitcoin; every participant knows the truth about what it is. As for the tulip mania or bubble notion, that has some credibility as the currency is not asset-backed.

Blockchain and accountancy

While blockchain was developed for bitcoin, it is realised that it is capable of wider use for accountancy, particularly bookkeeping.

At present if A buys from B, A records a double entry in its accounts, and B records a similar but opposite entry in its accounts. In effect double-entry bookkeeping has become quadruple-entry bookkeeping.

Also, there is no guarantee that A and B have recorded the transactions at the same value, or even that they have each recorded the transaction at all.

Blockchain would address both of these issues. The initial transaction from A would automatically record the transaction in both A's and B's accounts.

This could be extended to other ledgers in what the Institute of Chartered Accountants in England and Wales has called universal entry bookkeeping.

The advantages of blockchain are expressed as three Ps:

- a new transaction is **propagated** to a network of ledgers without a central controller
- all transactions and records are **permanent** and protected from tampering
- blockchains are **programmable** in that they allow for automation of new transactions via "smart contracts".

The use of blockchain would revolutionise long-established practices of bookkeeping and auditing. It could also reduce compliance and record-keeping costs. Greater reliance could be given to accounting records for tax and other legal purposes.

There are obvious legal, technological and compliance issues to be addressed. The legal issues would have to ensure there was adequate protection against error, hoax and fraud. There are also situations where the records of B will legitimately not be a mirror image of A's.

As for technology, blockchain is not a single technology but rather a protocol for different technologies.

Solutions to these issues have yet to be worked out, but accounting bodies are engaged in development of blockchain. One has only to look at the development of computers and mobile phones in the last 20 or so years to see how quickly this could happen.