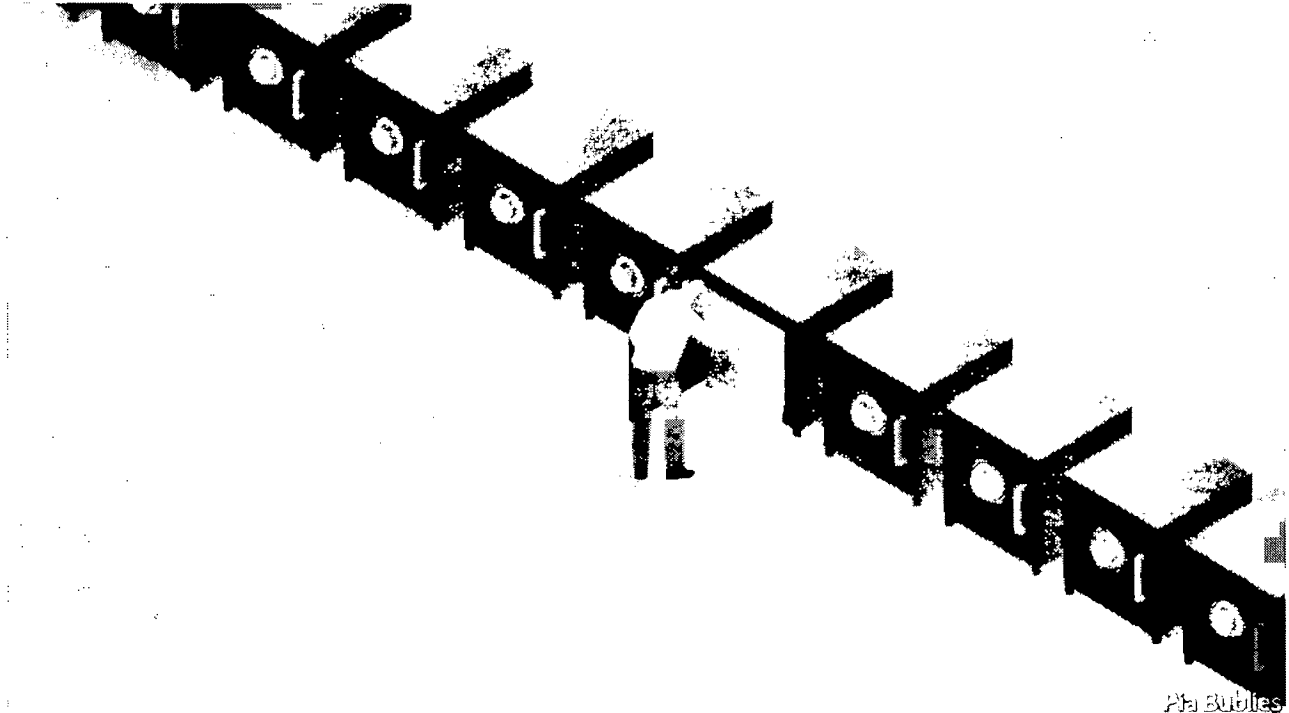


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If blockchains ran the world

Disrupting the trust business

The trust business is little noticed but huge. Startups deploying blockchain technology threaten to disrupt it, and much else besides



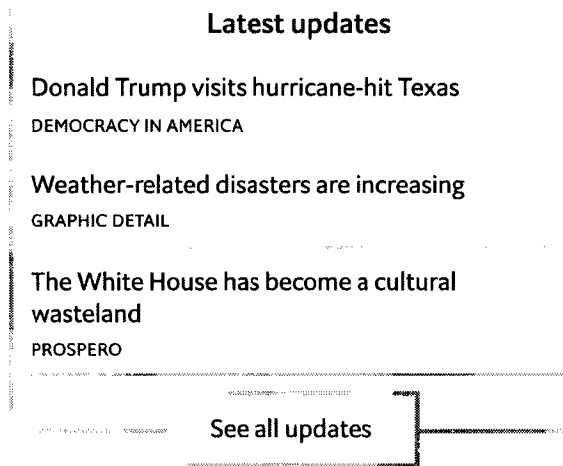
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“WE LIKE lists because we don’t want to die.” What Umberto Eco, an Italian writer, said about human beings applies even more to the institutions they create. Without lists that keep track of people and things, most big organisations would collapse.

Lists range from simple checklists to complex databases, but they all have one major drawback: we must trust their keepers. Administrators hold the power. They can doctor corporate accounts, delete titles from land registries or add names to party rolls. To stop the keepers from going rogue, and catch them if they do, society

has come to rely on all sorts of tools, from audits to supervisory boards. Together, list-keepers and those who watch them form one of the world's biggest and least noticed industries, the trust business.



Now imagine a parallel universe in which lists have declared independence: they maintain themselves. This, broadly, is the promise of the “blockchain”, the system which underlies bitcoin, a digital currency, and similar “distributed-ledger” technologies. If blockchains take over, as fans are sure they will, what are the implications of the trust business

migrating into the ether?

It would not be the first time a novel form of list-making changed the world. More than 500 years ago a new accounting technique, later known as double-entry book-keeping, emerged in northern Italy. It was a big step in the development of the modern company and economy. Werner Sombart, a German sociologist who died in 1941, argued that double-entry book-keeping marked the birth of capitalism. It allowed people other than the owner of a business to keep track of its finances.

If double-entry book-keeping freed accounting from the merchant's head, the blockchain frees it from the confines of an organisation. That is probably not what Satoshi Nakamoto, the still-elusive creator of bitcoin, had in mind when he set out on his endeavour. His aim was to create a “purely peer-to-peer version of electronic cash” as he put it in a “white paper” published in 2008. To do so, he created a new

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database, the blockchain. It provides proof of who owns what at any given point. It contains the payment history of each bitcoin in circulation; heavy-duty encryption makes it theoretically impossible to alter it once a transaction is recorded; copies are spread around the computers, or “nodes”, that form the network, so that anybody can check whether something is wrong. A consensus mechanism”, a complex cryptographic process which replaces the list-; turns the blockchain into an independent entity.

Clever minds quickly saw that such a set-up can be used for things other than money. Different sorts of self-sufficient lists now abound. Prominent among them is Ethereum. Like bitcoin, it boasts its own crypto-currency, called “ether”, but it also allows users to add “smart contracts”, code that encapsulates the terms of a business agreement and is executed automatically.

When Luca Pacioli, a Franciscan friar, wrote the first textbook on double-entry book-keeping in the late 15th century, he could not have foretold what the accounting technique would bring about. But today plenty of startups suggest ways that blockchains could change the world.

Everledger, for example, keeps track of valuable assets. The firm has registered the ID of more than 1m diamonds, making it easier to check whether gems were stolen or mined in war zones.

Other firms want to help keep track of people. One of the first things done for a baby could be to give the newborn an entry in a blockchain, the crypto-equivalent of a birth certificate. This sounds Orwellian, but it does not have to be. On the contrary, if people’s identity is anchored in one or several blockchains, this would give them more control over it and their personal data. If a potential tenant, for example, wants to prove to a landlord that his income is high enough to pay the rent, he need only disclose that bit of information, instead of allowing access to his entire credit history, as is often the case today.

In a blockchain world, having such a “self-sovereign identity” may well be a fundamental human right. Moxie Marlinspike, an anarchist entrepreneur, and others have already called for the abolition of the “ID-slavery” imposed by current national registration systems. A slew of startups, including Evernym, Jolocom and uPort, are working on services that will allow people to register identities.

Once people are able to manage their identity, other possibilities open up, says Kevin Werbach of the University of Pennsylvania’s Wharton business school. People will be able to band together in virtual countries and set their own rules. One such already exists: BITNATION. Anyone can become a citizen by accepting its constitution. To do business in BITNATION, people have to build up reputation, for instance by trading on the platform.

Chain reaction

This is also an example of the other big function of such ledgers: they can serve as a source of truth. All kinds of information could be attached to an entry in a blockchain. In the case of a car, say, that could be where it came from, the history of repairs and even where it was driven. Taken together, these data would form the “truth” about a given vehicle.

Many people are already working on “truth services”. Researchers have proposed creating unique cryptographic identifiers, or “hashes”, of the descriptions of clinical trials and registering them in a blockchain, so they cannot be changed to fit desired results. Georgia, Sweden and Ukraine are testing the technology as a way of digitising parts of their land registries. And Delaware, the American state which has made a big business out of registering companies from all over the world, is gearing up to allow blockchains for corporate record-keeping.

Transactions on a blockchain could also serve as input for smart contracts. Slock.it, another startup, is developing physical locks which have a digital existence on Ethereum. When it is sent some ether, this smart rental contract opens the lock. This could enable new ways of sharing things. If somebody wanted to rent a car, say, he could simply transfer money to its smart contract and drive away.

Smart contracts promise to change the economy more than any other feature of the blockchain. They could take over most routine business processes. Some companies could be no more than a bundle of smart contracts, forming true virtual firms that live only on a blockchain. Predictably, the first attempt to create such a “decentralised autonomous organisation” ended in disaster. Named “The DAO”, the entity was set up a year ago as a sort of virtual venture-capital fund. It raised more than \$160m, but then hackers siphoned off \$60m, leading to its demise.

Yet simpler versions of such structures, called initial coin offerings (ICOs), have since taken off—and created the first bubble of the blockchain economy. In an automated form of crowdfunding, startups set up a smart contract on Ethereum and publish a “white paper”, or prospectus. Investors can then send ether to the smart contract, which automatically creates “tokens” that can be traded like shares. More than \$550m has already been invested in ICOs.

Some of these projects are scams. And many honest ones leave outsiders baffled. EcoBit aims to build a market for carbon credits. Aragon wants to use blockchain tools to manage entire organisations, complete with decentralised arbitration courts. SONM is “a decentralised fog supercomputer”: users can either buy computing power with the project’s tokens or earn them by adding their machines to the pool.

Will the centre hold?

These efforts give a taste of what will be possible, says Albert Wenger of Union Square Ventures (USV), a venture-capital firm. He thinks that such decentralised organisations could one day disrupt the tech giants. At their heart, he argues, those tech titans are gigantic centralised databases, keeping track of products and purchase histories (Amazon), users and their friends (Facebook), and web content and past search queries (Google). “Their value derives from the fact that they control the entire database and get to decide who sees which part of it and when,” he says.

USV has invested in decentralised alternatives, such as OpenBazaar, an e-commerce marketplace. Instead of visiting a website, users download a program that directly connects them to other people wanting to buy and sell goods and services. Others have started to build blockchain-based social networks that pay users who contribute content. Steemit is a blogging-site that allows authors to earn tokens. Synereo lets users tip individual content-providers.

In a world run by blockchains, decentralisation could be pushed even further, to include objects. Once they have their own identity and can be controlled via a blockchain, it is possible to imagine them becoming, in a way, self-determining. A few years back, Mike Hearn, a former bitcoin developer who now works for R3, a blockchain consortium, suggested the idea of self-driving cars which are also financially autonomous. Guided by smart contracts, they would stash away some of the digital money they make by ferrying people around, so as to pay for repairs or to replace themselves when repairs are no longer worthwhile. They would put themselves in long-term parking if not enough rides are to be had—or emigrate to another city. They could issue tokens to raise funds and to allow owners to get part of their profits.

If even objects control their own destiny, what is left for governments and the nation state to do? Plenty, it turns out. Despite libertarian dreams of complete decentralisation, in many cases somebody still has to make sure that the information baked into a blockchain is actually true. In China, for example, regulators are part of a pilot project run by IBM and Walmart to make the retailer's supply network more transparent, for instance by tracing the provenance of pork and organic food.

In some areas the blockchain may even make life easier for governments. Last year Dubai announced that it wants all government documents secured on a blockchain by 2020, a prerequisite for agencies to become completely paperless. The technology could also be used as a cheap platform to generate what poor countries lack most: more efficient government and trust in contracts. And some hope that the blockchain could make the United Nations work better by helping it keep track of all its programmes, creating transparency and reducing waste.

Another example, counter-intuitively, is money. Although the blockchain was created to replace them, central bankers have been interested in the technology from the beginning. When banks share a ledger, rather than keeping their information in separate databases, it will be simpler for regulators to observe financial flows. Several central banks are toying with the idea of issuing their own crypto-currency; the Bank of Canada and the People's Bank of China are running tests. If digital coins were to replace cash, this would open up new possibilities for monetary policy. To increase demand in an economic crisis, for instance, the coins could be programmed to lose some of their value if they are not spent within a certain time.

Warning: blockchains ahead

The technology today is nowhere near being able to support many of these applications. Such ledgers may not be as immutable as they seem, and blockchains have yet to show that they can scale up sufficiently (the bitcoin system manages seven transactions per second, compared with thousands in a typical credit-card network). But if the history of digital technology is any guide, these barriers will be overcome.

A bigger issue is institutional resistance, as many blockchain enthusiasts are discovering the hard way. Corporate departments are not willing to give up control of their lists because it means a loss of power. In many cases it is also not clear how much value blockchains actually add. Some centralised systems seem to be doing just fine. For now, conventional payment services appear more efficient than their decentralised counterparts.

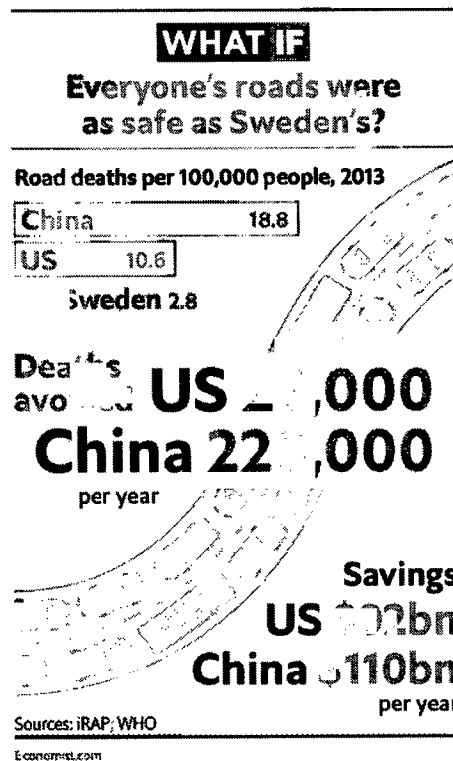
Politics will also be a hurdle. The reason many champions of the technology display an almost religious excitement about blockchains is because they believe these replace messy decision-making with clean cryptographic code. But bitcoin itself shows that even simple technical questions can turn into interminable fights between potential winners and losers. Even after years of discussion, those involved in bitcoin have yet to agree on how to increase the system's capacity.

This points to the biggest question of all. Should blockchains run the world? Warning voices are starting to be heard. If distributed ledgers indeed disrupt the trust business, then a lot of administrative jobs will be lost, perhaps even more than through artificial intelligence. Some have called blockchains a libertarian conspiracy. Others fret about a dismantling of institutions humans have painstakingly built. "Each time we use a distributed ledger we participate in a shift of power from central authorities to non-hierarchical and peer-to-peer structures," researchers at the European Parliament wrote recently. Then there is the concern that hard, cold blockchains and contracts too smart for their own good will ossify society—or make it run amok.

As decentralised list-keeping grows stronger, the list of worries about it is sure to grow longer.

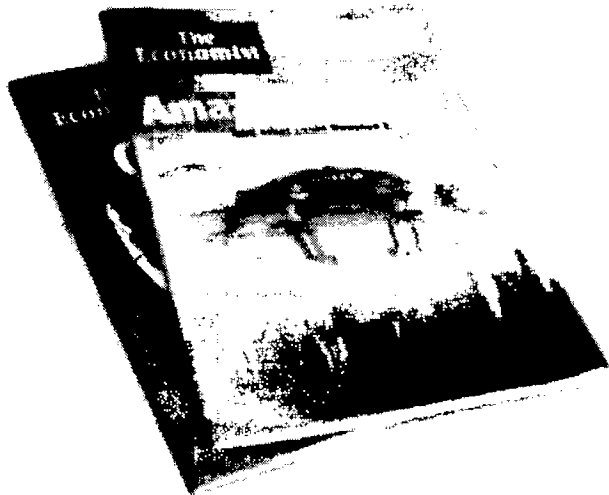
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