



The first computer was created back in 1946. The internet began implementation in 1983. The first smartphone was launched in 1992 – 15 years before the first iPhone drove us all into a frenzy. Following slow starts, these innovations became ‘disruptive technologies’ that fundamentally changed all aspects of the world around us, including within the pensions industry. And now another emerging technology is expected to have just as much of an impact: Blockchain.

About blockchain

Blockchain is a “game changer” according to Protiviti managing director, IT security and privacy, Ryan Rubin. “A disruptive technology that fundamentally calls into question many of the industry structures that have been in place for decades, if not centuries.”

Blockchain technology is a new way to process financial transactions. While traditionally these transactions required the use of ‘middlemen’ to verify the transaction securely (custodian houses

and the London Stock Exchange are two such ‘middlemen’ for example), blockchain removes the need for these intermediaries. The result is transactions can be completed more swiftly and with less ‘processes’ to go through, which can therefore lower costs.

To achieve this, the digital record of a financial transaction is encrypted into a ‘block’. A number of blockchain users’ computers (as independent entities known as ‘blockchain miners’) then verify if it is a genuine transaction. If they all approve the transaction the money will be passed from A to B.

The ‘block’ representing that transaction is then bound onto the ‘chain’ that records the movement of that money using algorithms – thus creating a continuous, linked list of transactions that provides a secure and unchangeable history of electronic transactions, Equiniti director Paul Sturgess says.

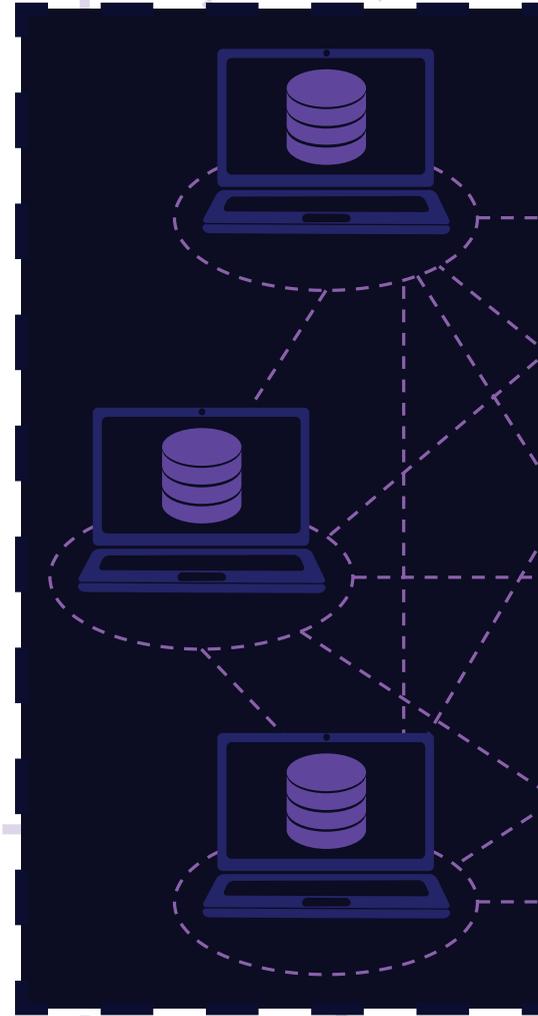
Or, to put it simply, EY director Jason Whyte compares it to the old mobile phone game *Snake*, where every time the snake ‘ate’ a block on screen, the block

Summary

- Blockchain is a new technology for processing financial transactions without the need of intermediaries. Each transaction is encrypted into a ‘block’ that is linked together into a ‘chain’ using algorithms and cannot be modified. Data can be stored within each block.
- Blockchain was first used by online-only currencies, such as Bitcoin, but its uses are currently being explored by the financial services industry.
- Pensions funds may use blockchain to improve the cost, transparency and speed of financial transactions and for the effective storage of data to help with administration services.
- A current barrier to blockchain’s implementation is the ‘newness’ of the technology, with teething issues to overcome.

New kid on the block

Blockchain technology has been gathering a lot of attention for its potential to ‘revolutionise’ the financial sector and beyond. Laura Blows explores its potential applications within the pensions industry



got added onto the end of the snake.

The details of each transaction/block are not stored, only the fact that the transaction happened, along with the unique ‘digital signature’ of that transaction/block, which cannot be converted back into its original form. “If the original data was altered it would produce a different digital signature that would alert the network to the mismatch,” Gowling director Liz Wood explains.

To put a visual slant on it, imagine someone holding a picture of themselves holding a picture of themselves holding a picture of themselves etc – each block has this ‘picture’ of all the previous transactions, and the further along the



chain, the more repetitions of the 'picture' each block would have. Therefore any tampering would stand out throughout the chain.

Also, as the data is distributed to so many computers, it should be much harder for hackers to attack it compared to traditional financial transaction processes. Blockchain's use of multiple peer devices to authorise every transaction means "it quite simply can't be overridden by one party attempting to manipulate records", Hames states.

Adding to the blockchain's security is the element of tracking and transparency. As there are no 'middlemen' recording the movement of money, the blockchains showing the financial transactions are

instead available for everybody to view, via a distributed (or 'shared') ledger.

IFDS director of innovation Phil Goffin adds that blockchain provides both investors and financial institutions with the same industry-standard cryptography controls to enable secure communications. This removes trust issues such as identity theft, thus enabling parties to maintain shared ledgers of their economic affairs, he explains.

Financial beginnings

Blockchain technology was first conceived in 2008 and was implemented in 2009 to be used with the online-only currency (which is a currency that has no gold or silver standard attached to it, no government backing, and is only worth as much as people are prepared to trade for it, also known as a 'cryptocurrency') Bitcoin.

So far, the amount of money moved using blockchain amounts to just 0.025 per cent of global GDP, or \$20 billion, according to the World Economic Forum. But while the amount is currently small, this is set to grow rapidly, particularly as the financial services industry has started to explore blockchain's potential.

There are currently a number of blockchain trials taking place within the financial service industry, such as R3 Cev, which is a consortium of over 40 banks developing the settlement of securities using blockchain and setl.io, a group that is developing an institutional payment solution for the UK banking system.

The Bank of England is also leading a trial to replace the Real Time Gross Settlement System (RTGS), which sits at the heart of the UK banking system.

Also, the Financial Conduct Authority said that it was considering approving a "small but significant number of firms", Alpha FMC principal Olivia Vinden says. "A group of seven banks, including Santander, CIBC and UniCredit were amongst the first financial institutions to move real money across borders using blockchain-based technology," she adds.

Financial services firms embracing this technology may seem strange, as it has the potential to be an existential risk to entire sections within the industry.

"For some financial companies, blockchain strikes at the heart of your business, if your business model is in managing those assets for people who want to trade them," Whyte says. "But then the question is if you think this is going to cannibalise your industry, are you better to cannibalise it first and build a new business model around it or wait for it to happen to you?"

Vinden agrees that blockchain could represent a risk to those parts of the financial industry that support clearing, settlement and safekeeping. "However, the possibility to reduce costs as a result of this technology should be seen as an opportunity, rather than a threat," she states.

For instance, Capita divisional head of marketing and research Robin Hames thinks it could quite easily take off in emerging economies where the financial infrastructure is less developed and less ingrained, so can more easily be overhauled. "It's the 'advanced' economies themselves in catch up, ironically," he adds.

Asset management is expected to be the first aspect of the financial services sector to take this opportunity and implement blockchain. Alternative assets in particular are normally quite illiquid, but blockchain could help turn them into more tradeable assets, Whyte predicts.

Pensions' explorations

So it is not surprising that the financial services sector is among the first to see if the benefits of blockchain can be utilised beyond the movement of online currencies. But what may be more surprising is that its potential within pensions is already being explored.

Dutch pensions manager APG recently announced that it has earmarked a significant part of its innovation budget for the coming years for working alongside other companies to



explore the practical applications of blockchain.

The California Public Employees' Retirement Systems (CalPERS), the largest public pension fund in the US, has also discussed the possibility of investing in blockchain technology, while reports have emerged that the Chinese government will soon start using blockchain technology to process social security payments.

Even the UK's Department for Work and Pensions (DWP) is in the process of a three- to six-month blockchain trial, which began in May this year, with up to 24 participants. This is conducted by a private sector company, that handles the claimant's data independently from government.

"This is a small scale, voluntary trial. There are no restrictions or limits on how welfare payments are spent for those involved in the trial and all personal information is removed before the data reaches DWP," its spokesperson states.

Industry uses

Within the pensions industry itself, people are beginning to consider the benefits blockchain could provide.

According to BTL Group founder and CEO Guy Halford-Thompson, "for industries, such as pensions, which have suffered from a lack of transparency in the past, there is a huge opportunity to transform the industry with a small amount of investment in blockchain technology".

State Street head of UK pensions and banks, asset owner solutions, Andy Todd thinks it will initially impact the most 'inefficient' areas of the pensions industry, such as those that are manual, require a lot of stakeholders to engage, align and sign-off, or have intermediaries that add cost to the system.

Certainly smoothing the

many layers within the pensions industry generally could be beneficial to savers.

Currently, the pension fund member is connected to a set of underlying assets via pension fund managers, asset managers, brokers and investment funds. Blockchain technology offers the prospect of sweeping away a lot of this complexity and frictional cost, Rubin says.

"For example, how long does it currently take the industry to undertake a pension fund transfer? Typically several months. To a customer who is already getting used to the fact that they can transfer money reliably between bank accounts now in a matter of minutes via Faster Payments, the length of this delay is difficult for the industry to explain. Blockchain technology could bring this time down to a matter of minutes if implemented correctly," he explains.

The greater transparency of ownership of pension fund assets could make well-performing funds more attractive to buyers, therefore helping generate better investment decisions overall, Rubin adds.

Blockchain technology could also instigate the use of 'smart contracts', where the technology has rules built in to automate simple transactions when certain conditions are met (such as a market fluctuation or a pension saver reaching a certain age). This would offer greater transparency on payments/fees/allocation of funds and shorten the time taken to complete transactions.

Blockchain's ability to 'link' financial transactions together could also be a valuable mechanism for recording an individual's pension savings.

"Instead of having a new pension every time I go to a new employer, the record of my pension and the contributions paid in may be added to my one blockchain, despite the different employers throughout my working life paying into my pension. And as it cannot be modified, we will always know that it is an accurate record," Whyte says.

Blockchain could then also have a role in the secondary annuity market

where initial and ultimate beneficiaries will change over time, Sturges adds.

It is important to note that blockchain technology has the potential for recording and linking any data, not just financial, meaning its uses within the pensions industry could extend beyond finance to administration.

For instance, blockchain could be used to improve upon pensions communications. If a member had several pots with various providers, that information could be pooled into a blockchain so as to form an overall position of the member's pensions savings, Wood states.

The industry is currently in the process of implementing a pensions dashboard to enable people to see all their savings in one place, so it would not be surprising if this area was an early adopter of blockchain within the pensions industry, Hames adds.

Documents such as member records, scheme documents, service contracts and accounts could be kept and updated through blockchain. All parties would be able to view the same information, so the problem of version control would disappear, Pensions Administration Standards Association chairman Margaret Snowden says.

Blockchain may become a powerful weapon against pension liberation fraud, due to the increased transparency it provides. Data could also be included within the blockchain to confirm whether advice has been taken before the money is transferred to the saver, Snowden adds.

"From a financial advice perspective it would be great to be able to hand over an accurate record of a pensions holdings and have a financial adviser view that blockchain very rapidly to get a view of what they have got and might need," Whyte says.

He adds that "you can imagine the government being quite interested in blockchain for tax records".

Hames agrees that it would be "tremendously useful" for regulators and auditors who struggle with reconciliation

activities, which could be done automatically. “A very prescient example would be the current GMP reconciliation requirements, which will exorcise the minds and time of administrators and trustees alike for the next couple of years,” he says. “Imagine how less painful, or frankly unnecessary, this work would be had a shared, validated ledger existed.”

Risks

So already the industry is imagining blockchain technology having a wide number of benefits for the sector. Imagination is a wonderful thing. But could the reality be not so pretty?

Despite blockchain still being a new technology, and the security it provides much heralded, it has already been subject to hacks. For instance, recent attacks on digital currency exchanges DAO and Bitfinex saw over \$50 million taken.

The Business Blockchain author William Mougayar states that while security is an inherent feature of blockchains, a blockchain application could be badly written and have security holes, “just as a web application could have security weaknesses too”.

Breaches so far seem to be exploiting the trouble users have protecting their online currency (as they are generally stored in digital files) instead of the distributed ledger system of blockchains itself being compromised.

But the whole ‘newness’ of the technology could also be an issue. The Financial Stability Oversight Council, which is a group of US regulators, has already warned that “operational vulnerabilities [*with blockchain*] may not become apparent until they are deployed at scale”.

A teething problem that has already occurred, Whyte notes, is when two transactions happen at roughly the same time, which can result in a short period of time where a blockchain has two chains until the ‘real’ chain is established.

Another issue is that the technology is changing very quickly. For instance, Accenture has just taken out a

controversial patent on a technology that lets them edit a blockchain. A key part of blockchain’s security is that it cannot be tampered with, but the argument for this patent is that it would provide a cleaner way to undo a mistake, such as if someone made a ‘fat finger trade’ and added an extra ‘0’ onto a transaction, Whyte explains.

The evolving nature of the new technology also generates a risk around standardisation and cooperation.

“As the technology is still evolving it is possible that we could end up with a VHS versus Betamax situation,” Sturgess warns, “where both technologies were technically excellent for the purpose, but ultimately it was disagreement regarding standards and licenses that allowed VHS to dominate the market.”

Reluctance

There is also a risk that the pensions industry itself may be reluctant to utilise blockchain technology. As is often the case with technology advances, legacy systems are the biggest barrier to implementation.

It really required online banking to take hold before many in pensions were prepared to embrace the digital channel, Hames states. “And let’s be honest, there are still plenty of schemes that are well behind the online curve, let alone exploring blockchain,” he adds.

To counter this, Snowden recommends the creation of a technology forum for the pensions industry.

But in the meantime, it seems unlikely the pensions industry would want to risk putting pension fund members savings in cutting-edge technology. While the technology is still being developed and is not yet being widely used by banks, a court may not look favourably on a trustee who invested in a company using blockchain if this resulted in the loss of pension scheme money, Wood warns.

And while blockchain may have benefits for the pensions sector, and could reduce some inefficiency, it will not be a panacea to all the industry’s

problems. For instance, it will not provide insight as to where money should be invested to achieve positive returns with low volatility. It will not stop human error, such the wrong amounts being put into the system. And it will not address the need for people save more for retirement and engage with those savings.

Overhype?

So as it is certainly not a ‘cure all’, does that mean blockchain technology is overhyped?

“It is approaching the peak of Gartner’s Hype Curve,” Sturgess states, “and as such will soon drop into the wonderfully-named ‘trough of disillusionment’, at which point many early-stage companies are likely to fail and the market will become frustrated by the lack of useable products and tangible benefits. The technology companies will then start to consolidate and prepare for mainstream adoption as clearer business use cases start to emerge.”

It has to be remembered that the technology is still very new. Currently, blockchain is being compared to the internet in the 1990s, where the first internet sites looked and behaved more like traditional shops until people became used to the new technology and its applications.

As it still early days for the technology, no doubt blockchain will see a number of false starts. But when considering if and when blockchain will have an impact on the pension sector, it is worth mulling over the words of a man at the heart of many technological innovations – Bill Gates. He has stated: “We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10. Don’t let yourself be lulled into inaction.”

Written by Laura Blows

