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HOW WEB 3.0 WILL IMPACT THE FINANCIAL SERVICES INDUSTRY

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EXECUTIVE SUMMARY

We are on the cusp of a revolution in the world wide web. This revolution will be aided by superfast 5G data speeds, data formats and software that are open, increasing and expanding capabilities of artificial intelligence (AI) and machine learning (ML) and the meteoric advancements in blockchain technology. Welcome to Web 3.0, the third generation of internet services and the next stage in the evolution of the web.

Web 3.0 is expected to deliver a more connected and intelligent internet. Its basic idea is to create a semantic web that has the potential to understand and interpret knowledge and data. The redesign of the web—Web 3.0—will change how we work and collaborate. This conversion to a dynamic smart web and changing infrastructure will give birth to a spatial web and global connectedness (or IoT) rich in data. This spatial web will have digital information which will blur the lines between the virtual and the physical world.[1]

The nature of the global economy is changing. With FinTech and new-age technologies entrenching themselves in the cashless and virtual economy, Web 3.0 will transform the way we work, learn, transact and interact. In Web 3.0, there will be no need for any central points of control for data to be categorised and stored. Distributed ledger technologies such as blockchain will support this decentralised network's security and storage. In short, Web 3.0 will be open, trustless and permissionless.

We explore the plethora of opportunities that will become available with the launch of Web 3.0. From financial services to capital markets, and from asset management to consumer and wholesale banking, transformation is coming. And we will be witness to a new era in technological history.

[1] Deloitte. The Spatial Web and Web 3.0. Available online at https://www2.deloitte.com/content/dam/insights/us/articles/6645_Spatial-web-strategy/DI_Spatial-web-strategy.pdf

AN OVERVIEW OF WEB 3.0 AND ITS DEVELOPMENT

Web 1.0 was the first iteration of the world wide Web. At this point, majority of the users were content consumers. Web 1.0 was largely a content delivery network that enabled users to view information hosted on websites. These were its key characteristics:[2]

- Pages were static
- Server's file-system was the source of content
- Server Side Includes or Common Gateway Interface was used to build pages
- Elements on a page were positioned and aligned using Frames and Tables

The shift from Web 1.0 in how digital information is created, distributed, stored and manipulated represents an essential part of Web 2.0. It is characterised by user-generated content, usability and interoperability for end users. This set of next generation internet technologies is also called participative social web. Interaction and collaboration have become the essence of how we perceive the internet now. Web 2.0 is characterised by:[3]

- Web-based applications accessible from anywhere
- Simple applications that solve specific problems
- Value in content, not the software used to display content
- Readily sharable data
- Bottom-up distribution, not top-down
- Employees and customers being able to access and use tools on their own
- Social tools that encourage people to create, collaborate, edit, categorise, exchange and promote information
- Network effects are encouraged; when more people contribute, the better the content gets

Web 3.0 will transform the internet as we know it, as detailed in the next parts of this paper. However, here is an understanding of how each version differs from the other.

Exhibit 1: Differences between Web 1.0, Web 2.0 and Web 3.0

Web 1.0	Web 2.0	Web 3.0
Mostly Read-Only	Wildly Read-Write	Portable and Personal
Company Focus	Community Focus	Individual Focus
Home Pages	Blogs / Wikis	Live-streams / Waves
Owning Content	Sharing Content	Consolidating Content
Web Forms	Web Applications	Smart Applications
Directories	Tagging	User Behaviour
Page Views	Cost Per Click	User Engagement
Banner Advertising	Interactive Advertising	Behavioural Advertising
Britannica Online	Wikipedia	The Semantic Web
HTML/Portals	XML / RSS	RDF / RDFS / OWL

Source: Geeks for Geeks[4]

[2] Geeks for Geeks. Web 1.0, Web 2.0 and Web 3.0 with their difference. Available online at https://www.geeksforgeeks.org/web-1-0-web-2-0-and-web-3-0-with-their-difference/
[3] CBS News. What Is Web 2.0? Available online at https://www.cbsnews.com/news/what-is-web-20/
[4] Geeks for Geeks. Web 1.0, Web 2.0 and Web 3.0 with their difference. Available online at https://www.geeksforgeeks.org/web-1-0-web-2-0-and-web-3-0-with-their-difference/

Centralised nature of data flow to companies

One definition of Web 2.0 describes it as "a collection of open-source, interactive and user-controlled online applications expanding the experiences, knowledge and market power of the users as participants in business and social processes. Web 2.0 applications support the creation of informal users' networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing/refining of informational content."[5]

In Web 2.0, organisations such as Google, Twitter and Facebook use centralised platforms to concentrate flows of data and advertising. The rapid uptake of social media across the world and the emergence of innovative, open and cost-effective platforms offer many opportunities to businesses. And although there is growing criticism around how these multinational businesses are using the user-generated data that they are in possession of, the uptake of social media, communities and forums continues.

Web 2.0 in financial services

With Web 2.0 technologies, consumers are changing their banking habits. The networked banking experience that is now taken for granted in many parts of the world has gained in popularity because of three main reasons—increased trust, transparency, and interactivity—all enabled by Web 2.0. While physical branches do still exist, their operations have become leaner as customers pivot towards a digital, user-friendly experience that offers both convenience and flexibility.

In regions like Asia, where the number of digital savvy consumers is rising meteorically—with many even digital-first—the financial services industry has had to innovate to keep pace with changing consumer behaviour. With almost all financial services available at the click of a mouse or the tap of a mobile screen, financial services companies are continuously innovating and evolving to catch the pulse of the modern consumer. With COVID-19 forcing behavioural change, even older customers are making the shift. There's no turning back.

Digital offerings in financial services are proliferating. With FinTech booming, and insurtech and regtech becoming increasingly popular, we are now witnessing a rethink of how financial services are sold and consumed. Digital banks have followed, with challenger banks, neobanks, beta banks and non-banks all in the fray to tempt the modern financial services customer. In fact, the global online banking industry is poised to witness spectacular growth. It was valued at $11.43 billion in 2019, but is projected to reach $31.81 billion by 2027, growing at a CAGR of 13.6% from 2020 to 2027.[6]

The financial services industry has swiftly shifted online and governments across the region are responding. In late 2020, Singapore awarded its first digital bank licenses to a Grab-Singtel consortium, Sea Group, Ant Group and a consortium led by Chinese real estate developer Greenland Financial Holdings.[7]

[5] Springer. Web 2.0: Conceptual foundations and marketing issues. Available online at https://link.springer.com/article/10.1057%2Fpalgrave.dddmp.4350098

[6] Allied Market Research. Online Banking Market Service Type (Payments, Processing Services, Customer & Channel Management, Wealth Management, and Others), and by Banking Type (Retail Banking, Corporate Banking, and Investment Banking): Global Opportunity Analysis and Industry Forecast, 2020–2027. Available online at https://www.alliedmarketresearch.com/online-banking-market

[7] The Straits Times. Singapore to have 4 digital banks, with Grab-Singtel and Sea getting digital full bank licences. Available online at https://www.straitstimes.com/business/banking/mas-awards-digital-full-bank-licences-to-grab-singtel-and-sea-ant-gets-digital

WHAT IS WEB 3.0 AND WHAT IT MEANS FOR THE ECONOMY AND FINANCIAL SERVICES

Open, trustless, permissionless networks

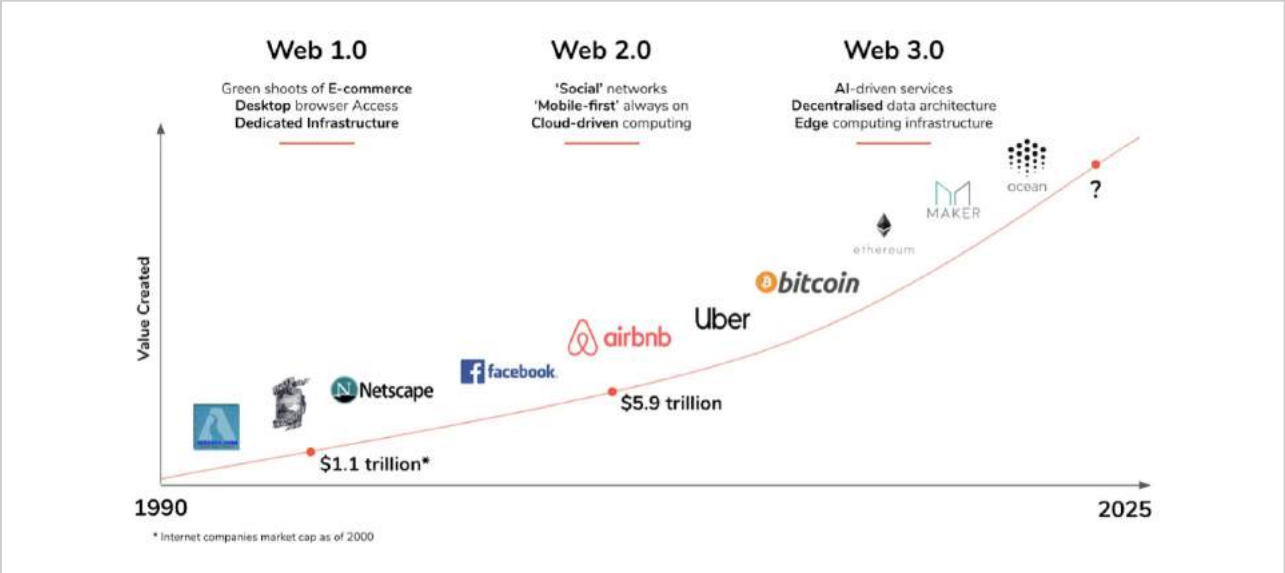
The world wide web as we know it is transitioning to the third generation of internet services. It took over 10 years to transition from Web 1.0 to Web 2.0, and it may take much longer for Web 3.0 to be fully realised. Web 3.0 will be powered by machine-based understanding of data to make websites and applications intelligent, connected, and transparent.[8]

Early stages of Web 3.0 are evident in the development of smart homes, where home appliances—from an air conditioner to a light bulb—can be controlled remotely. Internet of things (IoT) technology is unravelling possibilities of seamlessly communicating with any connected device.[9]

Web 3.0 is characterised by its ability to be open, trustless and permissionless. It is 'open' because Web 3.0 will be developed using open-source software by an open and accessible community of developers in full view of the world. Second, the Web 3.0 network, by the very nature of it, will allow people to interact publicly or privately without the need for a trusted third party. And lastly, Web 3.0 will be a permissionless network, requiring no overseeing governing body.[10]

Web 2.0 was driven by the advent of mobile, social and cloud. But Web 3.0 will largely be built on three new layers of emerging technologies – edge computing, decentralised data networks and AI.

Exhibit 2: The evolution of the Web



Source: Fabric Ventures[11]

[8] WhatIs.com. Web 3.0. Available online at https://whatis.techtarget.com/definition/Web-30
[9] Ibid
[10] Medium. What Is Web 3.0 & Why It Matters. Available online at https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b
[11] Ibid

AI-driven services (ML algorithms)

Let's dissect and understand the layers on which Web 3.0 is being built. Web 3.0 will be rooted in AI and ML. These technologies will have access to decentralised structured data, enabling the possibilities of meaningful insights and predictions for the Web 3.0 network to leverage. There is a wealth of potential applications where this can be used, such as in targeted advertising, precision manufacturing, drug design and climate modelling.[13]

AI/ML will play a foundational role in enhancing the computing power of Web 3.0. AI will enable machines and devices to understand the non-digital world through computer vision and natural language processing. And AI's core ability to keep learning and enhancing its programme will power Web 3.0 to provide personalised experiences for users.[14]

Decentralised data architecture

Web 3.0 could truly democratise the internet. One of the primary ways to do it is by making it open and decentralised. In a decentralised structure, data will sit in multiple connected devices, with each playing a specific role, be it as a node, verifier, developer or simply a participant in the network. Each connected device in the structure will have access to the same information with secure time-stamping, meaning the data cannot be easily hacked or tampered with.[15]

These abilities are being powered using blockchain technology. Blockchain ensures that a copy of the data ledger is present in all the connected devices, and needs the approval of all the nodes in the structure to make a change in the data. So, hacking into all the connected devices at the same time is extremely difficult and expensive.[16]

Edge computing infrastructure

Edge computing is providing the infrastructure for high speed 5G connection to realise its full potential. With speeds 100 times faster than 4G, 5G will greatly reduce latency between a device and a cloud-based processor. As of June 2021, 5G has been deployed in 58 countries, up from 38 in 2020. And the number of people using 5G services is expected to reach 1 billion users in 3.5 years.[17]

Edge computing infrastructure will enable computing tasks to be executed closer, if not directly where the data is being collected. It will unlock supercomputer processing power anywhere, enabling local edge servers, cameras, or even smartphones to run facial recognition algorithms in real time.[18]

"Web 3.0 will fundamentally expand the scale and scope of both human and machine interactions far beyond what we can imagine today. Web 3.0 will enable us to interact with any individual or machine in the world, without having to pass through fee-charging middlemen."[19]

[13] Medium. What Is Web 3.0 & Why It Matters. Available online at https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b

[14] Deloitte. The Spatial Web and Web 3.0. Available online at https://www2.deloitte.com/us/en/insights/topics/digital-transformation/web-3-0-technologies-in-business.html

[15] Okex. Web 3.0 explained: A decentralized internet is on the horizon. Available online at https://www.okex.com/academy/en/what-is-web-3-0

[16] Ibid.

[17] Statista. Where 5G Technology Has Been Deployed. Available online at https://www.statista.com/chart/23194/5g-networks-deployment-world-map/

[18] Emerge. Web 3.0 is here. Don't Let Your Digital Product Fall behind. Available online at https://www.emergeinteractive.com/insights/detail/web-3-0-trends-digital-product-strategy/

[19] Medium. What Is Web 3.0 & Why It Matters. Available online at https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b

WEB 3.0 IN FINANCIAL SERVICES

Web 3.0 will be more decentralised and personalised than the internet we know today. What does this mean for the financial services? FinTech companies will have a natural advantage, but banks and other traditional institutions will be able to catch up soon as they have access to large funds and form collaborations with innovative FinTechs. Financial institutions will need to start now by investing and strengthening their in-house tech capabilities.[20] Partnering and collaborating will also be key and we are already seeing that happening.

The emergence of AI and ML

We see many use cases where financial institutions are using AI to unlock new revenue opportunities, minimise operating costs, and automate manually intensive processes. Most financial service professionals are also very confident about the possibilities of AI in financial services. In a recent NVIDIA survey, more than 8 out of 10 (83%) surveyed financial professionals agreed that AI is important to their company's future success. [21]

The approach to using AI differs based on the type of financial firm. For most FinTech and investment firms, AI's use is more focused towards algorithmic trading, fraud detection and portfolio optimisation. Meanwhile, for banks, top uses of AI are garnered towards fraud detection, recommendation systems, and sales and marketing optimisation. Lastly, for consumer banks, the use of AI is not only limited to fraud detection and prevention, but also towards customer acquisition and retention, in addition to cross-selling and up-selling of personalised products and services.[22]

The Royal Bank of Canada is training its private AI, using millions of data points in a fraction of time, which has resulted in reduced client calls and faster delivery of new applications for the bank's clients. Meanwhile BNY Mellon, the world's largest cross-border payments service provider, has trained its AI and ML models to predict fraud, improving its accuracy by 20%. AI is also being combined with high-performance computing to derive better and faster intelligence for traders by crunching real-time market data within nanoseconds.[23]

But perhaps the most disruptive AI innovation has been witnessed in the FinTech sector. NerdWallet uses ML to recommend its customers the best-fit financial products, such as mortgages and insurance. Its recommendation engine is being fed with scores of profile features including credit scores, outstanding balances and credit utilisation to make it super familiar with the underwriting process and strengthening its ability to match NerdWallet's members with suitable products.[24]

The rise of cryptocurrencies and decentralised finance platforms

Decentralised finance (DeFi) is a collective term for financial products and services, that is open to anyone with an internet connection. These products and services are always open and have no centralised authorities who can block payments or deny access to anything.

If Web 3.0 is decentralised and harnesses the power of blockchain technology, DeFi will stand to play a much bigger role than what it is playing

[20] Interview excerpts from our email conversation with Oi Yee Choo, Chief Commercial Officer of ADDX.
[21] Finextra. How AI is powering the future of financial services. Available online at **https://www.finextra.com/the-long-read/231/how-ai-is-powering-the-future-of-financial-services**
[22] Finextra. How AI is powering the future of financial services. Available online at **https://www.finextra.com/the-long-read/231/how-ai-is-powering-the-future-of-financial-services**
[23] Ibid
[24] Ibid

today. But we will also see the two worlds of Centralised finance (CeFi) and DeFi merge together eventually. And the companies that are actively working towards closing the gap between CeFi and DeFi are the ones that will make big developments in financial services innovation.[25]

DeFi stands to negate the many pain points around traditional finance, such as inaccessibility to bank accounts or financial services; fears of financial services being brought down by governments or centralised institutions; premium and hidden charges; and the risk and delay in money transfers due to internal human processes.[26]

So how does DeFi actually work? DeFi uses cryptocurrencies and smart contracts to provide services without the need for financial institutions to act as guarantors. In DeFi, a smart contract immediately removes the vulnerability of relying on a financial institution. A smart contract is programmed to send/refund money from one account to another, without the need of a financial institution overlooking the transaction or charging fees.[27]

There are several use cases of DeFi and they are continuously growing. It lets one send money around the globe, stream money around the globe, access stable currencies, borrow funds with or without collateral, start crypto savings, trade tokens, buy insurance, and manage one's complete financial portfolio under one system.[28]

[25] Interview excerpts from an email conversation with Oi Yee Choo, Chief Commercial Officer of ADDX.
[26] Ethereum. DeFi vs traditional finance. Available online at **https://ethereum.org/en/defi/#defi-vs-tradfi**
[27] Ethereum. How does DeFi work? Available online at **https://ethereum.org/en/defi/#how-defi-works**
[28] Ethereum. What can you do with DeFi? Available online at **https://ethereum.org/en/defi/#defi-use-cases**

THE EVOLUTION OF WEB 3.0 CAPITAL MARKETS

Crypto is enabling the development of new forms of capital, and computer scientists working on developing blockchain have become capital markets people. Cryptos are digital assets supporting fully digital goods and services, where people can transact person to person without the need for any payment service provider in the middle. A peer-to-peer digital service, powered by peer-to-peer digital money.[29]

Bitcoin enables the sound governance of money, because the data or memory of what our money represents is preserved, intact, and cannot be tampered with. Meanwhile, fiat money or hard cash is arguably being manipulated in unprecedented ways. We can see how central banks have expanded their balance sheets materially since the Global Financial Crisis and through the ongoing pandemic. There is little doubt that the printing of money in large quantities will distort the real value of what our money should be representing. Cash in the current fiat-based local financial systems tends to lose value each year, but under a Bitcoin-based global financial system, cash or Bitcoin may not lose its purchasing power, keeping its weighting much higher. [30]

Bitcoin has enabled people to have digital property rights to their work on the web. Web 3.0 will emerge on top of blockchains. And Bitcoin is arguably the most secure blockchain present at the moment. Applications built on Web 3.0 can derive their security from Bitcoin. The underlying technology that enables cryptocurrencies is the same that enables Web 3.0 apps. Users will have the freedom to own digital currencies and internet assets with similar private keys, and the artificial line between money and data will disappear, paving the way for a unified digital society to emerge.[31]

Bitcoin mining happens on the blockchain and it requires solving a mathematical equation quicker than other miners for which massive computational power is a must, particularly a high-end graphics processing unit.[32]

Web 3.0 breaks away from the traditional model where communities contribute, but don't own or make profits. It ensures that access to data and power of the internet is not controlled only by corporations, but by communities – bringing the possibility of community centred economies of scale. In Web 3.0's decentralised world, participation is open to all and the greater the number of participants, the more everybody succeeds. To that end more institutional adoption of crypto is warranted to enable more community collaboration benefitting all.[33]

[29] Medium. Web 3.0 and Capital Markets. Available online at https://medium.com/@SathGanesarajah/web-3-0-and-capital-markets-2a3a627d45ba

[30] Holon Global Investments. Web 3.0. Available online at **https://holon.investments/web-3-0-the-new-investment-megatrend-that-will-eclipse-web-2-0/**

[31] Forbes. How Bitcoin Could Anchor Web 3.0. **Available online at https://www.forbes.com/sites/justinoconnell/2020/04/12/how-bitcoin-could-anchor-web-30/?sh=7dccfe6c7725**

[32] Business Insider. Mining for Bitcoin — everything you need to know before you start hunting for digital gold. Available online at **https://www.businessinsider.in/investment/news/how-to-mine-bitcoin-hardware-software-and-other-things-needed/slidelist/85003097.cms#slideid=85003307**

[33] TechCrunch. Crypto's networked collaboration will drive Web 3.0. Available online at **https://techcrunch.com/2021/09/16/cryptos-networked-collaboration-will-drive-web-3-0/**

Initial Coin Offerings (ICOs) or Security Token Offerings (STOs) are increasingly emerging as new paths for raising capital. ICOs are to startups what IPOs are to a large company. They help startups raise money by selling tokens to investors for equity stake in the company. As far back as 2017, 92 ICOs had collectively raised $1.25 billion. Although ICOs have received their fair share of criticism from governments, Oliver Bussmann, a former chief information officer at UBS, and now head of a FinTech advisory firm, is confident that ICOs will continue. He said, "ICO as a new business model leveraging blockchain technology will sustain as the digital way, combining crowdfunding and (a) new hybrid asset class of equity ownership and currency."[34]

ICOs provide a strong value proposition for SME financing. Some of the immediate benefits of ICOsfor SMEs are (i) no need for a government or a bank to facilitate the exchange of value; (ii) faster to implement when compared with other public offerings; (iii) through ICOs SMEs can diversify their financing options by appealing to investors on not just their profit potential, but also on other characteristics of their project; (iv) ICOs provide SMEs with a direct access to an unlimited pool of investors; (v) ICOs have also proven to be a more inclusive financing option by allowing subscribers to buy fractions of newly-issued tokens, to limit their exposure according to their risk appetite; and (vi) flexibility for entrepreneurs to raise finance without necessarily diluting ownership rights to the company.[35]

[34] CNBC. Initial coin offerings have raised $1.2 billion and now surpass early stage VC funding. Available online at https://www.cnbc.com/2017/08/09/initial-coin-offerings-surpass-early-stage-venture-capital-funding.html

[35] OECD. Initial Coin Offerings (ICOs) for SME Financing. Available online at https://www.oecd.org/finance/ICOs-for-SME-Financing.pdf

WEB 3.0 ASSET MANAGEMENT SECTOR

The use cases of AI in investment management firms can be broken into two broad areas – portfolio management and client enablement; and front, middle and back-office efficiency.[36]

Investment management firms are dogged by industry challenges that continue to intensify such as reduced organic growth and unpredictable capital market returns. And use of intelligent machines in the industry has centred around boosting in-house operational efficiencies, including product pricing, customer onboarding, and supporting sales and distribution. Meanwhile, AI stands to provide new avenues of growth for the industry. Many investment firms are toying with the idea of applying cognitive technologies and AI to various business functions across the industry value chain. BlackRock, the world's largest asset manager, has a dedicated AI research centre, called the "BlackRock Lab for Artificial Intelligence", researching on ways of using AI to help transform many facets of the asset management industry.[38]

AI also has several implications for the portfolio management sector. Different areas, including asset allocation, trading processes and risk management could be fully transformed using AI. And evidently, we can find many robo advisors delivering out-performing portfolios to investors using these technologies. Some other notable mentions are:[39]

Exhibit 3: Ten use cases of AI in investment management

Ten AI use-cases in investment management

Portfolio management and client enablement:

- **Automated insight:** reading earnings transcripts to assess management sentiment
- **Relationship mapping:** identifying nonintuitive relationships between securities and market indicators
- **Alternative datasets:** analyzing alternative data such as weather forecasts and container ship movements, monitoring search engines for words on specific topics to structure hedging strategies
- **Growth opportunities:** using corporate website traffic to gauge future growth along with clients' behavioral patterns
- **Client outreach:** smart client outreach and demand generation via analytics, using alternative data sources such as social media data

Front, middle, and back office efficiency:

- **Operations intelligence:** using machine learning to automate functions
- **Powering risk performance:** AI-based algorithms and machine learning to monitor for suspicious transactions, and trigger response protocols
- **Reporting and servicing:** generating reporting for clients, portfolio and risk commentary, and marketing material using natural language processing
- **On-demand reporting:** chatbots and machine learning used to respond to employee or investor queries, generating management reporting on-demand
- **Employee insights:** monitor employee conduct risk and employee morale

Source: Deloitte[37]

[36] Deloitte. Artificial intelligence: The next frontier for investment management firms. Available online at https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/fsi-artificial-intelligence-investment-mgmt.pdf

[37] Deloitte. Artificial intelligence: The next frontier for investment management firms. Available online at https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/fsi-artificial-intelligence-investment-mgmt.pdf

[38] Ibid

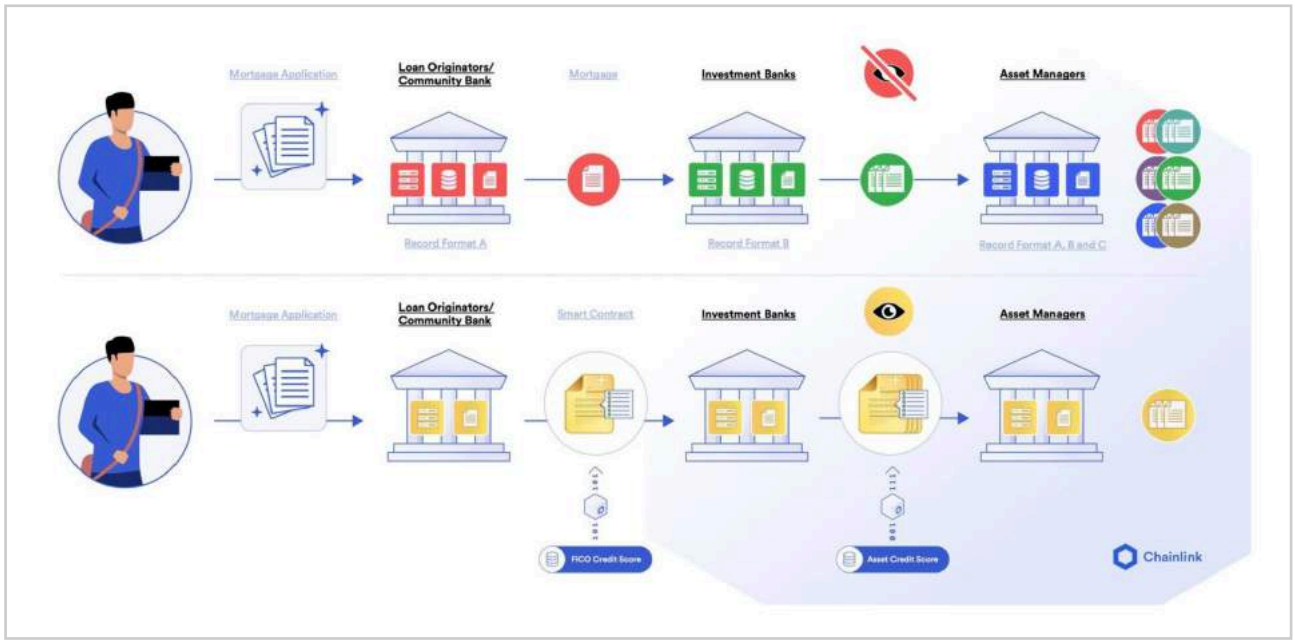
[39] MutualFunds.com. How Artificial Intelligence Is Transforming Portfolio Management. Available online at https://mutualfunds.com/portfolio-management-channel/how-artificial-intelligence-is-transforming-portfolio-management/

- Use of AI in conducting textual analysis of annual reports, economic reports and other meaningful information to predict stocks that could outperform or underperform
- AI techniques can help determine optimal asset weights based on accurate prediction of expected returns and variances/covariances
- AI techniques can also be used to incorporate qualitative data such as news reports and social media feeds to forecast risk variables and validate existing risk models
- Algorithmic traders could apply AI techniques in analysing transaction costs and executing large trades

Fund managers are also using AI to develop asset allocation models, assisting them in creating diversified portfolios with the right kind of assets, yielding better or expected results. These models are helping make more robust forward predictions of how stock prices will react if faced with a host of factors. This greatly helps fund managers in predicting and avoiding losses to generate a more stable portfolio.[40]

The mix of smart contracts and blockchain is also revolutionising the future of asset management. Today's asset management industry is highly fragmented, resulting in higher costs, heightened systemic risks and siloed data around different asset classes. Blockchain and smart contracts are trying to bring the industry together, proposing a 'single source of truth' where information resting with different parties remain the same. And having a single source of information, which cannot be tampered with, helps greatly reduce systemic financial risks and losses for asset managers and retail users.[41]

Exhibit 4: Better information leads to better risk management



Source: Chainlink [42]

[40] Forbes. Diversify Your Portfolio With AI. Available online at https://www.forbes.com/sites/qai/2020/06/04/diversify-your-portfolio-with-ai/?sh=1be7e58affc2

[41] Chainlink. The Future of Asset Management Using Smart Contracts and Blockchain Oracles. Available online at https://blog.chain.link/the-future-of-asset-management-using-smart-contracts-and-blockchain-oracles/

[42] Chainlink. The Future of Asset Management Using Smart Contracts and Blockchain Oracles. Available online at https://blog.chain.link/the-future-of-asset-management-using-smart-contracts-and-blockchain-oracles/

Decentralised management of investments

Decentralised autonomous organisations (DAOs) help like-minded people around the world to form an organisation where they set their own rules and exchange values freely without any intervention of third parties. All financial transactions happening in DAOs are done through smart contracts recorded on a blockchain. Smart contracts contain rules of the organisation and cannot be edited without people noticing it as DAOs are open to public. Another speciality of DAOs is that they are democratised organisations, allowing all the members in DAO to vote for any changes to be implemented, unlike traditional companies where governance and decisions are mostly based on executives, investors or the board of directors.

It is this inclusivity and openness that could revolutionise the asset management sector. Imagine implementing a DAO framework in an investment management firm, where voting is open to all within the framework to decide upon the investment strategy for a particular investment fund. This strategy can become embedded and automated in the investment fund, without interference or risk from external factors.[43]

Some companies have taken it up a notch by combining AI with DAOs. The goal is to develop an open and transparent organisation, requiring no human input, while making independent thoughtful changes to the organisation's structure. This will help unlock an era where companies could be run by an Artificial General Intelligence, helping them interact with each other seamlessly. AI DAOs can have some concrete use cases as it is governed by community-based decision making; is transparent as every transaction is recorded using blockchain; most internal processes are automated; and operational costs are lowered.[44]

Rise of crypto staking and yield farming as new investment opportunities

The trend of investing in cryptocurrencies is fast catching up with institutional investors and individuals alike. Some are also looking at earning through new avenues, such as opting to lock up a portion of their cryptocurrency for some time—called 'crypto staking'—to earn rewards and interest. Rewards can come in the form of earning additional tokens through staking; staking consumes less resources versus crypto mining; staking is also good for the entire ecosystem, as it makes cryptocurrencies rare and valuable; and staking opens up access to voting rights, giving stakers more clout in a specific blockchain network.[45]

Crypto yield farming is another emerging area of growth for crypto investors. Yield farming falls under the umbrella of DeFi, and is crypto's answer to traditional lending. As with DeFi, yield farming has also grown, spurred by low interest rates in other markets. Yield farming is a high-reward activity with a fair share of risks. One popular strategy in yield farming is liquidity mining, where yield farmers lock up tokens in exchange for fees. [46]

Why liquidity mining is so hot at the moment is because "a yield farmer gets a new token as well as the usual return (that's the "mining" part) in exchange for the farmer's liquidity." And moving forward, we will see more innovative and robust ways in which architects of DeFi will optimise liquidity incentives in increasingly refined ways.[47]

[43] Forbes. What Are DAOs And Why You Should Pay Attention. Available online at https://www.forbes.com/sites/cathyhackl/2021/06/01/what-are-daos-and-why-you-should-pay-attention/?sh=3d6717d97305

[44] Towards Data Science. Why Building an AI Decentralized Autonomous Organization (AI DAO). Available online at https://towardsdatascience.com/why-building-an-ai-decentralized-autonomous-organization-ai-dao-85d018700e1a

[45] Business Insider. What to know about staking - the process of locking up crypto holdings to earn rewards and interest. Available online at https://www.businessinsider.in/cryptocurrency/news/what-to-know-about-staking-the-process-of-locking-up-crypto-holdings-to-earn-rewards-and-interest/articleshow/86413783.cms

[46] Markets Insider. Crypto 'yield farming' is reportedly booming, and investors could see up to 50% returns - or watch as scammers make off with their investment. Available online at https://markets.businessinsider.com/news/currencies/crypto-ethereum-defi-yield-farming-mark-cuban-iron-titan-2021-07

[47] CoinDesk. What Is Yield Farming? The Rocket Fuel of DeFi, Explained. Available online at https://www.coindesk.com/learn/what-is-yield-farming-the-rocket-fuel-of-defi-explained/

WEB 3.0 CONSUMER BANKING

DeFi is giving strong competition to the existing consumer banking system. People are increasingly becoming indifferent to their retail banks, due to unreasonable fines, poor interest rates, and bad user experience.[48]

"DeFi isn't merely yet another unwelcome disruption for incumbent banks, it's an existential threat."[49] Below are four ways by which incumbent banks can react to this disruption.

- DeFi is here to stay and banks cannot neglect this reality anymore. Banks can start by allowing access to DeFi to their consumers through their banking services. JP Morgan Chase became the first bank to trial the use of its own JPM digital coin in a real-world setting
- Incumbent banks should initiate collaboration with the DeFi community to push for favourable regulations and compliances around decentralised and open banking
- Incumbent banks should start leveraging on their clout and resources to develop sustainable pathways between the centralised financial services ecosystem and the new world order of DeFi. Coinbase is one such example, helping bridge this gap and incumbent banks should emulate this
- Banks should also seek new ways to engage and partner with next-gen financial investors who are more interested in investing on emerging digital assets. Multinational investment banking companies such as Goldman Sachs and Morgan Stanley are already facilitating client investment in digital assets including Bitcoin

Privacy control

Blockchain technology, coupled with its cousin distributed ledger technology (DLT), can help banks reduce or eliminate the use of intermediaries in the key banking services it provides. Specific areas in which banks can benefit highly from these technologies are payments, clearance & settlement systems, fundraising, securities, loans and credit, trade finance, and customer KYC and fraud prevention.[50]

Banks can generally spend up to three months executing all KYC proceedings. This increases the chances of irate customers abandoning the relationship. Apart from time, banks also have to comply with KYC rules, adding to costs. Globally, banks spend up to $500 million annually on KYC compliance and customer due diligence. Blockchain can greatly enhance this process and lower these costs. Using blockchain for KYC purposes could reduce personnel requirements for banks by 10%, equating to cost savings of up to $160 million annually.[51]

Large banks such as HSBC, Deutsche Bank and Mitsubishi UFJ Financial Group, collaborated with IBM and tested a service to share KYC information via blockchain. This project resulted in eliminating duplication of effort in collecting the same information by different financial institutions, while digitising and storing all customer information securely at a single source.[52]

[48] Coin Telegraph. Better, faster, cheaper: How DeFi will kill the retail bank. Available online at https://cointelegraph.com/news/better-faster-cheaper-how-defi-will-kill-the-retail-bank
[49] Sifted. Four ways big banks can get to grips with decentralised finance. Available online at https://sifted.eu/articles/banks-defi/
[50] CB Insights. How Blockchain Could Disrupt Banking. Available online at https://www.cbinsights.com/research/blockchain-disrupting-banking/
[51] Ibid.
[52] Ibid.

Blockchain technology revolutionising insurance and loans

Traditional banks follow a tedious process of credit reporting to determine whether an individual is qualified to avail credit. This system is indifferent to customers' needs. Alternative lending using blockchain technology provides a much cheaper, efficient, and secured way to avail loans. With a cryptographically secure, decentralised registry, there will be one source of global credit score, enabling consumers to easily apply for loans. Although in its infancy, example of blockchain-enabled lending is available. SALT Lending, a P2P lending platform lends cash to its users against any Bitcoin, Ether, or blockchain asset as a collateral. It does not lend on the basis of an individual's credit score, but on the value of the collateral.[53]

Meanwhile in the insurance sector, blockchain is being used in several areas such as fraud detection and risk prevention; property and casualty insurance; health insurance; reinsurance; and life insurance.[54]

- Fraud detection and risk prevention – Using blockchain's distributed ledger technology, insurers can store and have access to a single claims information, negating the need to invest in gathering data from public and private domain. This also greatly enhances the chances of insurers to predict and analyse fraudulent claims
- Property and casualty insurance – Using blockchain technology, insurers can collect real-time data and run analysis on property and casualty claims, making it three times faster and five times cheaper
- Health insurance – Insurance companies often don't have complete information on patient's medical history, making it difficult to process healthcare claims. This costs hospitals a loss of $262 billion annually. Blockchain technology will enable patient's information to be encrypted and stored in distributed ledgers, ensuring patient's data is protected while also allowing seamless access for all the concerned users
- Life insurance – Claiming life insurance benefits on the event of death could be difficult and harrowing for the relatives of the dead. And processing a claim could take anywhere between two weeks to over six months. Blockchain can automate the manual claims process making it seamless, by brining all the concerned participants on a single network, where data is accessible and transparent to all

DeFi-enabled loans and insurance

DeFi is reimagining the world of finance. Cryptocurrencies are being applied in different ways to recreate traditional financial instruments. Web 3.0 is constantly powering decentralised financing to be capable of granting loans even for creative intangible assets such as a design, a software tool, a fashion concept or a video game.[55]

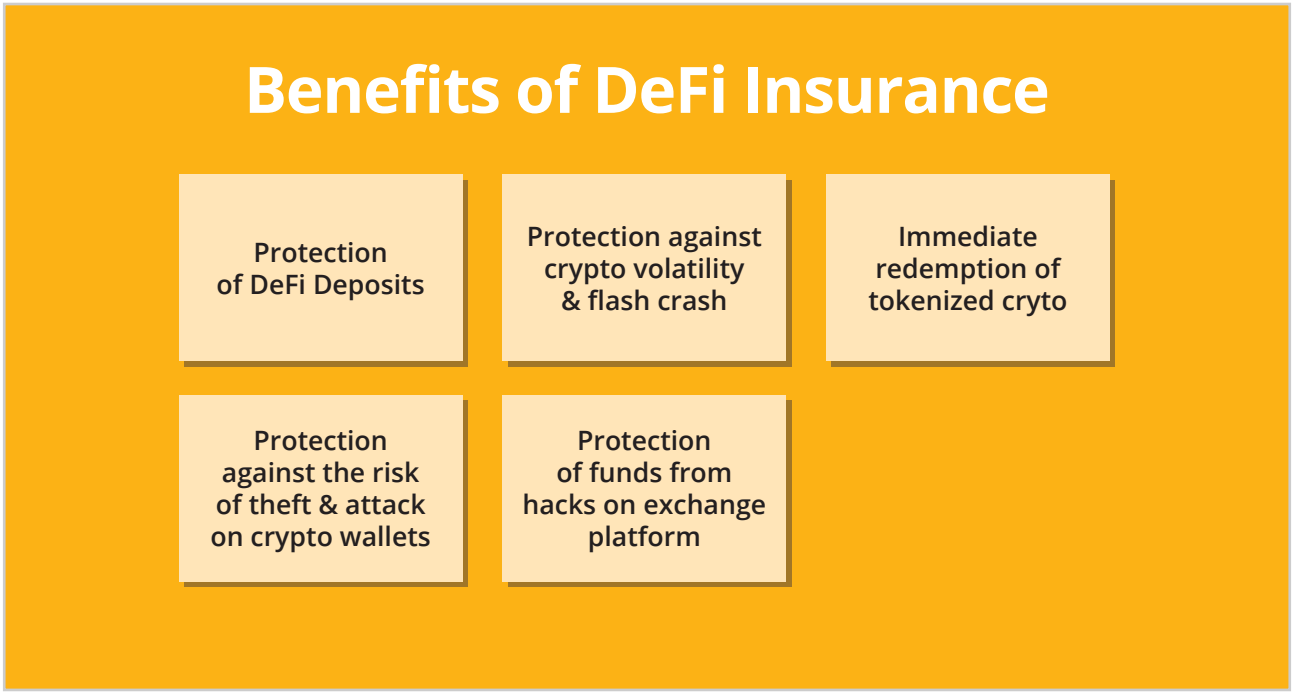
DeFi has several benefits for the insurance sector – protection of deposits; protection against crypto volatility and sudden crash; and protection of funds from hacks on exchange platforms.[56]

[54] CB Insights. How Blockchain Is Disrupting Insurance. Available online at https://www.cbinsights.com/research/blockchain-insurance-disruption/

[55] Coin Telegraph. DeFi and Web 3.0: Unleashing creative juices with decentralized finance. Available online at https://cointelegraph.com/news/defi-and-web-3-0-unleashing-creative-juices-with-decentralized-finance

[56] International Insurance Society. Decentralized Finance (DeFi) – Risks And Opportunities For The Insurance Industry. Available online at https://www.internationalinsurance.org/Insights_decentralized_finance

Exhibit 5: Benefits of DeFi insurance



Source: International Insurance Society [57]

[57] Ibid

WHOLESALE BANKING WITH WEB 3.0

Process efficiencies gained through joining the decentralised economy

Banks still struggle in two critical areas – KYC compliance and managing payments. A typical KYC request takes 30 to 50 days and entails duplication of work between banks and other third parties. There is not only a time factor, but also high costs involved in fulfilling KYC compliance. Differing regulations with no internationally agreed standards, make it increasingly hard for banks to remain compliant. And this relatively, adds another layer of pressure, which is large penalties for non-compliance, making the entire KYC process a time-consuming and risky affair.[58]

Blockchain-based KYC strives to significantly cut administrative overhead costs across intermediaries. KYC statements along with KYC documents can be stored on blockchain, which is transparent and secure and can be used by other banks and accredited organisations to do the KYC process without starting it all over again.[59]

Once verified and confirmed by the blockchain network, customer KYC details need not be verified or checked, greatly reducing the administrative burdens and costs for banks. Additionally, customers also save on time by just supplying KYC documents once to the bank, which also greatly reduces their security and privacy concerns. SWIFT, the world's leading provider of secure financial messaging services has developed a KYC registry system with 1,125 member banks, where KYC data is stored, shared, and regularly checked for changes and updating by SWIFT.[60]

Managing insurance and bonds with blockchain

Health and life insurers are racing to fit in the blockchain puzzle in their value chain. Key questions centre around whether blockchain can help insurers cut costs, manage risk, improve customer service and eventually grow their business. Some areas where blockchain can positively impact the health and insurance sector are:[61]

- Patient health records – Using blockchain's ability in encrypting and allowing open and transparent access to health records is a vital way in which the insurance sector can greatly benefit
- Administration and strategies – Blockchain can enable communication between all the stakeholders, bringing them together on one network, while automating the collection of data and acting on it using smart contracts. This would greatly reduce lengthy back-office processes.
- Claims – Fraud costs approximately more than $80 billion annually to the insurance industry. Blockchain's smart contracts help determine whether insurance claims filed are indeed valid.

[58] Finextra. Blockchain Use Cases For Banks In 2020. Available online at https://www.finextra.com/blogposting/17857/blockchain-use-cases-for-banks-in-2020

[59] Ibid.

[60] Ibid.

[61] Deloitte. Blockchain in insurance: Turning a buzzword into a breakthrough for health and life insurers. Available online at https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-in-insurance-ebook.pdf

Exhibit 6: Potential implications for health and life insurance

Health insurance-specific potential implications	Life insurance-specific potential implications
▶ Leverage the information on the blockchain to help members manage their health and provide wellness rewards. ▶ Using analytics and navigators, assist members in deciding what insurance plan would best meet their current health needs. ▶ Identify and close patient care gaps. ▶ Gain greater understanding of value-based care arrangements when a patient's entire episode of care can be accurately reviewed across providers.	▶ In combination with automated underwriting, reduce the need for consumers applying for life insurance to see a physician or, in some cases, take additional lab tests. ▶ Reward members who engage in healthy behaviors such as exercise (e.g., data from an exercise tracker could be uploaded to the blockchain and the insurance company could access it, with a smart contract triggering the appropriate incentive). ▶ Reprice policies or provide other financial or non-financial rewards based on current health information. ▶ Automatically process new business, claims, in-force transactions, disclosures, agent information, and other transactions.

Source: Deloitte[62]

[62] Deloitte. Blockchain in insurance: Turning a buzzword into a breakthrough for health and life insurers. Available online at https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-in-insurance-ebook.pdf

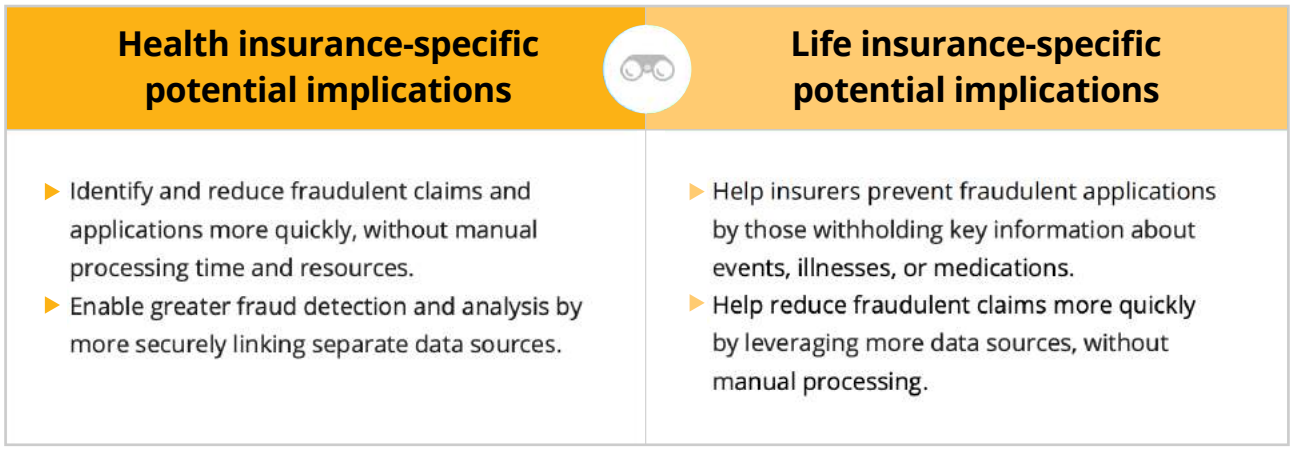
Exhibit 7: Enhancing back-office functions

Health insurance-specific potential implications	Life insurance-specific potential implications
Back-office functions ▶ Process customer transactions more quickly, improving application decisions, renewals, claims payments, and information updates. ▶ Lower overhead costs by increasing speed and efficiency of automated tasks and processes. ▶ Repurpose staff resources to non-blockchain-enabled roles. ▶ Bolster security for personally identifiable health information. ▶ Potentially use smart contracts to verify visits and procedures. ▶ Reduce prior authorization calls and paperwork because needed information would be available and smart contracts could verify the prior authorization automatically. **Value-based care strategies** ▶ Decrease time and resources needed to draft contracts and reconcile and execute payments. ▶ Provide more comprehensive and efficient quality reporting due, in part, to access to an interoperable health record. ▶ Increase access to data for risk adjustment. ▶ Access more utilization and spending information for risk-sharing arrangements. ▶ Understand whether providers are certified as medical homes.	**Back-office functions** ▶ Hasten processing of coverage applications. ▶ Lower overhead costs via increased speed and efficiency of automated tasks and processes. ▶ Improve access to comprehensive medical information. ▶ Increase reliability of medical data. ▶ Bolster security of personally identifiable health information. ▶ Enable automated validation of life events to trigger policy execution through smart contracts.

Source: Deloitte[63]

[63] Deloitte. Blockchain in insurance: Turning a buzzword into a breakthrough for health and life insurers. Available online at https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-in-insurance-ebook.pdf

Exhibit 8: Enhancing fraud detection



Source: Deloitte[64]

Blockchain has also been used to create, issue and manage the world's first blockchain bond, called bond-i, by the World Bank in 2018. The two-year bond successfully raised A$110 million ($82.37 million), thereby highlighting the support and interest by investors in pushing the adoption of such technologies in capital markets. Seeing the success of such bonds, the World Bank issued another round of blockchain bonds in 201, raising $108 million.[65]

Blockchain is well-suited to operate in the bond market. Two key value propositions in terms of technicality is blockchain's ability in lowering participation thresholds in terms of denomination in bonds and easing the process to participate. In the pre-issuance phase, blockchain removes the need for physical documentation, while in post-trade phase, it carries out real-time settlements to reduce involvement of multiple counterparties.[66]

By reducing costs and intermediaries, blockchain can also potentially revolutionise capital markets in emerging economies. This would greatly heighten the chances for SMEs to get access to a wide and open funding market.[67]

The ongoing pandemic is also making a strong case for the legacy bond issuance system to be digitalised. It was evident in the attempts by many companies to raise capital amid the pandemic. And many struggled due to the out-dated, slow, and human-dependent process in bond issuance. Blockchain can definitely modernise this system.[68]

[64] Deloitte. Blockchain in insurance: Turning a buzzword into a breakthrough for health and life insurers. Available online at https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-blockchain-in-insurance-ebook.pdf

[65] International Finance. The evolution of blockchain in bond issuance. Available online at https://internationalfinance.com/the-evolution-of-blockchain-in-bond-issuance/

[66] Ibid

[67] Intuition. Blockchain Bonds Could Slash Costs, But Serious Investment Is Needed to Modernize the Industry. Available online at https://www.intuition.com/blockchain-bonds-could-slash-costs-but-serious-investment-is-needed-to-modernize-the-industry/

[68] International Finance. The evolution of blockchain in bond issuance. Available online at https://internationalfinance.com/the-evolution-of-blockchain-in-bond-issuance/

Disruption to traditional capital raising

Blockchain is increasingly disrupting the capital markets. More options are now available for capital raising that go beyond traditional means.

Raising capital using ICOs have become a blessing for the startup ecosystem. By assigning an amount of equity to each coin offering, startups are raising tremendous amount of capital. Also, legal fees to register for an ICO is much cheaper than an IPO. Startups like Filecoin, Tezos, EOS and Bancor have successfully raised upwards of more than hundreds of millions of dollars. Incidentally, investors have also started to opt for purchasing ICOs as it allows them to cash out much before a traditional investment.[69]

The largest ICO funding raised till date was by Telegram, during a private ICO, which stood at a whopping $1.7 billion in 2018.[70]

Enhancing existing operations with DeFi

Cryptocurrency or DeFi elements can be added to an existing business model to further enhance it. Cryptocurrencies can be used to enable crypto payments, such as bitcoin, without showing it in their balance sheets by partnering with third-party vendors. Immediate benefits are reaching a new clientele and growing the volume of each sales transaction. A more hands-on approach would be to not only enable crypto payments, but also integrate crypto within operations and the treasury function.[71]

Similarly, key features of DeFi such as permissionless, programmable, transparency, immutability, interoperability and non-custodial, make it suitable for various use cases like asset management, DAOs, lending and borrowing, gaming, insurance, decentralised exchanges, data and analytics, margin trading, staking and tokenisation.[72]

DeFi brings an ideal mix of cryptocurrencies and blockchain features, increasing its potential uptake, particularly for the finance sector. According to Gwyneth Iredale, a software evangelist for blockchain technologies, DeFi's "transparency factor allows users to develop trust in financial services, while decentralisation ensures that they are not vulnerable to large-scale hacks. At the same time, immutability in DeFi protocols also ensures that sensitive financial information does not fall into the wrong hands."[73]

[69] Startup Grind. Raising Capital through an ICO (Initial Coin Offering). Available online at https://www.startupgrind.com/blog/raising-capital-through-an-ico-initial-coin-offering/

[70] Corporate Finance Institute. Initial Coin Offering (ICO). Available online at https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/initial-coin-offering-ico/

[71] Deloitte. The rise of using cryptocurrency in business. Available online at https://www2.deloitte.com/us/en/pages/audit/articles/corporates-using-crypto.html

[72] 101 Blockchains. Key Features Of Decentralized Finance (DeFi). Available online at https://101blockchains.com/features-of-decentralized-finance-defi/

[73] Ibid.

CONCLUSION

Web 3.0 will connect data from businesses, individuals and machines worldwide and create a wealth of data in an ecosystem that will be interpreted swiftly with improved AI and ML. This will help deliver new markets, new business models and a host of other opportunities that we can only guess now. Said quite rightfully, it could mean a "return to the global village".[74]

Web 3.0 will have blockchain technologies at its heart. As blockchain goes from strength to strength and eliminates inefficiencies across most things it touches, Web 3.0 will see the convergence of innovative technologies that will take the world wide web to an efficiency level not imagined before. For sure, there will be risks and it will be prudent to acknowledge, understand and mitigate these risks.

Financial services will witness a sea change, and so will other industries. Web 3.0 will even open new sectors and customer segments. COVID-19 is a timely reminder of what can be achieved with technology. It has proved yet again on a global scale that innovation and tech adoption are key to survival. Organisations will have to embrace the change when it does come, and be geared to reap the benefits offered by Web 3.0.

Retaining freedom of digital expression is an important aspect of Web 3.0, and a real change from the current Web 2.0. This next wave of decentralisation will put the power back in users to control a network, at least theoretically. While it does sound promising, it needs to come with responsibility and could prove extremely challenging for organisations and individuals alike.

Web 3.0 is on its way and with opportunities aplenty. How we adapt and deal with it to use it for the greater good and continue innovating, completely rests with us. A couple of years from now, we'll probably be discussing Web 3.0 in various ways, but to participate in it and reap the benefits it offers we need to prepare for this new era.

[74] Medium. What Is Web 3.0 & Why It Matters. Available online at https://medium.com/fabric-ventures/what-is-web-3-0-why-it-matters-934eb07f3d2b

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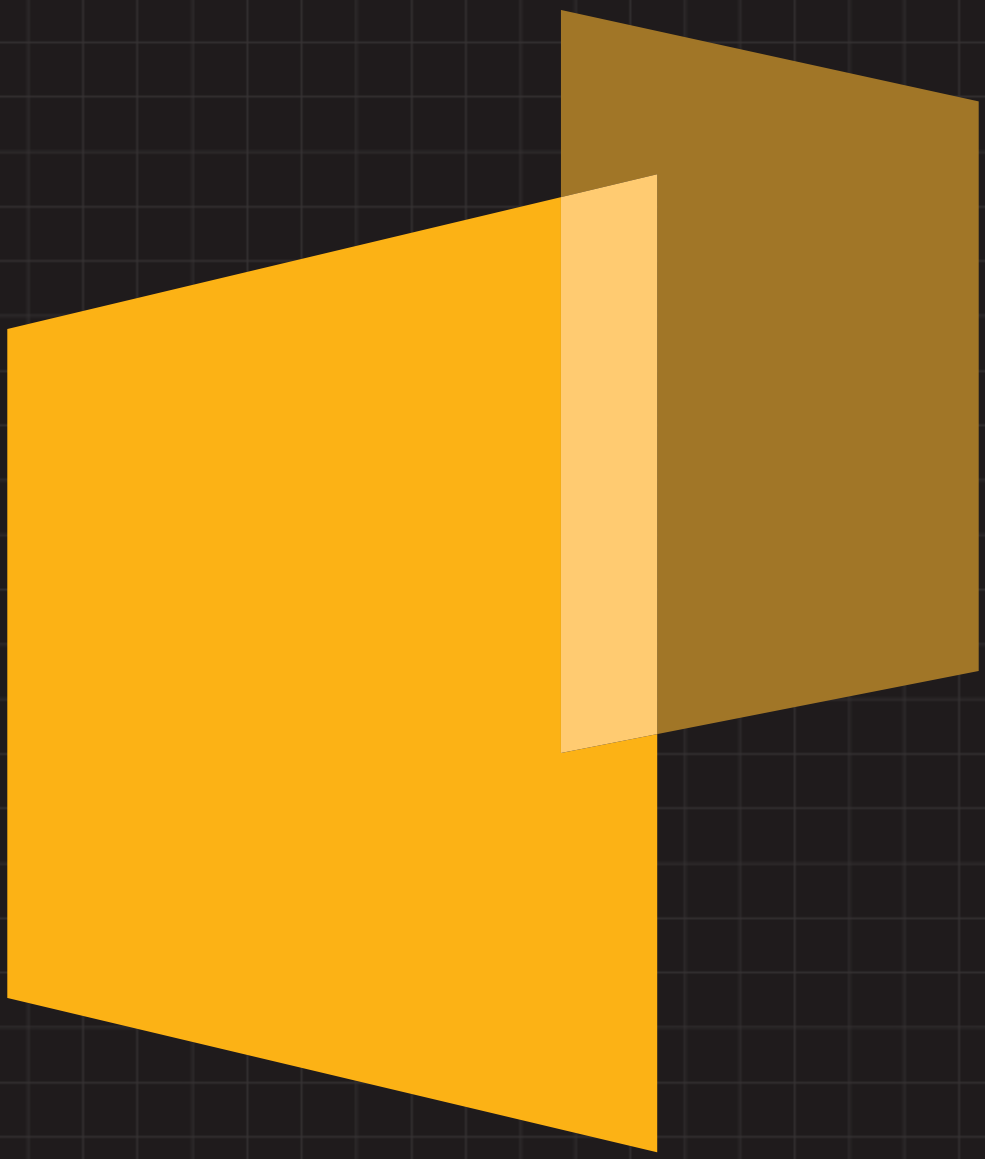

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