![Fidelity International logo]

FUTURE FORECAST REPORT

FIDELITY INNOVATION

A market transformed

The AI future of work

Clients evolved

fidelityinternational.com/innovation-at-fidelity

2024 content

■ Intro.

There is so much happening all around us. Typically enabled by converging levels of maturities across key emerging technology pillars and a variety of shifts in expectations across societies, innovations are being rolled out at increased pace touching various segments of societies across geographies. Typically enabled by converging levels of maturities across key emerging technology pillars and a variety of shifts in expectations across societies, innovations are being rolled out at increased pace touching various segments of societies across geographies.

When events of this nature unfold, it gives our strategists an opportunity to reimagine the future of the entire services and business models. In the context of the financial services industry, as employees, customers and members of society, we may have access to some of these disruptive innovations in our personal lives much before they are suitably adopted for a regulated industry like ours.

Machines are interacting more and more with humans and among themselves. Getting this early exposure gives us all a view of the capabilities and allows us to understand how these can influence their integration into our professional lives.

However, these rapid innovations are also testing applying stress to the traditional enterprises across various factors such as challenging the current norms around governance, safety of implementation, as well as needing to manage rapid experimentation and adoption. Balancing this need for pace alongside the risk appetite for an enterprise is becoming the core ask of teams like ours.

In such times, being still is not an option. Forecasting can also become a fool's errand. Yet, we need to find a way to channel the various insights we gather into a point of view that is relevant for the industry we work in.

We are thrilled to present this report on the key trends and technologies that will shape three fundamental shifts in the future of financial services. This report delves into the driving forces behind these changes and provides insights into the capabilities that Fidelity is exploring.

From the transformative power of tokenization and the rise of digital wallets to the potential of self-sovereign identities and decentralized physical infrastructure networks, the opportunities are truly unprecedented.

We are at the forefront of developing the underlying capabilities for many of these groundbreaking technologies, and we are excited to share our insights with you.

> **" Welcome to an era of perpetual disruptive innovations. Join us as we step into the future and explore the possibilities that lie ahead. "**

PRASAD CHANDRASHEKER
GLOBAL HEAD OF EMERGING
TECHNOLOGY STRATEGY

JOHN GIST
GLOBAL HEAD OF FIDELITY LABS

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Welcome to our annual report on the key trends and technologys that will shape the future.

We'll begin with a peek into the 2040s, then zoom out to explore the opportunities and threats already present. We'll delve into the driving forces behind these changes, and provide insights into the capabilities Fidelity are exploring. And we'll bring you up to date with the latest developments, equipping you with the knowledge you need to navigate this ever-evolving landscape.
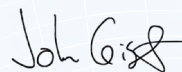
How this report was created

The Step into the future sections of the report were written in part by our in-house FILxGPT platform.

While we're excited to explore the capabilities of generative AI and bring you visions of the future it's helping to create, we believe humans will continue to play an important role as well. To produce the main insights of the report, we asked our experts to weigh in on the emerging technologies and trends that we at Fidelity think will matter over the coming decades.

A MARKET TRANSFORMED

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Step into the future

Step into the world of Olivia, a financial adviser in the year 2044. Cutting-edge technologies have revolutionised the industry and tokenisation has become the standard in financial markets, unlocking opportunities for investors. Digital wallets have seamlessly integrated into everyday life, streamlining transactions and empowering individuals to take control of their financial journeys.

As the sun rises on another day, Olivia begins her morning routine. With a tap on her augmented reality glasses, she's instantly immersed in a world of data and insights. Her smart assistant, lovingly named Aurum, seamlessly aggregates real-time market information, providing Olivia with a comprehensive overview of investment opportunities.

Armed with this knowledge, Olivia heads to the office, where a collaborative workspace awaits. Gone are the days of sifting through paperwork and endless spreadsheets. A sleek, mixed reality display presents a holistic view of her clients' portfolios, highlighting potential risks and opportunities. With a few gestures, Olivia can analyse asset performance and adjust investment strategies.

In this tokenised world, transactions occur at lightning speed, thanks to the power of blockchain technology. With a simple tap of her client's digital wallet, Olivia can securely transfer tokenised assets, eliminating the need for intermediaries and reducing transaction costs. What used to take days or even weeks now happens in a matter of seconds, allowing for efficiency and liquidity.

Interaction with clients has also undergone a remarkable transformation. Gone are the days of face-to-face meetings in stuffy boardrooms. Instead, Olivia connects with clients through immersive virtual meetings, using advanced video conferencing technology and the metaverse. With a few clicks, she can effortlessly share tailored investment proposals, visualising the potential returns and risks in real time.

As the day ends, Olivia reflects on the transformations she has witnessed. The industry has evolved – and so has she. Embracing technology and staying ahead of the curve has allowed her to thrive in this rapidly changing landscape. In this future, the financial adviser is not just a guide but a trusted partner, empowering her clients, navigating the complexities of tokenisation and shaping a prosperous financial future.

[written by our FILxGPT platform]

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The big picture

This vision of a transformed financial industry will be made a reality by the continued adoption of technologies that are already shaping our present. We've noticed several significant trends beginning to emerge.

Tokenisation

is the process of converting the rights to an asset into a digital token on a blockchain or distributed ledger system. Tokenisation can enhance the efficiency, transparency and liquidity of capital markets. It can create new types of funds, securities and assets, and open new platforms and markets for exchange.

Digital wallets

are software-based tools that allow users to store, manage and transact their digital assets. They are crucial for adopting on-chain, tokenised assets and decentralised applications. They offer operational efficiencies, secure client interaction and technical capabilities that drive value across the enterprise.

Self-sovereign identities

are digital identity-management protocols that give individuals greater control over their information. As a secure, private alternative to traditional identity verification methods, they reduce data breach risks and streamline onboarding. The adoption of self-sovereign identities is gaining momentum and is expected to become a trillion-dollar market in the near future.

Decentralised physical infrastructure networks (DePINs)

use blockchain technology to create resilient networks. DePINs reduce single points of failure and reliance on traditional data centres and costs, and enable greater scalability.

The big picture (con't)

These tools will allow financial advisers to offer superior products and streamlined transactions. They will improve engagement with clients and empower individuals to take control over their financial futures.

As these technologies become commonplace over the next two decades, we foresee a revolution in the financial system.

"Fidelity is at the forefront of developing the underlying capabilities for many of these groundbreaking technologies. We are also researching and experimenting with their transformative potential. We aim to revolutionise the financial industry by investing in cutting-edge infrastructure and collaborating with industry leaders."
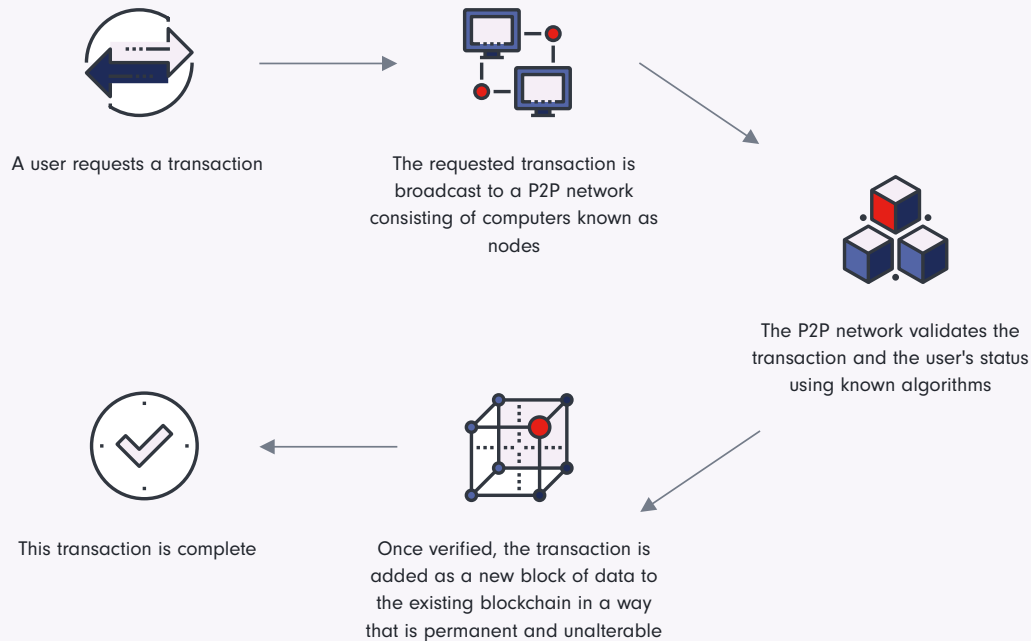
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Our deep dive

Tokenisation

Tokenisation is the process of converting real-world financial assets (stocks, bonds) or physical assets (real estate, art, commodities) into digital tokens that can be stored, transferred and traded on a blockchain. In this report, we use the word tokenisation to refer specifically to the digital representation of regulated financial instruments, assets and money.

These tokens are digital proof of the ownership of (and rights to) the underlying assets. They can be programmed with smart contracts to automate certain functions and enforce the rules of the contract.

A user requests a transaction

The requested transaction is broadcast to a P2P network consisting of computers known as nodes

The P2P network validates the transaction and the user's status using known algorithms

This transaction is complete

Once verified, the transaction is added as a new block of data to the existing blockchain in a way that is permanent and unalterable

What is blockchain?

- Blockchain is a distributed ledger technology that facilitates secure, transparent transactions without intermediaries. This transparency extends to tokenised assets. There are three main types of blockchain.

- Public blockchains are accessible to anyone with internet access and are non-restrictive. Basic use cases are the exchange and mining of cryptocurrencies: Bitcoin and Ethereum are prominent examples of public blockchains.

- Private blockchains are restrictive and usually open only to selected users within an organisation. They are suitable for internal business use.

- Permissioned blockchains are a hybrid of public and private blockchains. Access is granted by administrators. Users are grantedspecific privileges to allow them to perform certain actions.

Tokenisation has the potential to transform the financial system by enhancing the efficiency, transparency and liquidity of capital markets – especially for assets that are traditionally illiquid, complex or costly to trade. Tokenisation can create new types of funds, securities or assets, as well as new platforms and markets for exchange and discovery.

There is emerging demand from investors for tokenisation in two main areas. The first is the fixed-income market – specifically the corporate bond market, which is currently valued at around $11 trillion (USD). Non-standardised areas of this market can enjoy wider access to liquidity thanks to the transparency and fractional issuance of blockchains.

Some firms estimate that by 2030 the trade volume of tokenised digital securities could reach $5 trillion. This will bring significant value to blockchains, which are predicted to increase world GDP by 2% (or $2.1 trillion) by 2030.

Another opportunity lies in the tokenisation of illiquid and private asset classes such as investment funds. It's projected that the global value of tokenised illiquid assets could reach $16 trillion by 2030 (from the current value of around $300 billion).

Product innovation – including the introduction of new instruments such as tailored frequency income payments – could also drive value and meet client needs.

Capital efficiency and market size

Tokenisation can offer investors greater choice, liquidity and transparency. It enables fractional ownership – which means investors can buy and sell

smaller portions of an asset, such as a share of a property, a piece of art or a bond. This can increase the affordability and accessibility of investment opportunities – especially for retail and underserved investors who may otherwise face barriers to entry or exclusion from certain markets.

Digital tokens can be easily traded and verified, reducing the costs and risks associated with intermediaries, custodians and settlement systems. Investors can benefit more from the visibility of the underlying assets' transaction histories, ownership records and other important data listed directly on the blockchain. Intermediaries can use this transparency to improve coordination, collaboration and trust – among themselves and with issuers and investors.

 For issuers, tokenisation can open new sources of funding and innovation. By issuing tokens on a blockchain, they can reach a wider and more diverse pool of investors, streamline issuance and reduce administrative and regulatory burdens.

Tokenisation can enable issuers to tap into new forms of value creation and distribution, as well as foster more inclusive and sustainable economic development.

Many compliance systems today depend on manual inspections. Asset issuers could automate these compliance checks by incorporating specific actions such as transfer limitations into tokenised assets.

The system's 24/7 data availability allows for consolidated reporting, unchangeable recordkeeping and real-time, verifiable accounting, where the blockchain is used to create a so-called triple-entry bookkeeping system (the third entry being unalterable timestamps).

Tri-party repurchase agreements or money market fund withdrawals can be made instantly, unlike the current "trade date plus two days" (T+2) settlement. In high-interest-rate environments, faster settlement can provide higher savings – perhaps the biggest immediate benefit for investors from tokenisation.

The process can also facilitate the creation of new types of assets and instruments – such as social impact bonds, green bonds or community currencies – that can align the interests of issuers and investors with social and environmental goals.

Tokenization can benefit asset owners, service providers, and investors.

Potential benefits from tokenization, by stakeholder type, nonexhaustive

	Asset owners		Service providers		Investors	
	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency
Improved capital efficiency Lower cost of capital and free up capital in transit					★	★
Democratization of access Access to new secondary markets; greater liquidity					★	
Access to new pools of capital with lower minimum investment required	★					
Operational cost savings Opportunities to embed manual and error-prone product-structuring and asset-servicing tasks into the token smart contract and eventually across a portfolio		★		★		★
Enhanced compliance, auditability, and transparency Embedding of rules and credentials into the token smart contract (eg, investor qualification, carbon credit verification)		★		★		★
Cheaper and more nimble infrastructure Open-source technology driven by thousands of Web3 developers and billions of investment dollars		★		★		★

McKinsey & Company

Operational efficiency

Tokenisation can reduce the costs and risks of financial transactions – especially those that involve multiple intermediaries – by eliminating or simplifying intermediation.

Issuers can harness the programmability and automation of smart contracts to enforce conditions – especially for asset classes that typically involve complex manual operations. For example, corporate bonds and other fixed-income products often involve ambiguous interest calculations and cumbersome coupon payment distributions. Tokenisation can simplify and automate all interest payments, defaults and conversions.

Embedding smart contracts and digital identities into tokens can be a source of savings from a compliance perspective as well. Automation for processes such as know your customer (KYC), anti-money laundering (AML) and counter-terrorism financing (CTF) can reduce costs and minimise errors.

In the long run, the programmability of digital assets also offers advantages at the portfolio level, by allowing asset managers to rebalance their portfolios in real time, based on predefined rules and triggers.

New platforms and distribution

Digitally native platforms built on blockchain technology and using digital tokens have grown in recent years. These platforms aim to provide innovative solutions for capital markets by offering the features and advantages of blockchain technology mentioned above.

Despite increasing efforts to develop tokenised assets and use cases, the adoption of blockchain securities has not yet become widespread. Issuance of these securities has mostly been experimental and the level of liquidity is still far below what is expected in the long term. Significant challenges need to be addressed, including regulatory uncertainty, technical complexity and market fragmentation. Once these have been resolved, adoption is likely to increase rapidly.

Tokenization of global illiquid assets estimated to be a $16 Trillion business opportunity by 2030

Highly conservative forecast: tokenization potential of $68 trillion by 2030 in best-case scenario
Tokenized asset potential differ across countries due to variation in maturity of regulations and size of asset classes
Total tokenized market to be 10% of global GDP by 2030
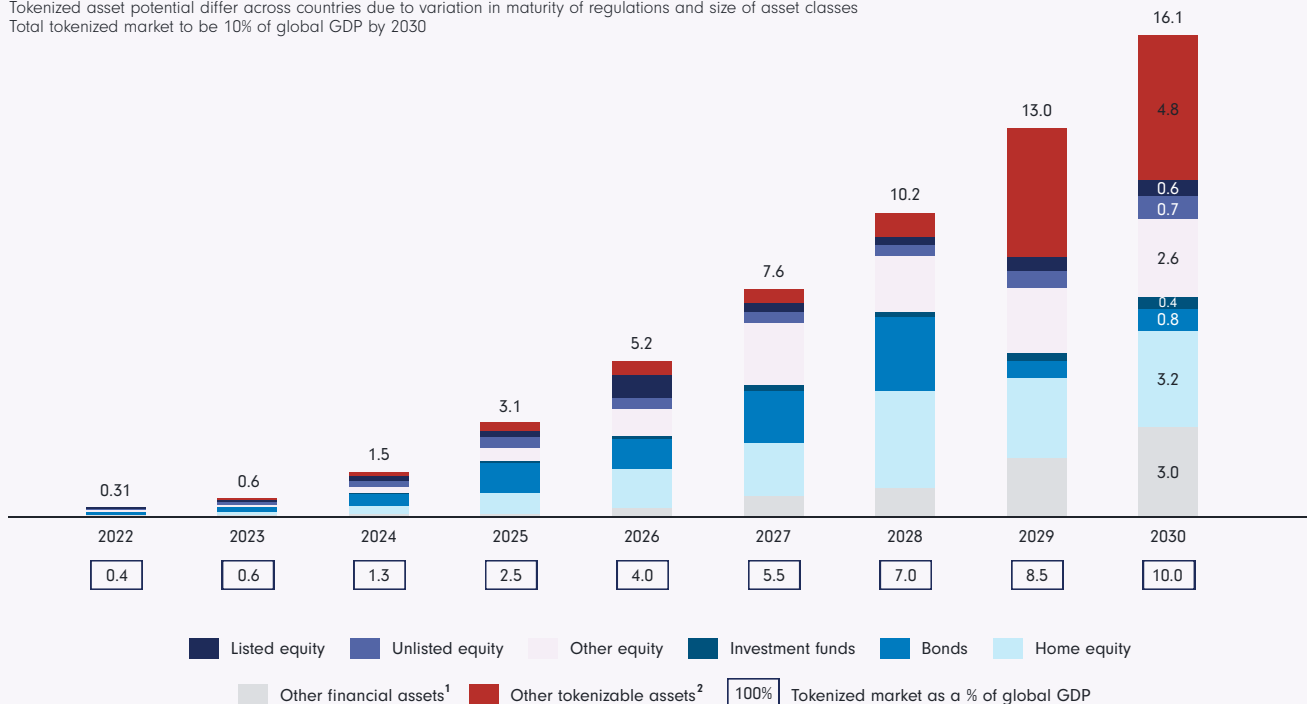
Source: World Economic Forum - Global Agenda CounciL BCG Analysis
[1] For example, Insurance policies, Pensions, Alternative Investments;
[2] e.g. Infrastructure Projects, Car Fleets, Patents Nate: The analysis does not include crypto assets

(Data from: Boston Consulting Group)
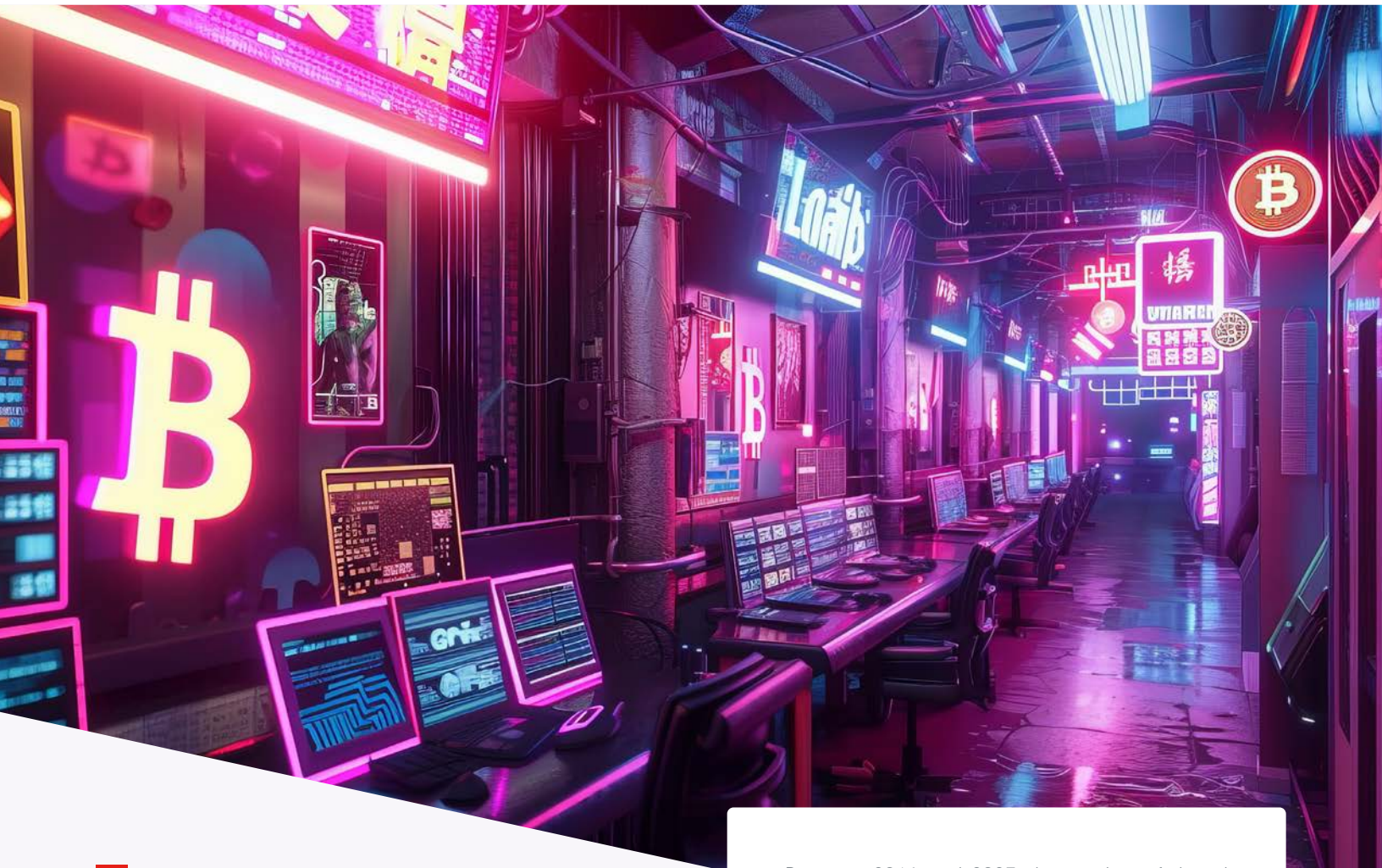
## ■ Our deep dive

Digital wallets

While financial institutions develop, scale and deploy tokenisation platforms, their clients are increasingly interacting with on-chain tokenised assets and cryptocurrencies. This trend is expected to continue, with a growing focus on decentralised applications (dApps).

Digital wallets, which offer a secure and private means of identification and transactional dealings, are emerging as a fundamental technical enabler for the adoption of both tokenised assets and dApps.

Between 2016 and 2023, the number of digital wallet users increased from five million to 425 million. This is thanks to their many capabilities, which are centred around three core pillars:

- Store of value: Digital wallets enable clients with singular or multiple accounts to hold on-chain assets.

- Identity: They streamline the process of capturing, identifying and protecting personal data, especially if used in combination with zero-knowledge proofs (ZKPs).

- Permissions: Digital wallets allow asset management firms and their clients to efficiently permission, track and audit each other's actions.

Types of Wallets

Self-custody

Software

Hardware

Custodial
(Third Party)
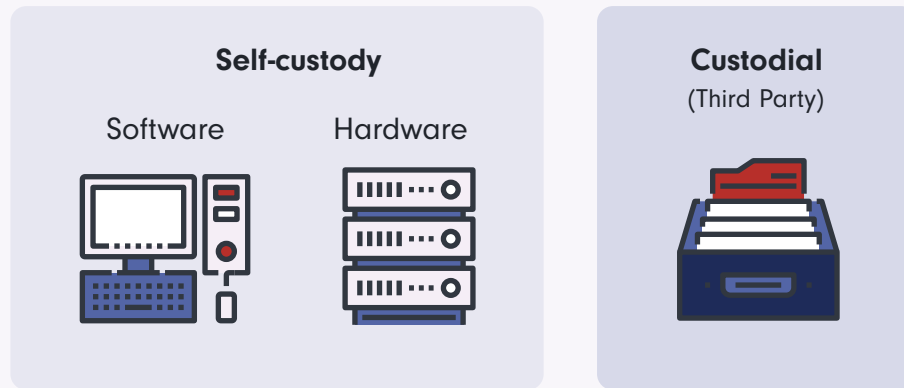
Self-custodial vs custodial wallets

There are two types of digital wallets.

Self-custodial wallets are digital wallets controlled by a user interfacing directly with the blockchain without intermediaries. They are aligned with the libertarian roots of Bitcoin and the decentralised nature of many blockchain-based projects. Their core benefit can be summarised in the axiom "My keys, my coins".

Self-custodial wallets have seen significant adoption but face challenges. The very features that make them attractive to many blockchain users have become limitations to their growth. Technical complexity, a lack of recovery services and a difficult user experience have led even highly experienced users to lose their funds and assets.

Due to regulatory frameworks and the preferences of most wealth management clients, the second type of digital wallet, custodial wallets, are expected to drive the next wave of adoption. Also known as keyless wallets, custodial wallets are digital wallets to which a third party, such as an exchange or financial institution, holds the key and manages the contents on the user's behalf. This eliminates the need for users to interact with their private keys when using the wallet, thus prioritising security.

For a custodial wallet to be truly beneficial it needs to replicate the trust, anonymity and decentralisation of a self-custodial wallet while providing the safety and convenience of a traditional digital wallet. This is possible through the integration of the following technologies:

- Multi-party computation (MPC) allows multiple parties to jointly perform a computation without revealing any of the private data held by each party.

- Zero-knowledge proofs (ZKPs) enable parties to prove knowledge of information without revealing the actual content.

- Proactive secret sharing protects secrets by splitting them and distributing the parts among multiple parties.

Integration

To realise the benefit of digital wallets for clients and asset management firms, integration into existing operating models would appear to be the sensible course. However, perhaps a better solution is to create new, digital wallet-based operating models.

The combination of digital wallets and distributed, decentralised ledgers will allow us to create more efficient operating models than ever. For asset management firms, the primary areas of opportunity are in custody, transfer agencies and central security depositories. As the range of on-chain products increases and the underlying technology matures, fund manager operating models will need to be adapted to complement the new protocols.

Drivers and challenges

Over the past eight years, new on-chain and digital-wallet-enabled platforms have emerged. We've seen increases in scaled solutions and connectivity deployment, as well as business-to-business and direct-to-consumer interaction.

Digital wallets are fundamental to all these advances. However, most implementations to date have been proof-of-concept and they face limitations. These include the difficulty of storing fiat currency directly on the blockchain, limited or no secondary trading, regulatory perimeters, and the extent to which current fund mandates allow for participation in these

transactions.

The key drivers for realising digital wallet growth will be establishing operating models and aligning multiple market actors.
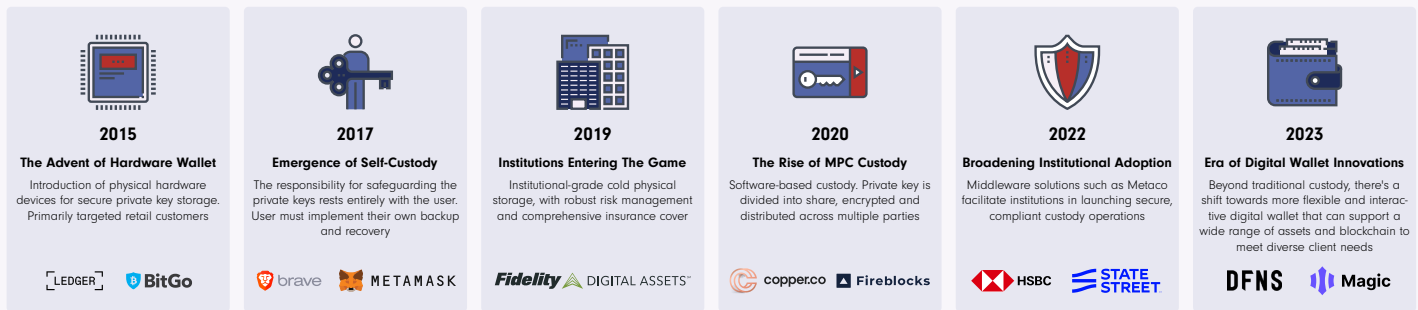
Continued innovation

The introduction of smart contract wallets further enhances the user experience, with features such as account recovery, delegated signing and even gasless transactions (where there is no extra fee to be paid). These advances make it easier for the average user to use digital wallets. As a result, asset managers can now build trusted solutions while maintaining anonymity, decentralisation and full user control.

As asset management firms scale their adoption and deployment of on-chain assets, new opportunities could arise to:

• participate in proprietary issuances

• drive operational efficiencies for firms

• simplify and enable more secure interactions with clients

• boost technical capabilities that could unlock value across the enterprise

In the future, digital wallets may completely replace physical wallets, providing enormous value to businesses and customers.

Evolution of Digital Assets Custody trends

2015	2017	2019	2020	2022	2023
The Advent of Hardware Wallet	**Emergence of Self-Custody**	**Institutions Entering The Game**	**The Rise of MPC Custody**	**Broadening Institutional Adoption**	**Era of Digital Wallet Innovations**
Introduction of physical hardware devices for secure private key storage. Primarily targeted retail customers	The responsibility for safeguarding the private keys rests entirely with the user. User must implement their own backup and recovery	Institutional-grade cold physical storage, with robust risk management and comprehensive insurance cover	Software-based custody. Private key is divided into share, encrypted and distributed across multiple parties	Middleware solutions such as Metaco facilitate institutions in launching secure, compliant custody operations	Beyond traditional custody, there's a shift towards more flexible and interactive digital wallet that can support a wide range of assets and blockchain to meet diverse client needs
LEDGER · BitGo	brave · METAMASK	Fidelity DIGITAL ASSETS	copper.co · Fireblocks	HSBC · STATE STREET	DFNS · Magic

Numerous crypto-scandals and news reports of millions lost to forgotten wallet passwords have led to growing demand from customers to see financial incumbents take proactive measures to provide secure and trustworthy custody solutions. Over the next few years, we expect new fintechs to capitalise within this space, providing the technology to enable the financial services industry to meet these demands. Players such as Metaco (a FISV portfolio company acquired by Ripple), whose technology provides an institutional standard for digital asset services, have already garnered attention from custodians and global banks within this arena.

- Jingwei Li, Investor at Fidelity International Strategic Ventures

Our deep dive

Self-sovereign identities

The self-sovereign identity (SSI) is another technology with the potential to revolutionise the way transactions are conducted – especially when paired with digital wallets.

The Three Pillars of Self-Sovereign Identity (SSI)
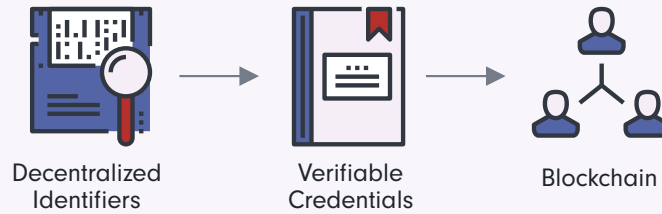
Decentralized Identifiers → Verifiable Credentials → Blockchain

The self-sovereign identity (SSI) is another technology with the potential to revolutionise the way transactions are conducted – especially when paired with digital wallets.

Using blockchain technology, SSIs offer a secure, private alternative to traditional methods of identity verification. They can reduce the risk of data breaches, allow more efficient onboarding and even help with targeted digital marketing.

As well as blockchain, the key technical pillars underpinning the SSI include decentralised identifiers and verifiable credentials. Decentralised identifiers verify individuals on the blockchain without relying on any central authority, and verifiable credentials ensure the authenticity of digital credentials through cryptography.

SSIs allow individuals to manage their personal data and control the extent and duration of information-sharing. This protects centralised databases and helps prevent identity theft and fraud. By requiring customers and prospective employees to share only essential parts of their identities, SSIs also reduce the need for repeated ID verification, saving time and cost.

Businesses can benefit, too. With customers increasingly concerned about privacy and data protection, security has become a major

selling point. SSIs streamline processes such as KYC and AML, and provide stronger safeguards for data management. This can protect against the types of cyber-attacks and data breaches suffered by traditional finance, minimising the chances of financial loss and reputational damage.

SSIs are comparatively user-friendly: verification happens instantly rather than taking days or weeks, resulting in savings and less time spent on data management. The integration of an SSI with a zero-knowledge proof will offer a means of instant verification that upholds privacy and security standards and remains compliant with regulations. Beyond operations, SSIs can cut out many of the intermediaries used in traditional finance.

SSIs are gaining momentum. They're projected to reach a value of $1 billion by 2024, and industry experts predict a trillion-dollar market within a few years. Key figures in financial services are actively exploring SSI technology through trials and partnerships with universities and postal services using initiatives such as the blockchain digital identity alliance ID2020 to advance their digital IDs. Accounting firms and individual banks are also integrating SSIs into their operations.

Issuer	Requests Credential ← / Issues Credential →	Holder/Prover	Requests Proof ← / Presents Proof →	Verifier
Signs Verifiable Credential		Wallet		Verifies Signature

Decentralised identifiers (DIDs)

Public Blockchain or other DID Network
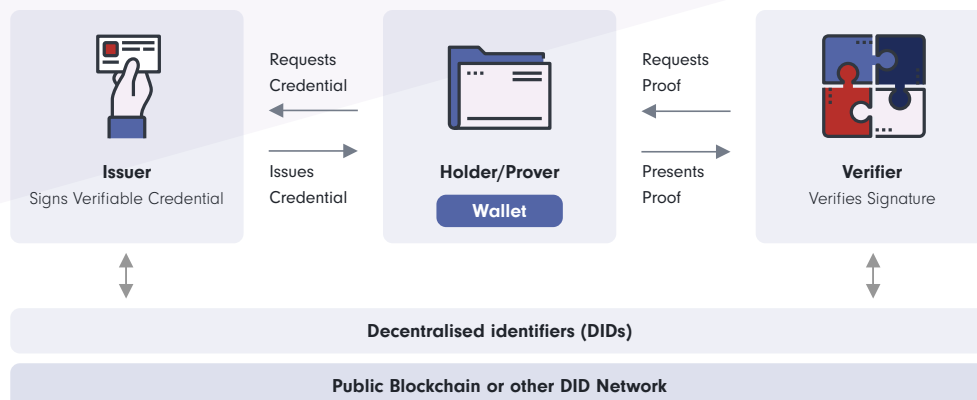
(Caption: The Three Participants of an SSI System)

Our deep dive

Decentralised physical infrastructure networks (DePINs)

Companies have an increasing need for computing infrastructure, yet available resources remain limited. This scarcity has spurred the adoption of more efficient infrastructure processes – notably through DePINs, an emerging trend in the Web3 space.

DePINs use decentralisation to "virtualise" the physical infrastructure. Participants on the supply side offer their infrastructure, and users on the demand side tap into the resources as and when they need them. These blockchain-based peer-to-peer networks are global and widespread.

DePINs reduce the reliance on conventional cloud operators, eliminating the potential single-point failures sometimes inherent in traditional infrastructure. This can reduce costs and enhance scalability.

DePINs can therefore become a core commodity, generating cost and energy savings while getting the most out of available computing. For example, if a company finds it is underusing its infrastructure, it can sell any available computing resources at the DePIN market rate and reap the financial benefits. Conversely, if a company needs more computing, it can buy "virtual" functionality on the DePIN to meet operational demands.

Market impact

By connecting organisations with idle computing power, DePINs offer cost-effective solutions and greater capabilities compared to centralised providers.

A notable illustration of this is seen in artificial intelligence. AI has rapidly become indispensable – yet growing demand and its cost-intensive nature means it requires more infrastructure.

OpenAI has predicted that the expense of training large AI models will increase to $500 million (from $100m) by 2030. DePINs could provide a solution to the need for more resources. Some already offer developers a one-click deployment of large graphics processing unit clusters that can become operational in minutes and support machine-learning workloads.

One network wireless infrastructure service for internet of things (IoT) and 5G connections deployed 833,000 hotspots across 175 countries in just 31 months. This meant a growth rate of 30,000 hotspots per month, all using DePINs.

Another example of the increasing popularity of DePINs is the provision of permanent data storage for NFTs and DeFi. Each node in the network stores encrypted data fragments, allowing data reconstruction any time a node is compromised – thereby making it more censorship-resistant.

Impacts and opportunities for the financial services and asset management industries

The future of DePINs is promising. The total market is approximately $2.2 trillion and is projected to reach $3.5 trillion by 2028. As technology evolves, DePINs could become the default for any cloud-computing strategy, thanks to their advantages over the current centralised system. DePINs also have the potential to fuel the growth of financial decentralised applications (dApps).

DePINs will offer significant benefits in the financial services and asset management sectors – particularly as they combine with other emerging technologies such as AI. Integration with AI algorithms could optimise DePIN deployment and operations, increasing their efficiency and effectiveness.

In return, DePINs can help boost AI capabilities by offering additional infrastructure for training, reducing the costs associated with AI model development. This will allow asset managers to offer better services to clients.

THE AI FUTURE OF WORK

Step into the future

Meet Alex, a portfolio manager who operates in the same tokenised world as Olivia. Alex's role is to oversee investment portfolios and make strategic decisions to achieve the best outcome for clients.

Each morning, Alex begins his day by immersing himself in a world of data and insights. With a simple voice command, his personal AI co-pilot Atlas springs to life, ready to assist. Atlas has been meticulously trained on vast amounts of historical market data and cutting-edge algorithms, making it an invaluable partner in Alex's decision-making process.

While reviewing the morning updates, Olivia, armed with Aurum's insights, comes across one of the funds recommended by Alex for one of his clients. With a few swipes and taps on her tablet, she accesses the detailed analysis created by Atlas. The AI-generated report provides a comprehensive overview of the fund's performance, risk factors and potential opportunities. Olivia's expertise and intuition, combined with Atlas's data-driven insights, allow her to make informed decisions.

In the collaborative workspace, Olivia and Alex's paths cross as they discuss their respective investment strategies. Olivia shares her insights on emerging trends and potential investment opportunities, while Alex showcases the power of combining human expertise with Atlas's AI-generated recommendations.

Throughout the day, Atlas continues to support Alex in his work. It monitors the market in real time, keeping a vigilant eye on fluctuations and identifying potential risks. When necessary, it sends timely alerts and notifications, allowing Alex to take swift action and protect his clients' portfolios.

In client meetings, Atlas's role is equally crucial. It generates personalised reports and visualisations based on Alex's direction and actions – helping clients understand the rationale behind investment decisions and the expected outcomes. With Atlas's assistance, Alex can present complex financial concepts in a clear and concise manner, fostering trust and confidence with clients.

As the day ends, Alex reflects on the transformative role co-pilots like Atlas play in the work of a portfolio manager. He recognises that technology has become an indispensable tool, enhancing his decision-making capabilities and enabling him to navigate the complexities of the new financial landscape.

In this future, portfolio managers like Alex embrace the power of generative AI, harnessing its speed, accuracy and analytical capabilities to create value for their clients. Through the partnership between human expertise and AI co-pilots, they can unlock new opportunities, drive superior performance and shape a prosperous financial future.

[written by our FILxGPT platform]

The big picture

AI is already influencing our current work environment, and we can expect it to be integrated into all aspects of work in the future. We've noticed several significant trends beginning to emerge.

Significant productivity gains

The future of work is evolving rapidly with the introduction of AI-powered tools that can address common challenges and offer significant productivity gains..

Add trillions to the global economy economy

AI has the potential to add trillions to the global economy.

Transform the work of employees in financial services

AI tools could transform the work of employees in financial services, enhancing their decision-making capabilities and helping them navigate the financial landscape.

AI will have a substantial impact

on portfolio construction, client interaction, fraud detection, risk management, market analysis, forecasting and product development. It will also improve operational efficiency, and enable sustainable and ethical investing.

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The big picture (con't)

The advent of generative AI marks a new era of technological innovation, presenting opportunities to reshape the economy and revolutionise the way we work.

But the expansion of AI brings concerns as well as opportunities. While it may allow us to enhance our abilities, create new forms of interaction and even extend human life, we must consider a range of psychological, philosophical, ethical and legal questions that arise from its integration into society. We should take care to fully address these before it's too late.

"At Fidelity, we're not only exploring the capabilities, risks and opportunities associated with existing AI tools; we're also investing in developing generative AI capabilities ourselves. Our organisation is committed to staying at the forefront of technological advancement and understanding its impacts on our clients. As well as our development efforts, we're running experiments and research projects around generative AI to better understand the benefits and threats it could pose to staff and clients."

Our deep dive

AI assistants

AI-powered assistants are boosting employee productivity and performance, revolutionising how we engage with clients. Sometimes called co-pilots, their capabilities include meeting transcription, personalised presentations, intelligent searching, summarising complex information, analysing heavy data and more.

> **Through experimentation, Fidelity is looking to understand whether incorporating intelligent assistants into employees' workflows can help alleviate pain points such as collating scattered data, lack of focus time, meeting overload and creative blocks. We are keen to understand how these tools can impact well-being, critical thinking and attention to detail.**
>
> **The AI tools we've developed are being piloted across a range of roles. Ourpilot programmes aim to explore the benefits and limitations of different assistants and determine how they can improve productivity, accuracy, collaboration and overall performance. There have been many early signs of success, highlighting the potential AI could eventually have to empower employees.**

Our deep dive

Generative AI and financial services

In today's rapidly evolving business landscape, financial services companies need to stay ahead. Generative AI enables the automation of routine tasks and non-routine analysis, boosting productivity and paving the way for new revenue streams. By automating repetitive tasks, AI also helps reduce human error.

In investment decision-making, AI's ability to analyse trends and economic indicators can provide a competitive edge. Advanced algorithms can process vast amounts of data to identify patterns that may not be noticeable to human analysts, leading to more accurate predictions and more strategic investment planning.

Asset management can benefit hugely from AI's capabilities – particularly portfolio construction. Machine-learning algorithms analyse market trends and suggest optimal investment strategies, providing real-time, data-driven insights to help portfolio managers make informed decisions.

AI's value extends to client relationships. Using client data, AI can help personalise interactions, offering tailored advice and investment options.

It can assist in product development and market reach by analysing customer behaviour and global trends, identifying gaps in portfolios and suggesting new financial products. And it can contribute to operational efficiency by streamlining tasks such as compliance checks and transaction processing. By quickly identifying anomalies in transaction patterns, it can aid in fraud detection and risk management.

Additionally, AI supports sustainable and ethical investing by evaluating companies based on environmental, social and governance (ESG) factors. This accelerates the shift to a low-carbon economy and boosts the incorporation of ESG parameters into current products such as equity mutual fund schemes.

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Our deep dive

Challenges of AI integration

To help overcome challenges associated with integrating AI into workflows, companies should develop advanced prompting techniques and robust governance frameworks.

Emerging technologies such as "liquid" neural networks – flexible algorithms that continuously adapt to new inputs – may complement the powers of large language models (LLMs).

As companies continue to take advantage of existing LLMs, it is important for them to consider what could be achieved by using multiple, separate, task-specific AI agents to work toward single goals. These could be higher revenue, operating margins, customer satisfaction scores or employee retention. Autonomous LLM-based agents can help employees bridge their skill gaps and use resources outside their areas of expertise.

The future of generative AI lies in its continued advancement and integration into industry. Ultimately it can transform the way businesses operate and achieve their goals. However, the use of autonomous AI agents to help them comes with its own risks.

Our deep dive

Risks and regulations

The rapid evolution of AI has led to the emergence of multiple dangers, which have in turn prompted regulations and legal considerations. Companies using generative AI must address the risks associated with model features, training approaches and retraining activities.

By navigating these challenges, companies can harness the full potential of AI while ensuring compliance and protecting their reputation.

- Regulation: AI regulations are coming down the pipeline. In the EU, a three-tiered approach to overseeing generative AI systems is being evaluated. These tiers would encompass the foundational models or engines that power generative AI; the systems used in model training, categorised by computational power; and AI models determined by the user base.

- Legal considerations: The current approach to training LLMs, which uses publicly available data, is being challenged in court. Even with the possibility of indemnity for generative AI service providers, AI organisations and their customers may be at risk of litigation and brand damage.

- ESG commitments: The creation and deployment of LLMs incur a huge carbon footprint, which could detract from the goals of ESG initiatives. The overall environmental impact of these models can be much larger than the already huge amount of energy required to create them. GPT-4 requires petabytes of data. Thus, when dealing with large models, companies should weigh the environmental cost of retraining or fine-tuning against any potential benefits.

- Ethical considerations: Deployment of AI across use cases will need careful consideration of its ethical implications and as such enterprises will need to have a strong house view to support their journey into the world of AI.

- Other risks: Inherent features of generative AI such as so-called hallucination, model inexplicability and large model size need to be considered carefully before AI is incorporated into operations and trained in specific functions. As well as any environmental damage, ceding control to AI agents runs the risk of causing unpredictable, deceptive or otherwise unwanted behaviour. Precautions should be taken to prevent these harms and humans should remain in the loop at all times.

Our deep dive

Evolution of generative AI

LLMs are very large, deep-learning neural networks guided by billions of parameters (or variables). Parameter-based training allows them to perform tasks they haven't specifically been trained in.

This ability to generalise can be considered a step towards artificial general intelligence (AGI) – although the definition of AGI is debatable, as is its timeline. Despite this, some AI companies have made it their core priority.

Approaches to AGI are often categorised into two broad schools: deep learning and cognitive architecture. Deep learning methods focus on data-driven techniques to train AI models. On the other hand, cognitive architecture is all about understanding the fundamental principles of intelligence and replicating them in AI systems.

Establishing an effective cognitive architecture is crucial, as it will lay the foundation for integrating algorithms and achieving intelligent behaviour. Additionally, reinforcement learning from human feedback (RLHF) and its potential future iterations will boost the potential of LLMs and other AI systems.

Our deep dive

Mechanised humans

The human desire to find the secret to eternal life has been a driving force behind the exploration of transhumanism and other futuristic concepts. Advances in AI have brought us closer to achieving "immortality" by encapsulating our personalities, thoughts and knowledge in digital form. This will allow future generations to interact with and learn from our digital legacy.

The fundamentals of digital immortality are based on what we've left in the digital world: our social media posts, photos, videos, voice recordings, Google searches, etc. The life-long trail of digital footprints may all one day be collated to form a digital apparition of ourselves, emulating our personality quirks, facial expressions, turns of phrase and, possibly, even our thoughts.

Recent advances in AI have made this once-futuristic idea attainable, leading some futurists to predict that humans will achieve immortality by 2030. Already, state-of-the-art LLMs allow the development of highly realistic virtual personas that can interact with humans in a natural and lifelike manner. Voice cloning models can replicate an individual voice within just a few seconds of recording. Other deepfake technologies can produce accurate visual representations of existing people.

AI digital replicas might come in handy even when we're still around. As the technology behind digital replicas expands and becomes more accessible, people may find new ways to integrate their AI personas into their daily lives. Indeed, we may one day work alongside our AI clones, combining our knowledge to significantly boost productivity.

Knowledge workers may be able to upload their professional expertise into a digital representation that people can interact with. Thus, clients may consult a lawyer, doctor or financial adviser's digital avatar at any time – for a much lower price than meeting in person – or talk to experts or celebrities they'd never be able to meet in real life.

Beyond the individual level, AI has the potential to create an ever-growing repository of collective human knowledge that can be passed down to future generations by processing vast amounts of data. But these incredible capabilities raise myriad questions, including:

- What does it mean to be human in a digital world?

- How will we know whether we are still in control?

- What's to stop others from manipulating or altering our digital selves once we're gone?

- Will digital immortality be available to everyone – or reserved for a privileged few?

It's crucial that we approach these potential realities with caution and carefully consider their societal implications.

Our deep dive

Technological convergence

AI is both the result of technological convergence and the driving force behind its acceleration. Companies that remain active in research, experimentation and technology adoption can establish a robust and agile operational model that will withstand continued technological disruption.

By carefully integrating AI, companies can boost their core competencies and streamline auxiliary functions, enabling them to deliver better value to customers.

03.

CLIENTS EVOLVED

Step into the future

On a sunny afternoon, Olivia prepares for a client meeting in her virtual office situated within the metaverse. As her client, Sarah, joins the meeting using her personalised digital avatar, they exchange greetings and begin discussing Sarah's financial goals and aspirations.

Olivia, equipped with Aurum's insights and the power of tokenisation, introduces Sarah to the concept of brand loyalty through NFTs. She explains how Sarah can invest in digital collectables associated with her favourite brands, allowing her to participate in their success and gain exclusive benefits. Sarah's eyes light up with excitement as she imagines owning limited-edition NFTs that grant her access to VIP events, discounts and unique experiences.

To further personalise Sarah's investment strategy, Olivia suggests exploring the emerging field of identity investing. She introduces Sarah to AI optimisers, powerful tools that analyse vast amounts of data to tailor investment portfolios based on individual values and preferences. By using AI optimisers, Sarah can align her investments with causes and companies that resonate with her identity and values, creating a truly customised portfolio.

As Sarah contemplates her investment options, Olivia guides her through a virtual showroom filled with digital representations of various investment assets, from tokenised securities to digital art. They explore the possibilities of diversifying Sarah's portfolio with these unique and innovative assets, discussing potential risks and rewards.

In this metaverse-driven client engagement, Olivia and Sarah navigate a virtual world that blurs the lines between reality and digital experiences. They leverage the power of AI optimisers to identify investment opportunities that align with Sarah's identity and values. Through tokenisation, Sarah can invest securely in NFTs and other digital assets, enjoying the benefits of brand loyalty and potential financial growth.

As the meeting concludes, Sarah feels excited about her financial journey. She appreciates Olivia's guidance in this rapidly evolving landscape, embracing the opportunities offered by the metaverse, NFTs and AI-driven investment strategies.

Olivia, too, reflects on the transformative power of these new forms of client engagement. The metaverse has become a dynamic space where financial advisers and clients can connect, collaborate and explore innovative investment opportunities. The integration of NFTs and AI optimisers has revolutionised the concept of brand loyalty and identity investing, allowing individuals to shape their portfolios according to their values, passions and aspirations.

In this future, client engagement goes beyond traditional meetings and discussions. It transcends physical boundaries, enabling financial advisers like Olivia to guide clients through immersive virtual experiences, leveraging cutting-edge technologies to create personalised and impactful investment strategies.

[written by our FILxGPT platform]

The big picture

AI is already influencing our current work environment, and we can expect it to be integrated into all aspects of work in the future. We've noticed several significant trends beginning to emerge.

Identity investing

AI optimisers can provide customers with tailored investment portfolios based on individual values and preferences. This personalised approach, called identity investing, can attract and retain clients who are looking to align their investments with their personal identity, leading to increased customer satisfaction and loyalty.

Integration of the metaverse, NFTs and AI-driven approaches

The integration of the metaverse, NFTs and AI-driven approaches has the potential to give customers immersive virtual experiences and personalised investment strategies. This can enhance client engagement and satisfaction.

Brand loyalty

NFTs offer asset managers the chance to cultivate brand loyalty by granting investors access to exclusive benefits and involvement in the success of their preferred brands. Such initiatives can elevate customer engagement and commitment, potentially leading to increased investment and fostering financial growth.

Investing is undergoing a profound transformation, driven by the rapid adoption of digital technologies, the emergence of new asset classes, and the changing preferences and expectations of investors.

Gen Z and young Millennials do not view money as their predecessors did. They see a different financial landscape – one fraught with uncertainty and characterised by the failure of traditional systems to

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The big picture (con't)

serve them. As a result, they are saving and investing more aggressively than their older counterparts. They are also placing a higher value on attributes besides profits and are signalling these values and interests to their peers.

As clients increasingly prioritise the causes they care about, they will look for investment communities that share similar interests. In the metaverse, these future clients can share attributes of their digital identity: values and alignments, investments, educational interests, activities, accomplishments and more. This could be done via NFT or other digital markers that will convert identity into communication, networking and community.

Future clients will be more diverse, empowered and expressive, facing new, higher expectations from brands. Because of this, the transactional and incentive-driven loyalty model of the past will be

ineffective at earning their loyalty. Companies should therefore tailor their loyalty programmes to this new breed of consumer by incorporating attributes such as personalised rewards, accessible and enjoyable digital experiences and non-financial benefits that reflect evolving expectations.

With three-quarters of Millennials and Gen Z expressing a preference for digital rewards, NFTs are likely to resonate with the most substantial consumer segment of the future.

In a globalised and on-de mand world, people are seeking new avenues to express their unique needs and values. Companies catering to clients with the options and flexibility they're looking for stand to seize a significant opportunity amid commodified brands and services.

> " Recognising the shifting expectations of new generations of consumers, Fidelity is exploring innovative technologies to cater to these preferences. We are experimenting with portfolio optimisation, AI-based fractionalisation and direct indexing tools to anticipate and support a desire for personalised investment strategies. We are also running several in-house experiments that explore the possibilities of NFTs for expression and communication.
>
> By harnessing these advanced technologies, Fidelity aims to empower investors to align their portfolios with their identities and values. This proactive approach demonstrates Fidelity's commitment to staying at the forefront of the industry and providing tailored solutions that meet clients' unique needs. "

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Our deep dive

Identity investing

For today's consumers, identity is of the utmost importance. For example, people are increasingly seeking sustainable and ethical fashion brands that align with their values. By supporting these brands, individuals can use their purchasing power to contribute to causes they care about. They can also challenge the prevailing norms of their chosen industries and force them to change. Thus, identity investing can give investors a sense of control over their financial assets.
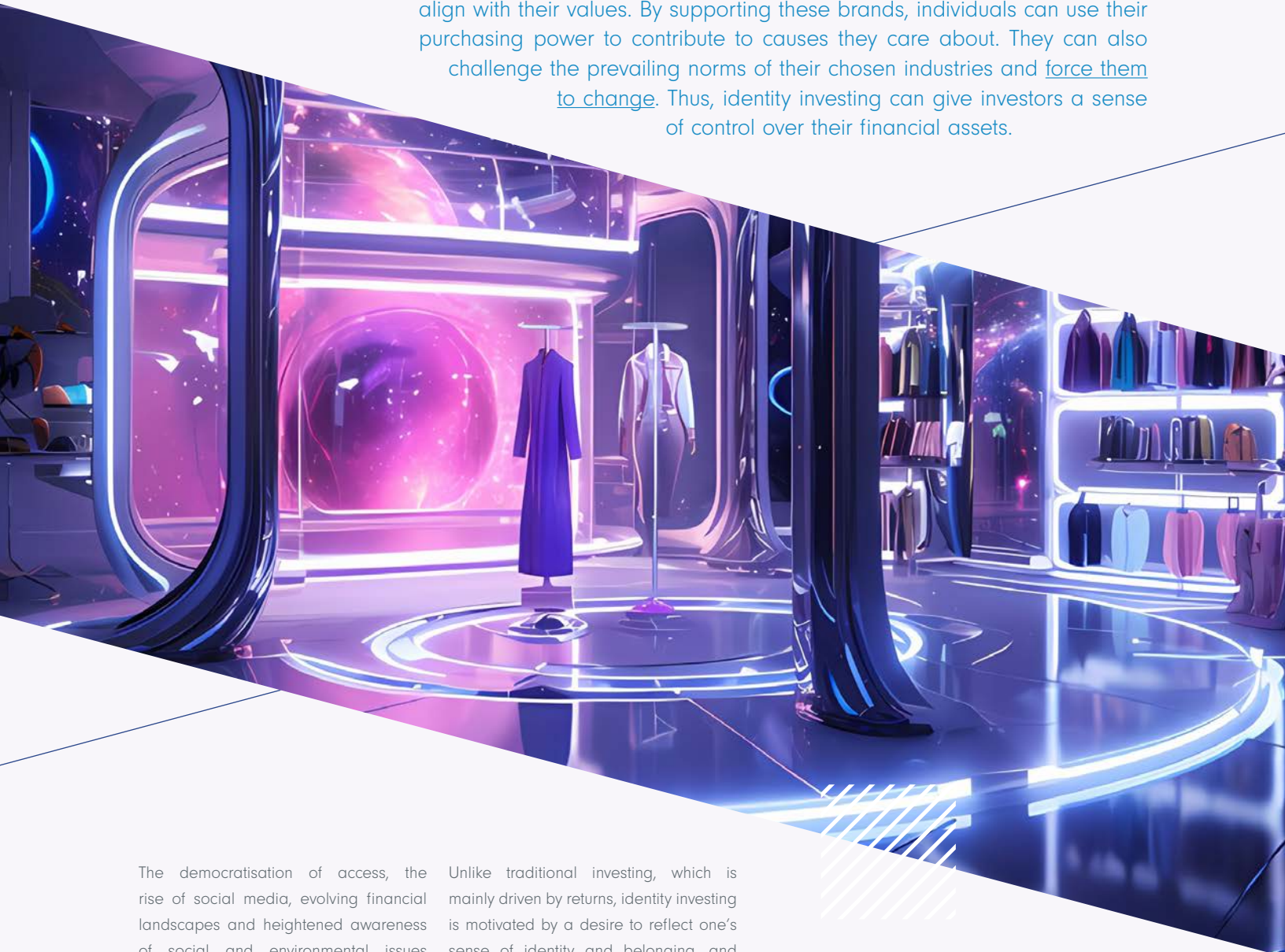
The democratisation of access, the rise of social media, evolving financial landscapes and heightened awareness of social and environmental issues all play a role in shifting consumers' expectations toward financial products. Investors are using their financial choices and behaviours to express their personality, values and interests and to influence others.

Unlike traditional investing, which is mainly driven by returns, identity investing is motivated by a desire to reflect one's sense of identity and belonging, and to signal taste and status. This change represents a larger cultural shift in attitudes and expectations, and indicates the need for personalisation that goes beyond incorporating ESG factors.

Two types of identity investors

Self-categorised identity investors invest in assets tied to their culture, hobbies or social causes.

- In China, for example, nationalistic Gen Z consumers are investing in NFTs of historical artefacts, traditional paintings and Chinese celebrities. This is part of a trend known as Guochao or "national wave".

- Meanwhile, the "hype" economy has elevated sneakers from a practical accessory to an asset class and an ultimate signal of identity. Brand cultivation, engagement and social media trends have driven this phenomenon.

Externally categorised identity investors invest in assets based on external factors such as familial arrangements, life stage and social context.

- For example, the "Bank of Mom and Dad" refers to parents providing financial support to adult children who struggle with living costs, inflation and unemployment.

- Household structures are becoming increasingly diverse. "Single income no kids" (SINK), "dual income no kids" (DINK) and "double income no kids with a dog" (DINKWAD) households have different spending motivations, consumption patterns and financial risks compared with traditional nuclear families

Signalling and personalisation

Identity-signalling behaviour is defined as actions chosen to convey particular information about the individual to themselves or to others. This is one of the reasons consumers engage in online social interactions, alongside information sharing, finding belonging in social groups, influencing other people and managing their own identity.

Identity signalling through digital possessions and online engagement with brands and other investors is becoming more and more prevalent. Asset managers must recognise identity expression tools such as sharing photos of consumption, liking brand pages, creating posts and joining identity-relevant communities.

> " **Research suggests that 56% of consumers will become repeat buyers after a personalised experience. Asset managers can capitalise on this by offering investors hyper-personalised experiences using data-driven AI algorithms.** "

Our deep dive

Metaverse

Over time, client engagement has evolved from face-to-face meetings and branch office visits to emails, websites and mobile apps. Now, as digital-native generations weave together their digital and physical worlds, we're seeing the next evolution in client engagement towards more immersive digital experiences.

The metaverse is an extension of the real world where physical experiences are amplified by and combined with the digital world to create a space for people to socialise, work, learn and entertain as they choose.

Although the metaverse has recently been a topic of much hype and speculation, successful prototypes have existed for decades. These have already attracted millions of users and generated billions of dollars in revenue. For instance, the decentralised Web3 metaverse – an immersive world powered by virtual reality, augmented reality and blockchain – has recently gained traction. Its goal is to provide users with a flexible and customisable experience.

While the hype around the metaverse is dying down, the underlying technology and its capability to deliver immersive experiences continue to develop and improve. We expect to see valuable use cases emerge and more meaningful brand-customer engagement developed in the metaverse.

Identity signalling through digital possessions and online engagement with brands and other investors is becoming more and more prevalent. Asset managers must recognise identity expression tools such as sharing photos of consumption, liking brand pages, creating posts and joining identity-relevant communities.

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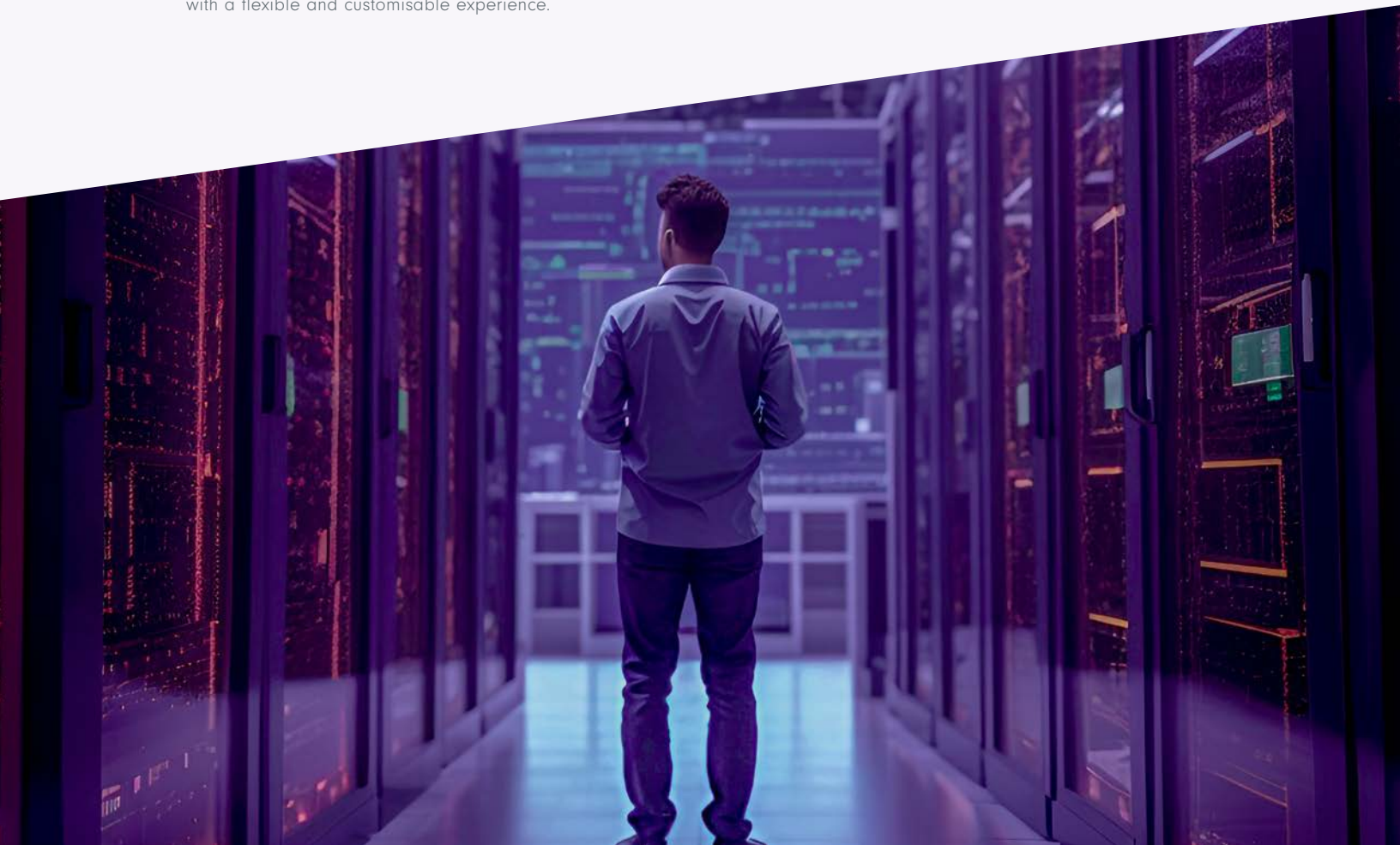
At Fidelity, we believe that financial institutions should explore the potential of various engagement media to create immersive, personalised and interactive experiences for their clients. So what are we doing?

Decentraland is Fidelity's chosen metaverse platform. In Decentraland, customers can play games, test their financial knowledge and collect limited-edition NFTs and wearables. Dencentraland represents an important first step in modelling new client-engagement media.

In this proof-of-concept experiment, we learned how to communicate our brand to customers and what new roles might be needed to assist our clients. We came to understand how a personalised experience in a virtual world could be created in partnership with our future clients, catering to their unique interests and needs. This was an important first step towards understanding the possibilities for our business and clients.

We continue to learn about our customers and the need for more personalisation, engagement and immersion in the customer experience. We have experimented with NFTs, the metaverse and hyper-personalised portfolios.

The Fidelity International Campus

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Our deep dive

NFT loyalty

Many existing loyalty programmes face challenges such as:

- Many existing loyalty programmes face challenges such as:

- Low redemption rates and inactivity

- Lack of differentiation

- Data privacy concerns

- Ineffective incentives

- Limited success in gaining and maintaining a customer base

However, by incorporating technologies such as NFTs, brands can revitalise their loyalty programmes. These technologies allow for greater credibility and ownership, demonstrable diversity and highly visible identity representation – all of which can contribute to increased customer satisfaction, loyalty and advocacy.

Tokenised digital assets such as NFTs offer a distinct avenue for individuals to express their identity and for brands to engage with them, as they are not only digital assets, but also digital experiences. Brands can now imbue digital assets with a narrative that speaks to their history, creating a deeper connection between owner and asset. The owner can then share this story with others, thus enabling new forms of social interaction and participation.

These assets can be displayed, traded or used across various platforms and communities. Moreover, their limited supply can create a sense of exclusivity and scarcity that may appeal to collectors, enthusiasts, influencers and innovators.

Established brands have already begun experimenting with NFT-based loyalty programmes. For example, a top retail coffee brand extended its existing rewards programme with a digital loyalty scheme that rewards customers with digital collectables and "journey stamps" in the form of NFTs. By "gamifying" the loyalty experience, the brand incentivises customer interactions and purchases. Since these rewards also represent proof of ownership, the company can host virtual events, workshops and coffee tastings exclusively for NFT holders, fostering a sense of belonging and strengthening the community.

Meanwhile, a market-leading sports and footwear brand that has generated over $1 million in sales. This complements its existing (and extremely popular) loyalty and engagement Web2 mobile apps, cementing its lead in the sector.

Asset managers should acknowledge and accommodate the diverse identities of their clients by offering more customised and tailored solutions that reflect their personalities, values and interests. By rethinking loyalty programmes and incorporating gamified incentives to encourage desired behaviours, brands can increase participation and reinforce positive financial habits in their clients, helping them meet their financial goals.

66 **Aside from the conventional boundaries of regulated financial institutions, there is a large but largely unexplored opportunity to use digital wallet technologies to enrich customer and employee engagement, retention and acquisition. In line with this, we're seeing new startups move into this space. Players such as DFNS and Venly, whose wallet-as-a-service platform allows organisations to streamline and implement digital wallets and Web3 solutions at scale, are quickly scaling in this space.** 99

- Jingwei Li, Investor at Fidelity International Strategic Ventures

❝ **In this report, we have explored three key trends that are shaping the future of asset management: clients evolved, the AI future of work, and a market transformed. We have shown how these trends present both challenges and opportunities for Fidelity as well as our clients. At Fidelity, we are committed to innovation and experimentation, leveraging our data, technology and human capital. We believe that by embracing these trends, we can help our clients achieve their financial goals and build long-term loyalty and trust.** ❞

■ Acknowledgements

Our work would not be possible without the contributions of our team. We are a diverse group, spread mostly across the APAC region. Our diversity of culture, age, and experience help us to identify the trends that are most disruptive and deserving of our attention.

YANNICK BOWE
HEAD OF INNOVATION
INTELLIGENCE

PRASAD CHANDRASHEKER
GLOBAL HEAD OF EMERGING
TECHNOLOGY STRATEGY

JOHN GIST
GLOBAL HEAD OF FIDELITY LABS

MATT TWIGG
FIDELITY LABS SENIOR MANAGER
Matt.twigg@fil.com

MIYA HUANG
INNOVATION INTELLIGENCE LEAD

MUKUL KUMAR SAINI
EMERGING TECHNOLOGY
ANALYST

CINDY SUN
INTELLIGENCE ANALYST

ROXANE OSUNA LOPEZ
SENIOR INNOVATION ANALYST

SAM COCKBAIN
EMERGING TECHNOLOGY
ANALYST

BEN BROPHY
HEAD OF BLOCKCHAIN CENTER OF
EXCELLENCE

RAHUL JAIN
HEAD OF AI CENTER OF
EXCELLENCE

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FUTURE FORECAST REPORT

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Fidelity Labs is a future looking emerging trends research team and a technology team, which utilises specialists from across Fidelity International to develop a 'house view' of the key trends we believe provide the greatest opportunities for Fidelity, its customers and the broader industry.

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