Institutional DeFi: Navigating the Landscape

European Edition, June 2024

By Stefan Grasmann (Zühlke),
Christoph Hock (Union Investment),
Hagen Weiss (Dentons)

zühlke
empowering ideas

Union Investment

DENTONS

Executive summary

How to think about the imminent DeFi wave: an inside perspective, an industry survey, and a look ahead
This study examines the influence of blockchain technology on financial services. For now, it remains largely confined to crypto assets like Bitcoin and Ethereum and services aimed at early adopters in the retail space. But hints of a broader change are everywhere, for example in the recent approval of Bitcoin ETFs or BlackRock's tokenised BUIDL Fund in the US. It will also affect traditional assets like bonds, stocks and fund shares. When taking a visionary look into the future of token economy, the investible universe for retail investors will widen significantly to products in the space of alternative investments, ESG-related themes and real estate.

Tech and customer needs come together
This suggests that we are in the calm before the storm that may end up shaking the foundations of traditional finance. We have seen it before with other technologies. Limited early adoption and widespread scepticism gives way, seemingly overnight, to a new financial landscape, leaving the unprepared in the lurch. Technologically, this incipient revolution relies on the simple fact that tokens can be used to express any financial asset. But like all economic upheavals, it will ultimately be demand driven. Customers will, as they always have, seek out the best solutions on offer, looking for speed, reliability, convenience and efficiency. Tokenisation can provide all of this. It is therefore expected that financial services will be reinvented on top of this new technological foundation. From this point of view, DeFi services will cease to be a niche phenomenon, instead becoming the first wave of a new financial order.

This being said, financial institutions live in the real world. They must work in tune with established technological realities and regulatory frameworks – not to mention client needs – here and now. This presents a challenge for players caught between a fast-moving present and a potentially revolutionary future. This makes it essential for financial service providers to develop a deep understanding of the fundamental mechanisms, benefits, and limitations of token-based systems as well as the DeFi service layer above. This is revealed in the study, which also yields some concrete approaches:

- **Take a strictly client-centric view and aim to provide greater value**
- **Approach the issues top-down and rethink existing processes especially established manual steps that might become redundant**
- **Think about which position in the ecosystem to strive for and build the technological and organisational foundation accordingly**

Changes are coming. These changes might not sweep away entire financial industries – financial risk, liquidity, and the basic logic of financial market forces will persist, after all. But the bigger risk by far lies in underestimating the approaching storm. By their nature, many bankers tend to look away from an uncertain, largely unregulated, and highly disruptive new world. This might prove to be very dangerous.

In this study, we establish some of the guideposts that can help financial institutions survive and thrive over the coming years – keeping a strong focus on customer needs, achieving clarity on the advantages of the relevant technologies, and preparing accordingly.

Content

On the Digital Assets team of ABN AMRO, we continue to build new capabilities to serve and support our clients in the transition to fully leveraging the rising interest in native digital assets in a decentralised economy as highlighted in this paper.

Martijn Siebrand, Digital Assets, ABN AMRO Bank N.V

Introduction

The introduction of Bitcoin ETFs in January 2024 is symptomatic of the acceleration in the underlying technologies and of their increasing reach into and adoption by traditional finance (TradFi).

While the technological possibilities are becoming more multifaceted, real-world adoption is still lagging. We believe this is fundamentally due to regulatory mismatch and an uneven market structure – geographically and by segments.

The goal of this study is to explore these issues, including information asymmetries and varying incentives, and to show possible ways forward.

Given the lack of reliable data and the complexity of the field, we decided to take a qualitative approach. We conducted interviews with numerous individuals playing various key roles in and around the industry.

While the results confirmed some of these initial propositions, they also showed deeper divisions within established financial institutions – e.g. an asset management vs. finance split – as well as a need for education and knowhow.

Institutional DeFi is at a crossroads. The coming months or years will be decisive in steering large parts of national and international financial systems towards a new mode of exchange – and new ways of answering age-old questions: How do I know what something is worth? How do I know whether to trust my counterparty? And who can settle disputes?

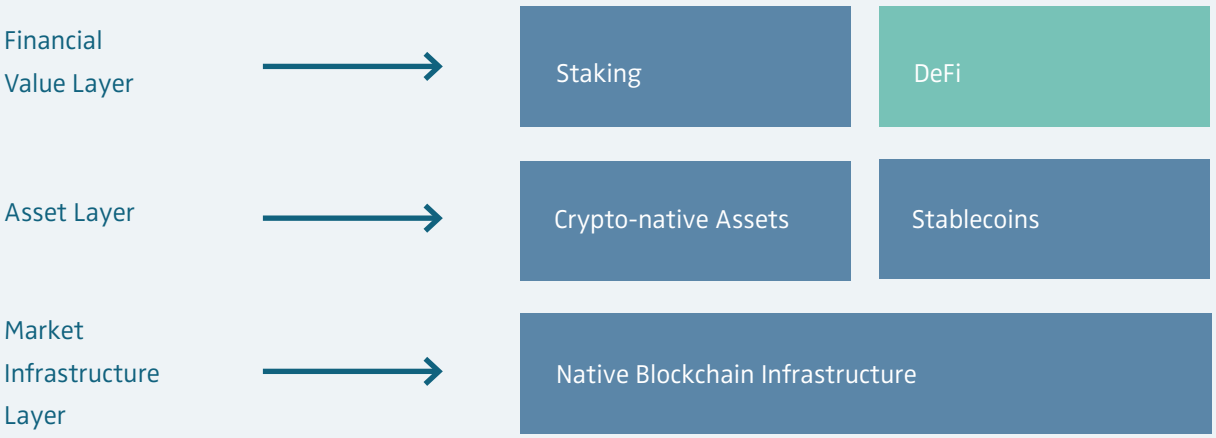
We believe current institutions must prepare now for what is coming or face disruption and eventual obsolescence. We are at a decisive juncture in the development and adoption of the underlying technology.

Crypto and DeFi – a new disruption

In January 2024, several Bitcoin ETFs were approved in the US, creating an accessible way of investing in this important crypto asset. Institutional investors around the world took notice. Now the clock is ticking for financial institutions to offer more native services to this asset class and other digital assets in token-ised format to unlock additional value.

Most traditional players recognise this. They have been seeking regulatory approval for various services – such as acting as registrar, custodian, or trading venue in this space. Also, many banks have built a foundational infrastructure of custodial wallets and offer basic access to mainstream crypto assets and to digital assets. Much of this is driven by demand from retail clients and tech-savvy family offices or mutual funds, while conservative investors such as pension funds remain cautious.

And yet, this only scratches the surface. Blockchains offer native value-added services like mining or staking – both bringing additional yields. Holders of crypto assets are interested in this yield – and expect financial service providers to support them. Third parties offer more advanced financial services like borrowing and lending, decentralised trading, credits and loans against crypto asset collateral, index funds, advanced investment strategies, derivatives or insurance services. These third-party services are usually called decentralised Finance (DeFi). Currently, this is the domain of a new class of startups operating at the boundary of finance and tech.
As shown in the illustration below, DeFi services depend heavily on crypto-native assets and stablecoins to work. Some DeFi services in borrowing and lending even issue and burn stablecoins in their operations. Nevertheless, these assets are not the focus of this study, but rather the financial services they enable through their existence. Similarly, staking is also out of the scope of this report: While an interesting and important topic, this study places its focus on third-party value-added services beyond native staking.



This brings us to the third big player – the regulators. The international financial environment is governed by a dense network of regulations concerned with transparency, risk, ownership, responsibility, enforcement etc. Having remodelled itself to meet the requirements of the digital age and the internet, the typical regulator has nevertheless remained anchored in the traditional world of big institutions and national boundaries. To put it bluntly, when something went wrong, there was a phone number to call. Some regulators are now again finding themselves out of step, and it is not always clear yet how they will approach a new, decentralised paradigm. This being said, European regulators have been at the forefront, creating a fertile environment for innovation.

It is the objective of this paper to offer a glimpse into this three-body-problem of legacy players, DeFi startups, and the regulators overseeing it all.

The situation

DeFi services are fully automated and distributed on smart contracts without human involvement, 24/7. They are permissionless and accessible to everyone. Many of them are open source and standardised, offering plug-and-play features based on commonly accepted token standards like *ERC20*.

For Ethereum, there are currently 970,000 largely unknown actors (see *VALIDATORS*), who align behind its consensus algorithm to append transactions and execute arbitrary financial services. This pseudonymous and decoupled setup is fundamentally different from traditional financial services, usually run by just one well-known centralised entity.

This being said, there are certainly central elements like entities who create these smart contracts, extend them, and profit from their execution. Regulators are trying to catch up with this situation and set additional guard rails to create a perceived level playing field for fin-tech start-ups in DeFi and established institutions. They are trying to create proper and well-intended rules to preclude scams and fraud without stifling the innovation. Nevertheless, as current DLT statutes show, they often favour centralised and already licensed institutions and entities.

A glimpse into DeFi services

DeFi services come in many variants. Most widely known are decentralised crypto exchanges (DEXes) such as Uniswap, Balancer or Curve. These work very differently from centralised exchanges like Coinbase or Binance. Users trade directly from their self-hosted crypto wallet, never losing control over their assets. Assets are exchanged in atomic transactions and instantly settled between wallets. DEXes internalise large parts of market making via smart contracts: automated market makers (AMM) work with predefined bonding curves to dynamically define market prices, bringing basic liquidity even to rarely traded tokens. The permissionless nature of DEXes enables ordinary users to act as liquidity providers and deploy capital into existing trading pairs. Users can even create their own trading pairs. Many DEXes offer additional features, e.g. for yield farming.

But DEXes are just the foundational part of DeFi. Other DeFi services offer borrowing and lending markets. Prominent examples are Aave, MakerDAO or Liquity. One interesting use case is over-collateralised lending: users speculate on long-term price appreciation of their crypto currency like ETH or BTC. They lock their assets in these services as collateral and borrow stablecoins at very low interest rates, sometimes for a one-time fee of 0.5%. These low fees are possible because DeFi loan management is handled fully on-chain by smart contracts, without humans in the loop.

Other DeFi services like Enzyme, Yearn or Index Coop run on higher levels of the stack, e.g. as index funds or vaults with various investment strategies. DEX aggregators like 1inch, Matcha or CoW Swap split trades into several batches to find best-price execution for their users. Marketplaces like Synthetix, GMX or dYdX focus on derivatives and perpetuals. Liquid staking services like Lido, Frax or Rocketpool offer flexible value-added services around staking, Eigenlayer offers additional value layers for stakers to increase their yields via re-staking.

Lastly, DeFi frontends like Summer.fi, Zapper.fi or DeFi Saver offer interfaces that resemble mobile banking apps.

Broader implications for financial markets – and a motivation for this study

The promise of fully digitalised financial processes between parties who technically don't even have to know each other is mind-boggling. Technologically guaranteed "trustless" trust shifts validation and verification steps from third-party institutions into smart contract code, settling critical transactions in seconds instead of days. Furthermore, the technologies and principles that run crypto assets can run any kind of digital asset or financial service.

Given this immense potential for disruption and innovation, it is critical to consider the implications for financial institutions end-to-end:

1. Regulators are examining how these technological innovations will redefine the core infrastructure layer of our financial systems (see *GL1*).
2. Banks and exchanges are exploring new forms of token-based digital cash (CBDCs, stablecoins, deposit tokens) and digital assets (tokenised bonds, stocks, real estate, and other even more advanced projects).
3. DeFi-like services will emerge as financial applications for digital cash and digital assets.

A tectonic shift for financial institutions is imminent. Financial institutions need to explore this new terrain on all levels, beyond blockchains and tokens. In an ever-shifting landscape, this study aims to provide a starting point and potential way forward.

The Study

Studying the landscape of institutional DeFi is as hard as it is important. The landscape is in constant flux and what is true today might not be true tomorrow. There is a mismatch between the enormous potential on one side and the low current volume and participation on the other. Therefore, we decided to go for a largely qualitative study and undergird it with data where we could. The result is a snapshot of a complex and rapidly evolving situation, informed by historical precedent and expert insights.

The scope of the study

The study focuses on the value layer on the very top of the stack and analyses the consequences that DeFi brings to the financial service layer.

- We investigate how DeFi startups extend their reach by fulfilling requirements from institutional investors and regulators.
- We examine the status quo of financial institutions like banks, exchanges and asset managers who are starting to create services around crypto and digital assets for their clients, but who are also adopting decentralised technologies in other, more traditional areas of their businesses.
- We ask: What are the services and applications on top of tokenised assets or tokenised cash? What is the main value proposition for clients and providers? Where and what exactly is the business case?

We are still in the nascent days of institutional adoption of DeFi technologies. That's why we decided to take a qualitative approach and conduct a series of in-depth interviews (each about 1 hour) with experts with very different views on this topic:

- Heads of digital assets at banks, exchanges and asset managers
- Founders and C-level executives of Web3 fin-tech startups and scaleups who want to serve this market with their products
- Compliance officers
- Legal experts
- Former and current regulators and policy makers

We conducted approximately 50 interviews. Most participants have their headquarters in Europe – with the majority in Germany and Switzerland – with some influence from Asia. Many of them operate internationally. Web3 fin-tech players usually have a global approach.

We complemented our interviews with a survey that asked market participants for opportunities, roadblocks, investment expectation and education preferences in that field. We collected survey participants during finance innovation events and through social media campaigns that reached a target audience of about 100,000 people. The very fact that a mere 40 experts took part shows the early stage of adoption. The goal of this survey was not to provide quantitative or representative results. We aimed to validate certain findings from our in-depth interviews. These interviews proved to be more valuable in understanding the current state of the market.

Findings

While our study did corroborate some of the conventional wisdom currently common in the field, it also brought to light several surprises. It allowed us to get a deeper and more detailed view on the roles and categories of players. It showed us some of the commonalities between these categories, but also some of the main differences – not only in actual operations, but in how incentive structures around risk and compliance shape these operations and likely tech adoption trajectories. In summary, we found five central points that will impact the financial landscape.

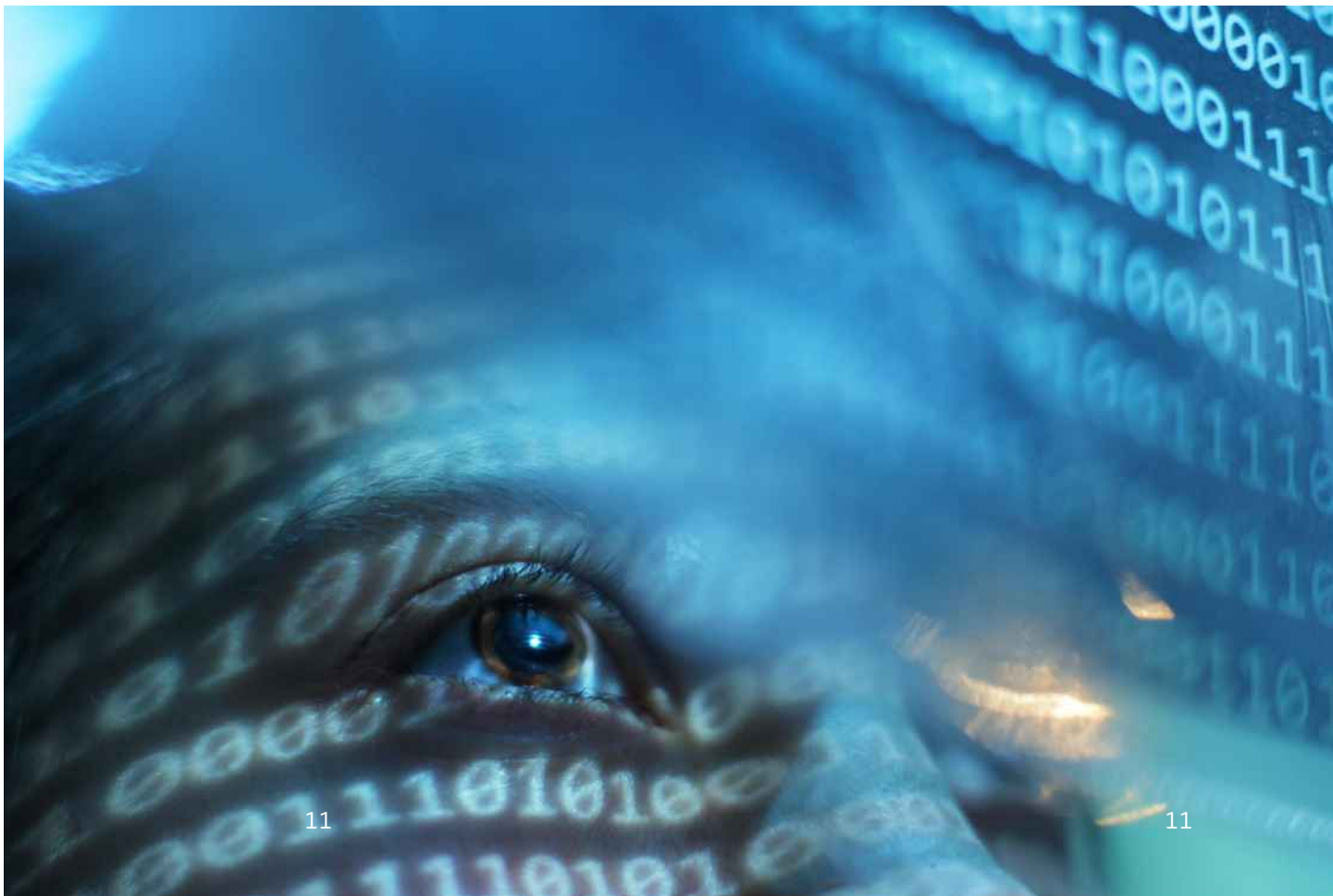
1. The disruption potential could be enormous: financial services will be re-shaped from the ground up in a scenario where institutional players might need DeFi services even more than vice versa.

2. Long term, the market will converge on public block-chains; permissioned and permissionless applications will run side by side.

3. Currently, the lack of confidentiality (too much transparency) in these systems is still a major roadblock.

4. Regulatory frameworks must conceptually incorporate new possibilities of blockchain technology (letting tech take over responsibilities we traditionally delegated to government institutions and intermediaries due to lack of alternatives).

5. As a likely inflection point approaches, legacy players must be prepared, or risk being left behind.



11

A) Categories

Currently, the boundary between legacy players and DeFi startups remains well delineated. However, as more traditional institutions move into the DeFi space and as network effects take hold, the boundary will become blurry. Additionally, within the traditional finance landscape, it depends very much on where you sit.

1: DeFi startups. Often organised as DAOs (Decentralised Autonomous Organisations), they serve crypto-savvy retail users who want to make more from their investments in crypto assets by using DeFi services as a new ecosystem for financial services. The majority of what they do is happening "on-chain" in smart contracts – usually on public blockchains like Ethereum.
These start-ups are currently extending their service offerings towards institutional investors – mainly targeting family offices or mutual funds. Topics like KYC/AML and knowing all counterparties in trades are getting more important in the context of serving the regulatory and compliance needs of these clients.

2: Traditional players. These stalwarts of today's financial ecosystems have launched many trials with block-chains in recent years – most of them on private blockchains. This category contains banks of different kinds, exchanges and asset managers, and they drive innovation on three levels:

a) They see growing demand from their **clients for investing in crypto and digital assets.** Most banks have either partnered with fin-tech companies or applied for their own crypto licenses to serve the new asset class to clients. They have invested in foundational technologies like custody services that can be used on private and public blockchains. Most exchanges have similarly positioned themselves with new or extended infrastructure to embrace the new asset class.
b) They are experimenting with blockchain technology to **tokenise financial instruments like bonds and fund shares as part of the development of digital services and products.** The big motivation is to make transactions faster and more cost-effective for their clients and to enable new product offerings in the future. Going forward, operating costs can be reduced due to much higher levels of efficiency in the value chain, e.g. during issuances of new assets and trading. Big cost drivers like settlement, clearing, and reconciliation are expected to go away to a large degree when the technology is applied to its full extent.
c) They are interested in **different forms of digital money.** Banks will sooner or later be forced to engage with CBDCs, but many of them – similar to some fin-tech companies – have also started to build their own digital money like stablecoins or consider issuing tokenised deposits. Different players see themselves in a different situation depending on their legacy business models: while investment banks' core business is clearly upended by DeFi, some asset managers still believe they can more easily treat it as "a technological opportunity" and ease into it more gradually and with less disruption. This complacency seems unjustified.

3: Finally, some players are actively shaping **regulatory sandboxes** like the EU's DLT Pilot Regime, see *DLTPILOTREGIME,* and the UK's Digital Securities Sandbox. They are working at the intersection of crypto-native DeFi startups and banks. While these sandboxes set critical boundaries that market participants describe as too limiting, they also open new terrain for regulated financial services on public blockchains. It might be the best of both worlds, but only time will tell. Additionally, we include crypto-native banks in this category. They have a similar block-chain-first mindset and are at the forefront of regulatory development, constantly pushing the boundaries.

B) Commonalities

The main factor driving this revolution is technology, therefore it comes as no surprise that market participants across the board would seek to take advantage of its most promising features. This results in a common pursuit of:

- the most promising tech and
- the strongest network effects.

At the same time, these market participants are also uniformly plagued by:

- a lack of true end-user convenience that hampers broad adoption and
- a drive towards the speed and efficiency that would be provided by atomic swaps.

1 Technology

Most interview partners are heavily focused on running their financial services on top of core blockchain systems that are compatible with the Ethereum Virtual Machine (EVM) or, in some cases, blockchains like Solana. This is true for applications on both public and private chains. Being compatible with common public blockchains on a smart contract level is a big design driver. Everybody wants to stay flexible for the future. For the moment, Ethereum seems to be the platform of choice for most activities.

2 Network effects

All players hope for network effects. Several trials with private networks from the past have shown that it is not wise from a business perspective to create closed, isolated systems. Everyone is looking for environments that leverage synergies – even with competitors. Regulatory aspects are the only limiting factor – more on that later.

3 Mass adoption needs convenience

Most agree that DeFi services as they are constructed today are too complex for mass adoption. Typical clients expect much more convenience – on several dimensions like initial on-boarding, general user experience, but also on the product side. By the same token, some interview partners are addressing exactly that issue by successfully harnessing complex technology to facilitate mass adoption for the DeFi sector. Users need to be able to understand both conventional financial products and DeFi before they invest.

4 Atomic swaps

Trading assets is a central use case in DeFi, e.g. crypto assets against stablecoins. This will hold true when additional assets from traditional finance are expressed in token format. All players prefer to deploy digital assets technologically close to digital cash since atomic swaps and instantaneous settlement are a big driver for efficiency in trading. They have enormous potential to reimagine financial transactions from the ground up. For many participants, improving today's existing Delivery-versus-Payment (DvP) settlement mechanism is a central design driver. Market participants expect huge gains when both asset and cash are ideally managed on the same blockchain infrastructure – being programmable from the same smart contract. Atomic swaps bring various advantages:

- **Speed:** Transactions are usually settled in seconds to minutes – which is a huge gain compared to traditional systems that take several days – depending on who trades which asset with whom. It is especially beneficial when we think of trades across national boundaries and international settlements.
- **Operational efficiency:** Settling trades in a synchronous manner over a very short period means less dependency on third parties for managing risk, cash reserves or default of counterparties. For banks, this will have enormous consequences in several departments. There is, for example, no longer a need for reconciliation.
- **Composability / plug & play:** DeFi has shown that atomic swaps of assets enable composite use. Trading aggregators use this concept to split orders between several Decentralised Exchanges to find the best route. They use searchers to find the best price, trade, and in the end recombine the order. All of this happens in one complex transaction. This composition enables other use cases like arbitrage via uncollateralised flash loans (see *HAMACHER*): bots lend digital money, e.g. stablecoins, use this money in several arbitrage actions, and pay the loan back – all in the same transaction. This is only possible when everything happens synchronously in the same technical environment.
- **Avoid technological risk:** If delivery and payment run on the same systems, participants avoid bridging technologies to work across system boundaries. While these bridging technologies continuously evolve, we saw many DeFi-related hacks in this area. Bridges increase complexity and introduce new risk vectors.

Despite these commonalities, the concrete implementation of on-chain cash and on-chain assets might take very different forms in the different market sectors such as wholesale CDBC on a private chain (see *SDX*), permissionless stablecoins on public blockchains in the case of DeFi, or fully compliant e-money tokens in DLT Pilot Regime scenarios (see *MICAR* and *DLTPILOTREGIME*).

Decentralised Finance stands for the removal of central authorities in financial processes. At 21X we enable peer-to-peer trading and settlement of financial securities through smart contracts without the need for a central counterparty.

Severin Kranz, Head of Business Development, 21X

C) Differences

Despite these commonalities, we noticed a big gap between DeFi startups and traditional players who are about to enter that market. A deep integration between both seems years away. The basic reason lies in the nature of the differing institutional setups and respective market incentives. This becomes visible in a number of context:

- Regulatory uncertainties are viewed differently by startups, who are willing to risk entering an uncertain market and walk away or adapt if the wind changes. Traditional players are more cautious as they have more to lose.
- Risk appetite breaks along a similar fault line as above, with established players more reluctant to put a foot wrong for cultural and institutional reasons, while fin-techs are all in, almost by definition.
- Integration into legacy systems is a burden for established players, and less so or not at all for fin-techs, for obvious reasons. This also dovetails with the aforementioned differences.
- Attitudes towards access – i.e. whether to build on public or private systems and how to handle permissions – also emanate from these basic differences in culture and incentives, as well as the regulatory environment.

1 Regulatory aspects

Regulatory clarity is still missing for use cases in DeFi. This starts with uncertainty about cash-like assets that are not yet qualified as legal tender, which makes them a no-go for most B2B use cases. Similarly, the legal status of many crypto and digital assets is still evolving and seen very differently across jurisdictions, especially the US. New financial services for crypto assets like native staking or DeFi services such as liquidity and re-staking come on top and haven't seen regulatory clarity. It's a catch-up game between technical innovation and regulatory clarity.

Startups have learned to manage this uncertainty and are forced to quickly adapt to new regulation like MiCAR. As they now try to open their services for institutional investors, they need to adhere to their new clients' requirements. This means they will have to slow down, place even more focus on security, and improve reporting services and risk management procedures.

Traditional players have generally a more cautious view as financial stability, a highly reliable regulatory governance and trust of investors are key elements to consider. They can't afford any negative impact on their core business. In some cases, they are not even allowed to enter a certain market and usually have to wait for regulatory clarity. Acquiring the necessary licenses usually takes time. Additionally, offering financial services like staking for crypto assets is still a complex endeavour in many jurisdictions. The market pressure to offer at least basic staking services is certainly there, but regulatory clarity is missing. More advanced DeFi services like liquid staking, re-staking or cross-chain DEXes are not expected to be simpler in that regard.

On the positive side, traditional institutional players are used to handling regulatory and compliance requirements in a professional manner. They know the regulators, have a trusted relationship, and have a clear advantage over fintechs in that respect.

Crypto banks operate in the middle ground and are more open to trying out DeFi-inspired use cases.

Exposure to crypto assets and risk regulation

One critical aspect in the regulatory landscape is the treatment of banks' exposures to crypto assets in general and the related cost of balance sheet. The Basel Committee on Banking Supervision has defined strict rules around the prudential treatment of various types of crypto assets and also tokenised traditional assets and stablecoins, thus limiting the credit institutions' regulatory perimeter and prudential financial leeway by categorising them into different groups. The standard is outlined in a new chapter of the consolidated Basel Framework called "SCO60: Crypto asset exposures", see *BIS1* and *BIS2*. The committee has agreed to implement this framework by 1 January 2026. Many of our interview partners see these rules, which differentiate between permissioned and permissionless blockchains, critically since they create a disadvantage for banks in this market and discourage compliant behaviour and investment, compared to less regulated entities. Some base their planning on these rules, others expect them to be changed in favour of a more innovation-friendly approach.

2 Risk appetite

DeFi start-ups are born with an appetite for risk and are accustomed to challenging the status quo. They are deeply into the new technology and have a clear advantage in judging the technical risk involved, e.g. on smart contract level. On the other hand, they are less experienced when it comes to professional risk management compared to asset managers and pension funds, which cannot afford to lose a single cent of their investment.

Established players have reduced risk appetite. Decision makers want to see a clear business case before they invest. It is very hard to predict user adoption and a profound return-on-investment thesis for advanced DeFi use cases which proves to be a deal-breaker for heads of digital assets in traditional finance.

Exploring novelty without preparedness leads to disaster and mistrust. If institutional adoption of DeFi is to go on a sustainable path, a smart approach to risk is paramount.

Marcel Kaiser, Co-Founder, Defiria

3 Decentralisation

We found that different players use blockchain technology at very different integration levels. We can roughly distinguish three levels of decentralisation of data and logic:

Golden record

Some players use the blockchain to just record the proof of transactions and state changes. They keep most data and logic off-chain. This is certainly the easiest approach for market participants with legacy systems. They can claim to use blockchain technology and use it gradually to benefit from its core facilities as a decentralised audit trail for transactions, often called a "golden record". But it is just the start of a longer transition and cannot be seen as decentralised finance in the narrower sense. These solutions have strong dependencies on the parties that run the adjacent systems which are vital for the whole ecosystem to work.

On-chain state

In this approach, blockchain accounts and tokens are used as foundational elements. At the same time, there is a parallel system involved that runs core parts of the logic in a classical way. The token might contain the hash value of a PDF document that describes the financial asset in detail. Important parts of the data and most parts of the logic live outside the blockchain. The blockchain system plays a crucial part in storing the state about who owns what. The main driver for this design approach is confidentiality. Blockchain systems are created with transparency at their core. While this is a great feature for making them work, it is equally a big liability for many business transactions – especially when competitors work on the same blockchain.

On-chain logic

Typical DeFi services run fully on-chain and reduce external dependencies to the minimum. It is relatively simple to bring payments on-chain via stablecoins. It is more complex to describe financial instruments like structured products or derivatives as fully on-chain since they can involve, for example, time- or threshold-dependent payment obligations between parties. Nevertheless, this logic can and should be implemented in smart contracts that trigger payments automatically. Genuine DeFi protocols go even one step further and use incentives for third parties as keeper or watchdog services to, for example, trigger liquidation processes in lending services when certain collateral positions fall under pre-defined thresholds. All this logic lives on-chain – and thus avoids any manual reconciliation efforts.

Large disparities exist among the participants. Some early adopters from traditional finance like DZ BANK and asset managers like Union Investment have shown strong interest in this new fully on-chain way of building financial systems. They have created several proposals around Smart Derivative Contract (SDC, see *FRIES*). Other participants mentioned emerging standards like ACTUS (Algorithmic Contract Types Unified Standards, see *ACTUS*) that define taxonomies, data dictionaries and technical specifications and can be used to implement financial instruments on blockchains. Standards like these might play a significant role in the future of blockchain-based financial service management.

For an in-depth discussion about several centralisation vectors in DeFi and the notion of "centralised DeFi" we recommend the article of *SCHULER*.

The importance of on-chain logic

The importance of logic that is enforced on-chain by smart contracts was recently observable in the realm of NFT marketplaces. In 2021, blockchain enthusiasts called out for a new "creator economy" because NFT artists can define the amount of royalty payments they receive with every secondary sale of their digital asset on NFT marketplaces like OpenSea. These royalties help to fairly launch NFT projects with cheap prices, because they generate a regular income stream and let creators participate in the success once market prices start to rise. Royalties work especially well for artists who become more endorsed and celebrated later in their career. The problem with this approach is that royalty payments have never been enforced by common smart contract standards for NFTs like ERC721. These contracts only specify what is supposed to happen. While this worked nicely in the beginning, fierce competition among NFT market-places has led to a situation where most of them have reduced their payments to be competitive – with some of them reducing royalties to zero – or asking their users for voluntary payments during the purchase. This example shows how important on-chain enforcement of pre-defined logic can be in a competitive decentralised landscape.

4 Integration aspects

There are notable differences when it comes to integration with legacy systems. Traditional players see big challenges in integrating blockchain-based financial services with their legacy IT. They need to examine all existing processes and judge the impact. This is potentially slowing them down.

DeFi start-ups do not come with this technical burden. On the other hand, they need to build up the whole landscape of surrounding processes and systems, like professional risk and compliance management, liquidity management and reporting to gradually offer institutional-grade systems.

5 Access control

Two very interesting questions emerged:

1) Is it better to build on public or private blockchains?
2) Should systems give permissionless or permissioned access to financial services?

Most of our participants agree that public blockchains are the future, but they disagree about the preferred option for now. Some participants have elected to strictly follow the rules and are creating their own infrastructure to be able to enact the control mechanisms that regulators expect them to establish. Others are positioning themselves as fast followers and expect big players to convince regulators that public blockchains are a viable option and should be considered as infrastructure like the internet.

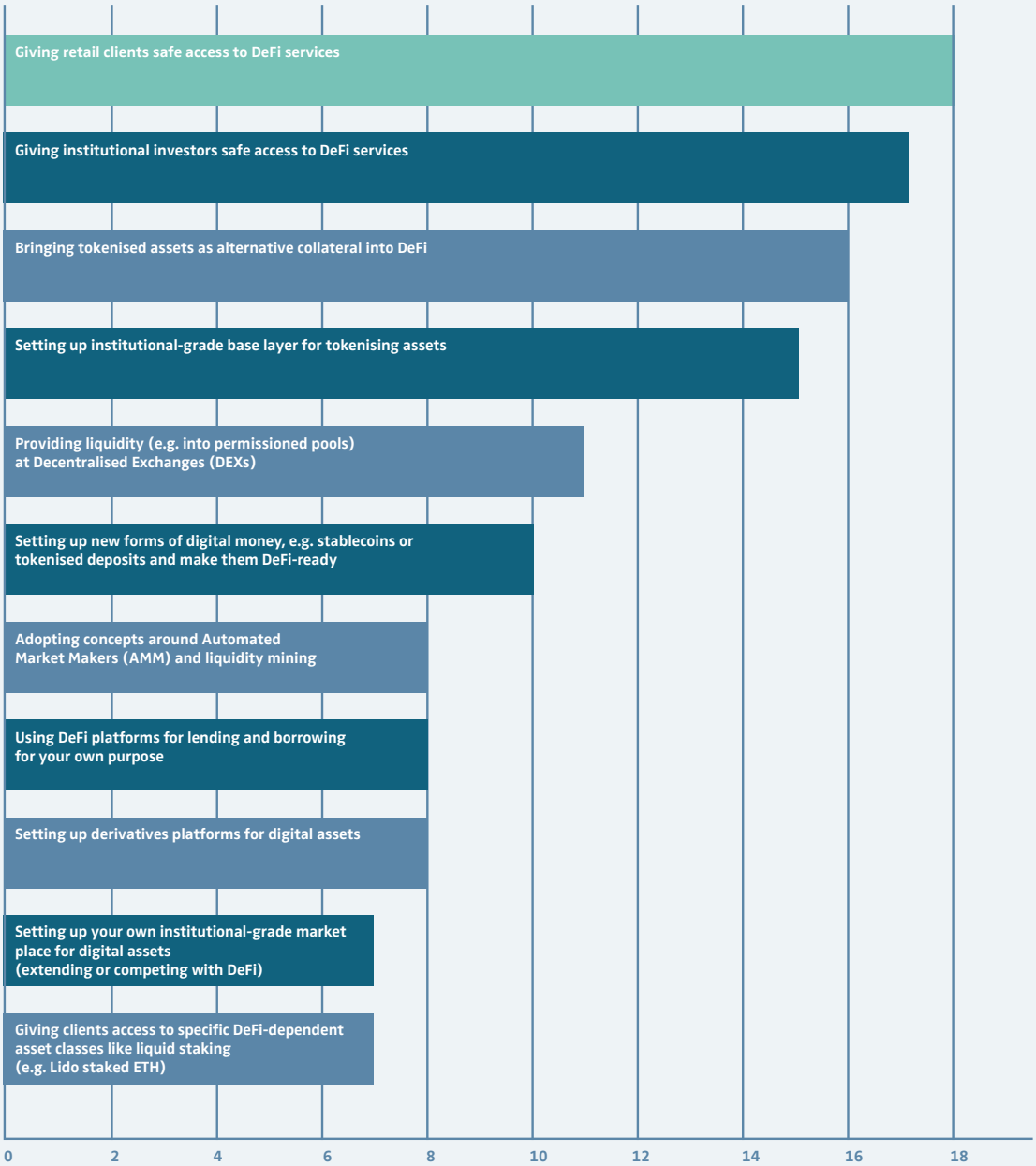
With KYC, AML and travel-rule obligations in mind, most participants agree that institutional-grade DeFi services will most likely run in a permissioned scheme – again for regulatory reasons. Regulated providers need to know who is interacting with their financial services. Most participants see a lot of value in running these permissioned services on top of public permissionless infrastructure. This is further supported by guidelines in regulatory sandboxes like the DLT Pilot Regime (see *DLTPILOTREGIME*) that want to examine exactly this combination.

D) Opportunities for institutional players

Most participants see great potential to give retail and institutional clients access to DeFi services. One participant from our interviews mentioned an internal study in their bank that revealed that clients under 30 have invested more money in crypto assets like Bitcoin and Ethereum than in traditional asset classes like stocks.

Another favourite use case in the survey is "Bringing tokenised assets as alternative collateral into DeFi" – a statement that was also backed in our qualitative interviews.

Where do you see the biggest opportunities in DeFi adoption for institutional players?



What became clear is that tokenisation and instant settlement via atomic swaps deliver a lot of value in the field of asset finance when compared to existing approaches as follows:

- by making reconciliation and whole departments obsolete.
- by reducing counter-party risk and releasing capital to manage that.
- by challenging the role of oligopolies and monopolies of central securities depositories and central clearing houses.
- by freeing up money that is locked during the settlement for several days.

At the same time, we heard scepticism from experts that tokenisation would magically bring liquidity to illiquid asset classes. The main argument is that the reason for illiquidity does not lie in the technology but rather in the asset itself – e.g. when it is hard to find a proper market price.

Several experts also noted that – according to in-house analyses – it is very important to judge different asset classes separately. Each asset class is served by specialised market participants along their value chain. Through tokenisation, some of these players might become obsolete, but certainly not all of them.

Smaller private banks see a lot of potential in DeFi concepts with their composite nature since they are already used to outsource commodity services to more specialised partners. They expect the banking model of the future will drift away from one-stop shops like the universal banks of the present.

E) Roadblocks

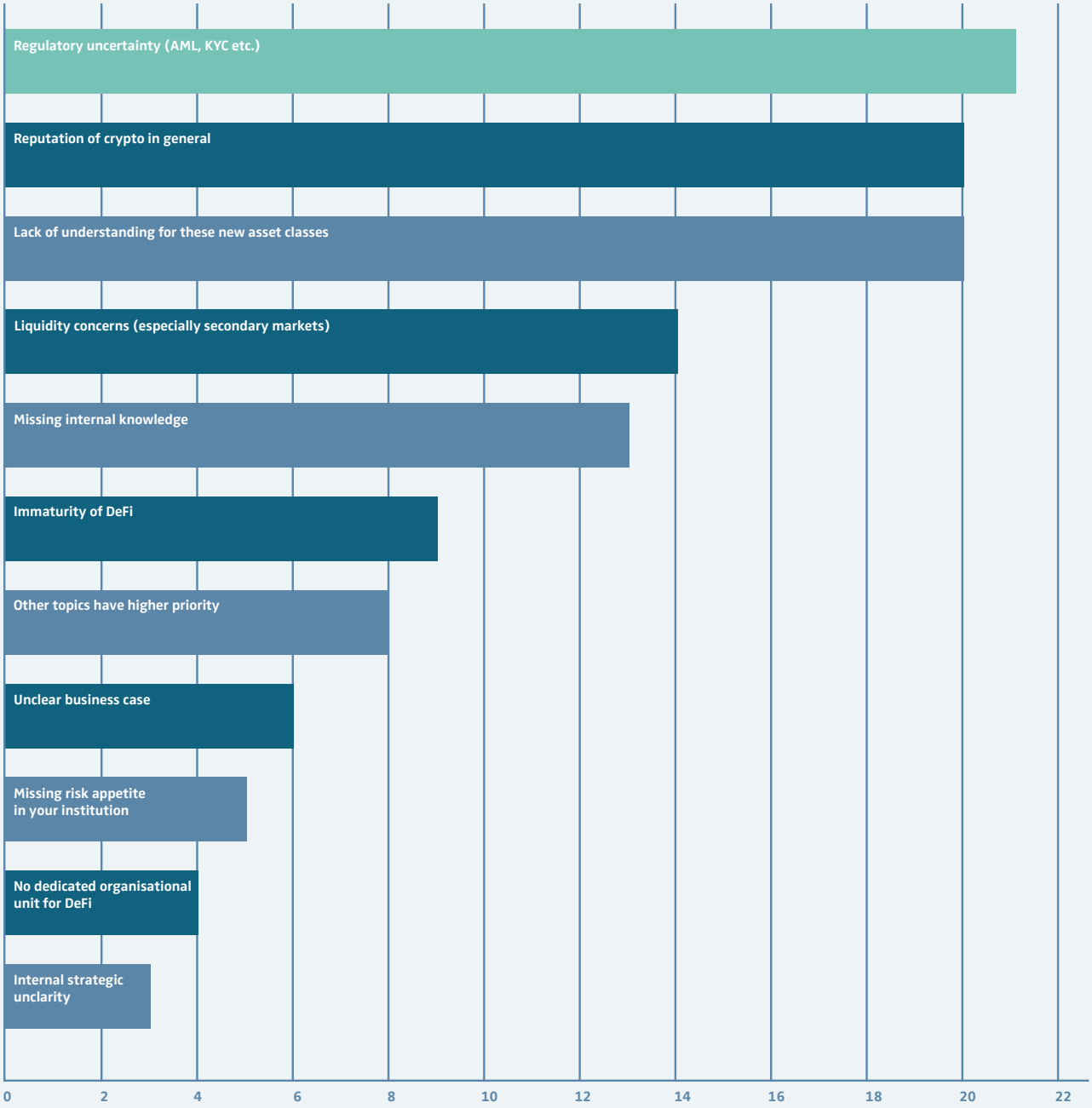
A number of roadblocks currently impede the broad adoption of DeFi. These include things that are not really the 'fault' of the technology, such as its reputation, regulatory uncertainty, or a simple lack of knowhow. In fact, a "Lack of understanding of these new asset classes" was seen as a problem by about half of our survey participants.

Some roadblocks seem to be especially salient in investment banking, as DeFi is a fundamentally different approach than investment banking as we know it. It takes a lot of courage and financial effort for investment bankers and wealth managers to look deeply into these systems and utilise their advantages. An additional problem for investment banks is that DeFi users can access many services "for free" (e.g. via DeFi front ends like Zapper.fi or Metamask Portfolio). When clients use similar services with investment banks, they must pay. These banks risk losing business through DeFi, which holds them back.

We also saw that many bankers still think that tokens are mainly suitable for retail clients and are less convinced that they are suitable for institutional adoption, which is in line with the high numbers for "Missing internal knowledge" in the survey. Since tokens are the main building blocks of DeFi services, this unveils a major misunderstanding.

Finally, a lack of confidentiality for financial transactions figured prominently among the roadblocks. While this level of transparency can be seen as blockchain's unique superpower, it is also its biggest liability for institutional adoption and B2B use cases in general. Typically, network participants can see account balances of all parties and transaction payloads they are not involved in. This needs to be fixed at a fundamental level, e.g. via mandatory and standardised Zero Knowledge Proofs. While there is amazing research progress in this area, this is still a major roadblock for all participants.

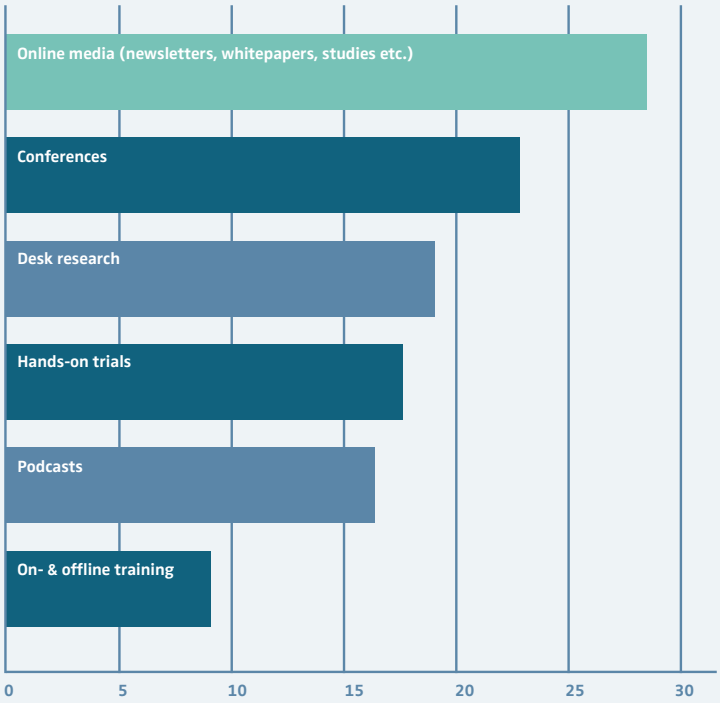
Where do you see the biggest roadblocks?



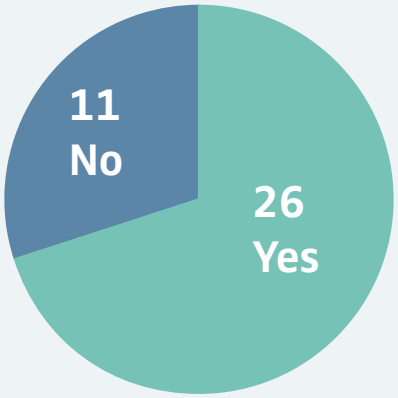
F) Education

Our interviews and surveys revealed that there is an extensive need for education. Blockchain-based systems are hard to understand without practical, first-hand experience. Yet, most survey participants still rely on online media, conferences, and desk research as primary means of education. Hands-on trials are only in fourth place. Even among experts, one third of our participants stated that they had never invested their own money in DeFi.

How do you educate yourself about DeFi?



Have you ever invested your own money in DeFi services?



G) Intermediaries

Many blockchain supporters claim that the use of the technology will eliminate most intermediaries from the financial systems. Our interviews revealed a different reality: while most participants agree that intermediaries will be heavily affected, that doesn't mean that they will go away. Participants expect that intermediaries have a role to play, but state the following:

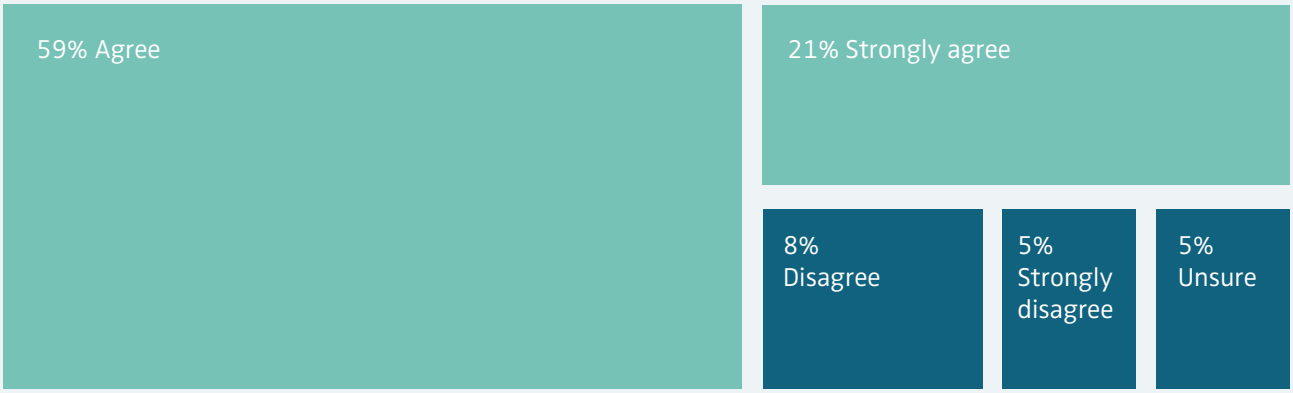
- On a global level, we will see fewer, but bigger intermediaries, like we already see in staking and validating.
- On a more technical level, service providers will need to offer fully automated services on-chain, 24/7.

These developments might impose new dependencies and centralisation vectors which would create problems similar to those in traditional finance.

H) R&D investments

Most of our survey participants expect to increase R&D budgets for this area.

Do you believe that R&D investments in adopting Decentralised Finance (DeFi) will become more relevant and attractive in the next 12 months?



The Scope of Institutional DeFi

After analysing many commonalities and differences between different participants in this market, there remains one big question to be answered: How do we define the scope for institutional DeFi?

We see three dimensions to take into consideration: decentralised operations, governance and institutional-grade services.

Decentralised operations

Institutional-grade DeFi services must inherit the main attributes from DeFi services regarding decentralised operations. While there might be (partially) centralised entities which develop the services (which is also true for many DeFi players), the services need to run on systems that are operated by several distributed and independent entities. Depending on the service level, these operators might be well-known, licensed entities or ''the crowd''. We think both permissioned and permissionless approaches for operators are feasible for consideration in the context of DeFi services.

Governance

In their original form, many DeFi services are governed by token holders who decide about the direction of these protocols and also profit from their financial success. There are movements in DeFi that propose to ''ungovern'' the operational part of these protocols and further reduce attack vectors that come via token voting, especially when voting participation is low and only a few participants might influence important decisions. Governance is important to include the community in strategic decisions about future developments of a service. It remains to be seen if and how this specific aspect of DeFi can be adopted by institutional players offering DeFi-like services.

Institutional-grade services

In order to merge and grow further into a professionally regulated environment and attract institutional investors, DeFi services might further focus on and address additional finance dimensions. They need to offer risk-adjusted returns, regulatory compliance, financial stability, transparency and disclosure, professional governance and management structures, long-term viability, proper client services, and communication. Last but not least, environmental, social, and governance (ESG) factors are becoming increasingly relevant.

What does that mean for traditional finance?

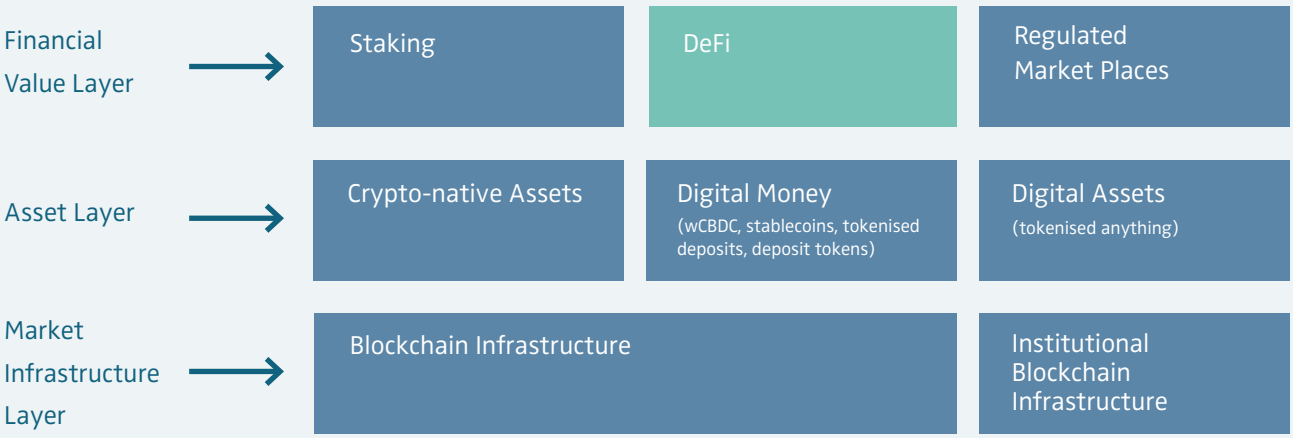
From the perspective of traditional finance, our definition of institutional DeFi offers several avenues to interact with DeFi:

1) Incumbents can decide to use DeFi for their own business.
2) They can embrace DeFi and give clients access to DeFi services.
3) They can extend and augment DeFi through tokenisation of money and additional asset classes.
4) They can finally run their own financial services in a DeFi-like manner.

Extending DeFi on the asset layer with additional forms of digital money and digital assets is a key area of development. Wholesale Central Bank Digital Money and creating new forms of stablecoins or tokenising bank accounts will bring additional use cases for DeFi. Similarly, tokenising financial instruments or alternative assets is a field of rapid innovation. These assets will extend the foundation, scope and current understanding of DeFi.

Advancements in regulation will bring along new kinds of regulated marketplaces for digital assets that will most probably compete and integrate with DeFi.

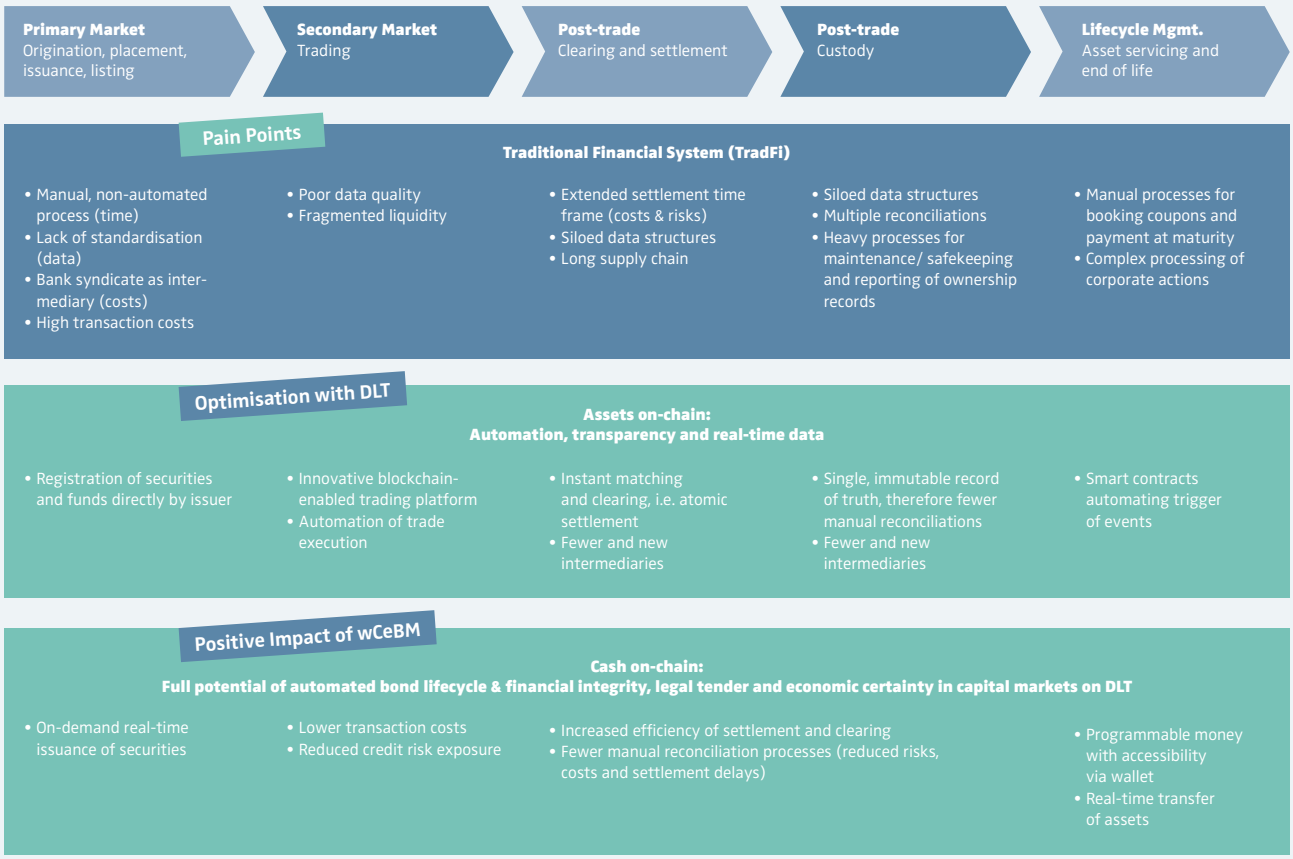
TradFi extending DeFi



The Value Chain of Digital Assets

Investing in traditional assets is a standardised, but complex business process that involves many specialised parties and suffers from information asymmetries, media disruptions and many error-prone manual tasks. Pain points can be found at every stage of the process.

Current technology, while much improved compared to previous decades, still puts hard limits on efficiency, speed and integration. Using tokenisation at the heart of this process and bringing assets and cash on-chain promises to be a major step forward in unlocking these areas.



Source: Union Investment, Axa Investment Managers

The chart above clearly shows two things:

- First, as sophisticated as banking and adjacent industries have become, there is still much room for improvement. Blockchain and DLT technologies can address specific pain points and create new opportunities as their penetration of the industry deepens.

- Second, this is not about building tech castles in the sky. These technologies have been developed for the practical world and have proven themselves. Despite institutional culture, market structure and regulatory stability still lagging, the technologies have begun to make real inroads in the industry. It is only a matter of time before the remaining puzzle pieces fall into place and acceleration takes a steeper trajectory.

Why are we so confident? On one hand, as seen before, the various incarnations of digital technology upended the economy and finance in successive waves – computers, the internet, Web 1.0, Web 2.0. And each of these developments went through an initial phase of scepticism, only to eventually reach an inflection point and accelerate. On the other hand, as in these previous cases, change is ultimately driven by the most powerful market force – customer demand.

The change may be enabled by tech, but demand drives it. The use cases in the chart lay this out. Each one addresses a clear pain point in today's processes and makes it faster, more reliable, cheaper, or more convenient.

Source: Union Investment, EY

Demand-driven revolution

As the specific elements of this way of doing business fall into place – driven by client-centric innovation – they will start to connect in new and perhaps unexpected ways, and truly trigger the revolution. The following are just some of the solutions that may emerge:

1. A tokenised, actively managed fund investing in tokenised asset classes in a certain ratio. It might contain tokenised bonds and stocks, staked Ethereum and some yield-bearing stablecoin. It lives on a public blockchain, with automatic daily rebalancing and regular on-chain pay-outs and fees, all based on smart contracts. This would allow the fund to be used in ways that were never anticipated by its issuer in the traditional financial world and to therefore branch out into new versions depending on the needs of investors.

2. Something like the DeFi protocol Pendle – but for stocks, for example. Pendle allows the separating of a crypto asset into its constituent parts and the tokenising of these individually. In the case of staked Ethereum, this might mean splitting the yield and principal components, allowing for separate trades on each and therefore enabling bets on just the yield. Everything runs with on-chain logic. Projecting these concepts onto traditional financial assets, a dividend could be separated from the stock, which would allow the market to trade pure dividend expectations. This would mean that the stock, including the dividend pay-out, would have to live on the chain and be governed by smart contracts. Furthermore, to truly reap the benefits of information and efficiency gains, such trades would have to be open access and not limited to whoever issued the tokens or only to a select circle of investors.

3. A third example is the instantaneous large purchase by a consumer, e.g. a car. The buyer can access all assets 24/7 that live on the chain via a DeFi app and decide in real time how to finance the vehicle and monetise the assets. The necessary transactions and rebalancing happen on the chain, allowing for a seamless and convenient experience.

This is very much in contrast to the current systems, where selling a fund share and initiating a cash transfer can take days due to the settlement cycle of the assets.

As of now, these and many other use cases are speculative examples – but they are not science fiction. All of this is currently technologically feasible. And all of them represent a significant improvement for the customer in speed, reliability, cost, and convenience.

What is preventing these innovations from breaking through ranges from risk control requirements to institutional siloing and regulatory roadblocks. Some of these hurdles do represent genuine concerns, which must be addressed. But once the institutional and regulatory frameworks are in place, acceleration will set in quickly, with nimble players swiftly claiming market share.

The following examples also help put contours on the financial landscape currently being built:

- In the medium and long term, everything will converge for economic reasons and due to network effects. The technology just creates the basis for this familiar logic to function more efficiently and faster than ever.
- This will most likely happen on a public blockchain, as this is the only way to gain the kind of global access needed for the most attractive use cases.
- Irrespective of the high degree of technological interoperability, different assets run under different regulations. Not everything that is technically possible is permitted by regulation.
- And yet, an enormous amount of potential has been created already and is ready to be leveraged, both technically and from a user perspective.
- From a regional perspective, European (e.g. the EU and especially Germany) as well as some Asian (e.g. Singapore) jurisdictions are at the forefront, making them fertile ground for innovation.

When all is said and done, DeFi protocols harbour the potential to remove many of the traditional finance pain points. Things will be quicker (mostly in real time), smoother, more convenient, more accessible, and cheaper – and therefore demand driven. Keeping a tight focus on the customer is the north star for not only surviving but thriving through these developments.

The integration of decentralised finance into traditional banking and asset management is underway and steadily gaining momentum. However, overcoming the main challenges in compliance, security, privacy, and interoperability will require time and effort from all relevant stakeholders.

Alexander Bechtel, Head of Digital Product Strategy, DWS

Limitations and Recommendations

Despite a very positive mood about the future of institutional DeFi, we learned about several limitations in our interviews that need to be considered before bringing DeFi to the masses.

Confidentiality

The current state of blockchains offers too much transparency. Uninvolved third parties can see far too much detail that is not relevant for them. Confidentiality about who owns what or who interacts with whom is a key requirement for many financial use cases. Despite huge advancements in research fields like zero knowledge proofs and fully homomorphic encryption, these technologies are not yet practically and constantly applied to mainstream blockchain infrastructure, their account systems, and smart contract layers. This poses a critical limitation for all participants and leads to counter-intuitive designs like putting logic off-chain with negative effects on decentralisation, resilience, and the business case of these systems.

Recommendation:
Financial institutions should select blockchain ecosystems not only by scalability and transaction cost, but closely watch advancements in terms of confidentiality. Blockchains like Secret Network from the Cosmos blockchain ecosystem might show the way but lack the necessary traction. Token extensions like those proposed by Solana deserve close observation (see *SOLANA*).

Law versus blockchain

Despite their name, smart contracts are not necessarily contracts in a strictly legal sense, but programs. While some enthusiasts might claim that ''code is law'', this is not per se the case for regulated environments. The law is not automatically congruent and is often overlapping with code in many situations and jurisdictions. In addition, the legal and regulatory framework needs to evolve to account for DeFi's radical transparency and immutability, and different counterparty risk compared to the core banking system. Only a new way of determining the collectivistic and opensource nature of DeFi will yield appropriate results. For the same reason, DeFi-specific governance mechanisms – such as community-driven governance tokens – need to be adequately assessed and given their requisite regulatory importance by way of not simply imposing gatekeeper-type regulatory frameworks.

Recommendation:
While we see a trend of ''legalisation'' of factual matters, most DeFi services and institutional players are not yet completely prepared for this scenario. Service providers need to be very careful when mixing classic crypto assets with these similar but also different assets, even if their technical interfaces might look very similar.

Illiquid asset classes

Many blockchain experts claim that tokenising assets will bring liquidity to many asset classes. This is overwhelmingly denied by many experts from traditional finance. Illiquid assets are often illiquid because of the complexity of the asset class. In many cases, it is hard to objectively find a valid price because the asset is rarely traded, or price determination requires deep expert knowledge. It took decades in traditional finance to overcome these problems and develop deep value chains with highly specialised experts. Tokenising a complex asset class will not magically solve these problems and make specialists obsolete.

Recommendation:
DeFi start-ups should work more closely with traditional financial institutions when they try to tackle these areas. Tokenisation might be able to solve some of these problems, e.g. by bundling tokens that represent similar assets into larger investment pools. Platforms like Centrifuge offer mechanisms in this regard that might help to overcome some fundamental problems attached to singular assets.

Insurance and risk management

Institutional investors demand much more control and risk management than retail investors. Similarly, regulators expect financial services to work as expected. Risks need to be managed on many different levels. Most DeFi projects put a strong focus on technical risk management in their smart contracts. Other risk vectors, e.g. centralisation risks in underlying assets are equally – or even more – critical. There are innovative approaches to offer decentralised insurance services in DeFi to cover some of these risks, but they are still limited compared to classic offerings (see *BEKEMEIER* for an overview).

Recommendation:
Established insurance companies should proactively move into this area and cooperate with DeFi protocols.

Resistance from employees

For financial institutions, the introduction of blockchain technology means not only technological advancement, but also process change. This change might have a fundamental impact on certain employees and often results in fear and resistance, which slows innovation down.

Recommendation:
Financial institutions should put considerable emphasis into education programs and demonstrate the positive effects of this technology. Processes will become more streamlined. A good proportion of manual tasks could be eliminated. Humans are still crucial for critical aspects. It seems wise to equip DeFi changemakers with a clear corporate mandate and to combine driven and open-minded crypto-native colleagues with experienced bankers to merge the best of both worlds and tackle preconceptions early in the process.

External dependencies

Tokenised financial instruments or real-world assets bring new risk vectors to DeFi because they often depend on data or services that run outside the scope of a blockchain. Blockchains run perfectly well if they can rely on the state they control. This is less so when they are exposed to variables that are managed externally in the real world, like the current foreign exchange rate or data stored in a bank's central database or a PDF document. Someone needs to feed this data reliably into the blockchain system, and this interface (usually called an ''oracle service'') is a critical attack vector. If someone succeeds in manipulating this interface, problematic consequences are bound to happen, because the smart contract will run on top of compromised data. Writing a secure oracle service is a complex task – and needs to be decentralised like the blockchain itself. Several oracle nodes must agree with their peers that the data fed into the system is uncompromised and trustworthy. If decentralised financial products or services rely on off-chain data, this poses a critical challenge.

Recommendation:
In DeFi, specialised players like ChainLink or Pyth Network tackle these aspects. Institutions should consider partnering with these kinds of top-tier companies to learn from their experience.

Permissioned DeFi on public chains

Regulation will force most institutional-grade DeFi services to know their customers and function according to additional rules like anti-money laundering or OFAC compliance. This militates against permissionless access to these services due to the status quo, but not necessarily against the permissionless nature of the underlying infrastructure. Different regulators will create a variety of – potentially gatekeeper-centred – rules, but network effects will also be decisive and drive political decisions.

Recommendation:
Financial institutions should refrain from building their own permissioned infrastructure and instead seek ecosystems with network effects that offer permissioned access on an application level in order to prevent "walled garden" issues. Permissioned infrastructure might be demanded by regulators today, but we consider it possible that economic pressure might change these regulatory boundaries in the future.

Yes, limitations exist. Most of these are not inherent to the technology itself but arise at the boundary between tech and other aspects of finance, such as laws and regulations, institutional memory and culture, or the characteristics of assets and markets. This means that the solutions will never be purely technological. Sometimes the tech will have to be tweaked in a way to conform with the outside world, such as for KYC requirements. Sometimes certain possibilities will not (yet) be able to be realised, as market acceptance is lacking, or regulation will simply not allow it.

But any technology offering true benefits will break through one way or the other. And that last phrase is crucial. Technology is not determinate. There are many social, cultural, legal and other factors playing into how the technology will be adopted and used. We are currently at a critical juncture, and the decisions taken today will set the stage for what is to come.

Conclusion

DeFi and its associated technologies are coming at the financial sector hard and fast. Here and there, market participants have recognised this, but most, in our view, have yet to comprehend the magnitude of what is happening. The revolutionary potential is akin to the invention of the modern bond 400 years ago, or, within living memory, the internet itself.

Dangerous complacency

There are several factors masking this imminent exponential expansion. Bitcoin and its peers currently represent a tiny fraction of the world's investible asset base. The expected scepticism by entrenched interest seems corroborated by high-profile "fails". So far, the crypto- and DLT-nerds seem to sometimes be overpromising and underdelivering, leading to complacency among their bosses.

We are here to argue that any complacency – as uncovered by this study – is not only misplaced, but dangerous.

On one side stand the advantages in terms of cost reduction, speed of execution and elimination of counter-party risks that are simply too big to be ignored. It is very likely that most financial services will be completely reimagined over time. It all started with crypto enthusiasts and bold retail users. Now, the movement will gradually reach a broader audience and the institutional world. On an abstract level, DeFi brings digitalisation of financial services through the use of blockchains, tokens and smart contracts – running fully automated and operating without humans in the loop. Humans are only needed for oversight, deviations, and dispute resolution.

On the other side we have the historical precedents of Web 1.0 and Web 2.0 – where initial reluctance was blown away by sudden acceleration, mass adoption and widespread network effects. Such inflection points are typical of exponential developments and are commonly referred to as "hockey sticks". Those who are caught unprepared when this point comes will be swept away.

The foundation is being laid now

We are not saying that we are currently at that inflection point. But many players are working on different foundational puzzle pieces that will cross-fertilise each other:

- Crypto assets like Bitcoin and Ethereum are already available as an incubating asset class.
- Several forms of digital money like stablecoins, CBDCs or deposit tokens are currently being designed. Advancements in regulation like MiCAR will give them an additional push.
- Tokenised forms of financial assets like bonds, fundshares or stocks are gradually being introduced. Similarly, regulatory clarity is on its way or has already taken hold for the more conventional parts of the digitialised financial markets.
- Tokenisation of real-world assets like art, real estate, commodities, or collectives are an additional piece.

Once these parts fit together harmoniously and offer a real, convenient way for consumers to take advantage, there will be no way of stopping the momentum. For a concrete scenario – imagine the following. I want to buy a car. I see the car I want in the dealership. I pull out my smartphone and open my DLT-enabled finance app, where I play with a few sliders. Bit of credit here, sell a few bonds there, dip into my checking account. Press the 'buy now' button, verify with facial recognition, and drive off the forecourt. Elapsed time – a minute or so. And, of course, the insurance is embedded.

But we are not quite there yet

It is still hard to justify singular innovation projects in these areas with short-term business cases. Nevertheless, crypto-savvy DeFi startups are already professionalising their financial service offerings for institutional investors like family offices and funds. Additionally, highly equipped and specialised fin-techs are prepared to address the retail market with institutional-grade DeFi products to address retail demand.

Similarly, many banks, exchanges and asset managers from traditional finance have successfully started their blockchain journey. In between, there are players who try to play the best of both worlds on top of regulatory sandboxes like the EU's DLT Pilot Regime. While these worlds currently seem to evolve separately, most participants in our interviews expect them to merge in the mid- to long-term. This convergence will most likely happen on public chains.

It is obvious that all market participants will greatly benefit from partnerships. Crypto-savvy DeFi start-ups bring deep technical knowledge and agility to the table, while they can learn from institutional players when it comes to reporting, risk management, and compliance. Vice versa, institutions face a steep learning curve to embrace the technical possibilities of blockchain technologies. They must drastically rethink core processes and decentralised operations in an on-chain world. It is hard to imagine that these changes are possible on top of core banking systems that carry technical debt from the last 40 years with them. It seems more likely that new systems landscapes will evolve and run side-by-side with existing ones.

We expect that financial institutions will not only partner with DeFi startups but also start to invest in important projects to gradually increase their influence.

I see the near future of blockchain adoption in a useful combination of DeFi infrastructure and traditional legal frameworks with compliant financial structures offering differentiated value.

Martin Quensel, Co-Founder, Centrifuge

So, what to do?

Given the observations above, we recommend that financial institutions shift up a gear and gather momentum. Blockchain technologies are much more than ''pure crypto''. They define the future rails of the financial markets, their assets, and their service landscape. Therefore, it is not enough to invest in foundational technology like custody or to tokenise singular bonds. The technology will be deployed on an extensively broad scale – from future money to all asset classes. We recommend thinking with the intended achievement in mind and explicitly including and reverse engineering the future value layer from its intended optimal state:

What might institutional-grade DeFi services look like?
Which asset classes will come first?
Which kinds of services will clients request?
What will be our role in this new ecosystem?

The goal is to provide true plug-and-play compatibility across cash and assets, creating the building blocks for a new way to manage virtually all aspects of finance in real time and in the same environment. This will only work if all assets exist fully on-chain – meaning all payments referring and related to the asset in its life cycle. To enable this, the cash component must run side-by-side next to the asset on the same blockchain.

This is what we want everyone to think about when they hear DLT or DeFi or blockchain. Forget Bitcoin or NFTs or any other specific phenomenon that emerges from the chain. It is about so much more: a new technological medium through which to process the essential functions of finance – risk control and resource allocation – instantaneously as well as more reliably, more efficiently, and more accessibly than ever before.

Acknowledgements

We want to thank all participants in our survey and interviews for their time and openness in sharing their personal points of view. This brought us deep insight from very different perspectives. We also want to thank Corinna Egerer and Max Hunzinger from Frankfurt Digital Finance conference for supporting our topic at their conference and promoting our survey via their newsletter.

References

ACTUS Algorithmic Contract Types Unified Standards, available at:
https://en.wikipedia.org/wiki/Algorithmic_Contract_Types_Unified_Standards

BEKEMEIER Bekemeier, Felix: ''A primer on the insurability of decentralised finance (DeFi)'' (2023), available at:
https://link.springer.com/article/10.1007/s42521-023-00093-x

BIS1 ''Prudential treatment of cryptoasset exposures'', available at:
https://www.bis.org/bcbs/publ/d545.htm

BIS2 ''Cryptoasset standard amendments'', available at:
https://www.bis.org/bcbs/publ/d567.htm

DIXON ''*read, write & own*'', available at:
https://readwriteown.com/

DLTPILOTREGIME ''Document 32022R0858'' (2022), available at
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022R0858

ERC20 ''ERC-20 TOKEN STANDARD'', available at:
https://ethereum.org/en/developers/docs/standards/tokens/erc-20/

FRIES Fries, C., Kohl-Landgraf, P., Korpis, A. (2022): ERC-6123: Smart Derivative Contract, available at:
https://eips.ethereum.org/EIPS/eip-6123

GL1 Ledger Insights: ''Singapore's MAS to explore ''global layer 1'' blockchain tokenization with BNY, DBS, JPM, MUFG'', available at:
https://www.ledgerinsights.com/global-layer-1-gl1-blockchain-tokenization-bny-dbs-jpm-mufg/

GRASMANN Grasmann, S. (2024): ''The DeFi Primer – 2024 Edition'', available at:
https://medium.com/coinmonks/the-defi-primer-2024-edition-6b6654e6b7ae

HAMACHER Hamacher, A. (2021): ''What are flash loans? The DeFi Lending Phenomenon Explained'', available at:
https://decrypt.co/resources/what-are-flash-loans-the-defi-lending-phenomenon-explained

MICAR ''Markets in Crypto Assets Regulation'' (2023), available at:
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1114

OliverWyman Ekberg, J. et al: ''It's Time to Explore Institutional DeFi'', available at:
https://www.oliverwymanforum.com/future-of-money/2022/Nov/institutional-defi.html

PROJECTGUARDIAN ''Project Guardian'', available at:
https://en.wikipedia.org/wiki/Project_Guardian

SCHULER Schuler, Katrin; Cloots, Ann Sofie; Schär, Fabian:
''On DeFi and On-Chain CeFi: How (Not) to Regulate Decentralised Finance'' (2024), available at:
https://academic.oup.com/jfr/advance-article/doi/10.1093/jfr/fjad014/7606986?login=false

SDX ''Swiss Cantons Basel-City and Zurich Pioneer the Settlement of Digital Bonds Transactions in SNB's Swiss-Franc wCBDC on SIX Digital Exchange'', available at:
https://www.sdx.com/news/franc-wcbdc-transaction/

SOLANA ''Token Extensions'', available at:
https://solana.com/solutions/token-extensions

VALIDATORS ''Ethereum validator statistics'', available at:
https://beaconcha.in/charts/validators

Contact

Stefan Grasmann
Chief of Blockchain & Partner, Zühlke
Stefan.Grasmann@zuehlke.com
zuehlke.com

Christoph Hock
Head of Tokenisation & Digital Assets (PM)
Union Investment Privatfonds GmbH
Christoph.Hock@union-investment.de
union-investment.de

Hagen Weiss
Counsel, Dentons
hagen.weiss@dentons.com
dentons.com

Images: Getty Images Deutschland GmbH