KPMG

Thriving in the era of crypto and blockchain

Distributed ledger technology and the future of digital assets, asset management and banking in Europe

Current trends

Contents

Management summary

Digital Assets are here to stay – and they hold immense potential for the financial industry: This is the main result of KPMG's recent opinion poll on blockchain and crypto in digital assets. With 20 participating enterprises from six countries, the poll gives a comprehensive picture of the European financial industry's views on distributed ledger technology (DLT). Based on participant responses, we have formulated four core hypotheses:

#1 Firstly, the main issue behind the reluctancy of banks and asset managers to actively engage in the DLT market is the lack of a regulatory framework and, consequently, legal certainty regarding surrounding cryptocurrecies like Bitcoin and Ethereum. This may be about to change: Recent regulatory developments, in particular the Regulation on Markets in Crypto Assets (MiCA) the ECB's Digital Euro project and the eWpG in Germany, increase regulatory certainty for banks and asset managers. This may encourage them to consider extending their services further towards digital assets.

#2 Secondly, with the key advantages of fewer intermediaries and only one common and decentralised ledger, Blockchain and other DLT solutions have the potential to greatly simplify financial markets and significantly improve the operational efficiency of the sector.

#3 Thirdly, the increasing demand for products and services for digital assets related to cryptocurrencies and security tokens are pushing established market players to expand their offerings and thus target new investors and client groups.

#4 Lastly, we address the topic of competition: Investing in digital assets will soon be a necessity for the European financial industry if they wish to remain globally competitive. BigTech and FinTech enterprises are already making significant headway in this new financial market. If banks and asset managers fail to accelerate their investments in digital asset products and services, they not only risk falling behind these enterprises, but also their U.S. competitors.

1 Introduction and market overview

Despite the immediate economic and financial threats posed by the COVID-19 pandemic, European banks and asset managers must not lose sight of the overall increasing potential of new technologies. For example, the growing importance of blockchain/ distributed ledger technology (DLT) and digital assets to disrupt business models.

In January 2009, when the global financial system was on the brink of collapse, Bitcoin was launched anonymously by Satoshi Nakamoto. This "peer-to-peer electronic cash system" based on DLT in its special form as a blockchain, is the first crypto currency to promise decentralization, immutability and pseudo-anonymity of transaction storage on an encrypted, open-source, permissionless and trustless platform. Ethereum, a next generation DLT proposed by Vitalik Buterin in 2013 and launched in 2015, added smart contracts, which enable general-purpose programming and thus particularly the conditional execution of transactions.

Today, more than a decade after the launch of Bitcoin, the European financial system is more stable, but its fundamental vulnerability to banking crises and bursting stock market bubbles remains unchanged. Although not established as a means of cross-border payment, Bitcoin has asserted itself as the leading crypto currency with a market share of around 44 percent. Due to the limited availability, it is commonly designated as digital "gold", as it could also possibly help to hedge against inflation. Ethereum, with a EUR 440 billion market cap is the second most valuable crypto currency. It has established itself as the global ecosystem of choice and also offers permissioned enterprise solutions. At the end of November 2021, the total market capitalisation of the top 100 crypto currencies amounted to over EUR 2.2 trillion, which nearly equals the GDP of France.[1]

One of the most dynamic and innovative segments in the blockchain universe is "decentralised finance" (DeFi). DeFi is an experimental form of finance solutions that do not rely on central financial intermediaries, and instead builds applications on top of DLT, in most cases Ethereum, to provide banking, lending and asset management services. As of November 2021, crypto currencies worth over USD 104 billion have been "invested" in various decentralised financial applications.[2] Despite significant volatility along with technological and legal risks, the demand for crypto currencies from investors – ini-

1 As of 17.11.2021 based on coinmarketcap.com
2 As of 17.11.2021 based on defipulse.com

tially from crypto enthusiasts, but increasingly also from retail clients; primarily millennials, high net worth individuals, family offices and institutions keeps growing. These investors require new services, such as crypto exchange, trading and custody services that most banks and asset managers are currently not offering.

In addition to crypto currencies, so-called security tokens are also gradually taking hold. These are property rights in assets such as securities registered on a distributed ledger. Market observers assume that the penetration of security tokens can quickly reach several percentage points of the gross national product. Not only can securities be tokenised, but also the fractional property right to any type of real physical or intangible assets such as a piece of art, real estate, or intellectual property rights. As such, the trend toward tokenisation is a broader disruption paradigm that could significantly reduce transaction costs for economic activity well beyond the securities industry. As early as 2015, the World Economic Forum (WEF) estimated that by 2027, 10 percent of global GDP would be stored on a distributed ledger.[3] Taking the current global GDP of around USD 87.8 trillion into account, this would amount to a potential volume of tokenised assets worth USD 8.8 trillion.

In a recent contribution to "The Daily Hodl – News and Insight for the Digital Economy", crypto finance experts have tried to estimate total market size in Europe for crypto currencies and security tokens combined[4], and predict that their combined market value will reach EUR 1.4 trillion in 2024. This calculation is based on the assumption of crypto currency market volume growing at a compound annual growth rate of 26 percent and a flat 35 percent crypto currency market share for Europe. Security tokens are expected to reach a level of 7 percent of European GDP by 2024.

So-called stable coins have established themselves as the third crypto category. Examples are Tether, USD Coin or Binance USD. Stable coins are crypto currencies designed to minimise price volatility relative to some "stable" asset or basket of assets. A stable coin can be pegged to a crypto currency, fiat money, or to exchange-traded commodities such as precious metals. The most prominent example of a stable coin is Diem (formerly Libra), the global project proposed by Meta Platforms, Inc. (formerly Facebook, Inc.), which would be US dollar backed.

The three digital asset categories – crypto currencies, security tokens and stable coins – can be held outside of the banking system in electronic purses called wallets. A traditional bank account is not necessarily required. So far, developments in these three categories have largely taken place without the involvement of European banks and asset managers. Although the underlying DLT was used in application-related experiments in consortia with competitors, traditional banks and asset managers have largely avoided digital assets due to the anonymity (keyword: money laundering and terrorist financing risks), volatility (keyword: consumer protection) and general regulatory uncertainty.

So far, larger international banks and asset managers have focused their efforts on the most salient pain points in their businesses, such as slow payment transactions, security concerns, complex onboarding processes, multiple stakeholders and compliance concerns. Public and permissionless smart contract platforms, such as Ethereum or private industry-focused enterprise DLT solutions like R3 Corda and Hyperledger, offer ways to solve these pain points. They aim to reduce transaction costs significantly, but require cooperation among competitors. In most cases, however, the efforts of established financial services companies to build industry-wide DLT ecosystems and to establish standards have rarely moved beyond the experimentation and prototype stage, and very few blockchain/DLT solutions are actually productive today.

However, the wait-and-see attitude of established European banks and asset managers could soon change for two reasons. On the one hand, crypto currencies, security tokens and stable coins are slated to be integrated into the existing financial market regulation with the planned EU directive Markets in crypto assets (MiCA). On the other hand the ECB, driven by developments in China (keyword: Digital Yuan) and the Diem project (text box page 6), has further specified its preliminary considerations on the Digital Euro and on 14 July 2021, announced their decision to launch a formal investigation phase of a Digital Euro. The combination of a stable regulatory framework and the Digital Euro could help digital assets make a breakthrough in the European financial system this decade.

3 As of 08.12.2021 https://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf
4 As of 08.12.2021 https://dailyhodl.com/2020/03/05/tokenization-in-europe-market-size-to-reach-1-5-trillion-in-2024/

DIEM PROJECT

The Diem project, formerly know as Libra, is an open source, blockchain-based payment network developed by Meta Platforms, Inc. (former Facebook, Inc.). This payment network comes with a stablecoin that is pegged to the US dollar. Diem is linked to the social media networks like Facebook and Whatsapp, offering the potential of billions of users around the globe. The main goal is to provide people everywhere with access to secure and affordable financial services.

2 Digital assets and the future of finance

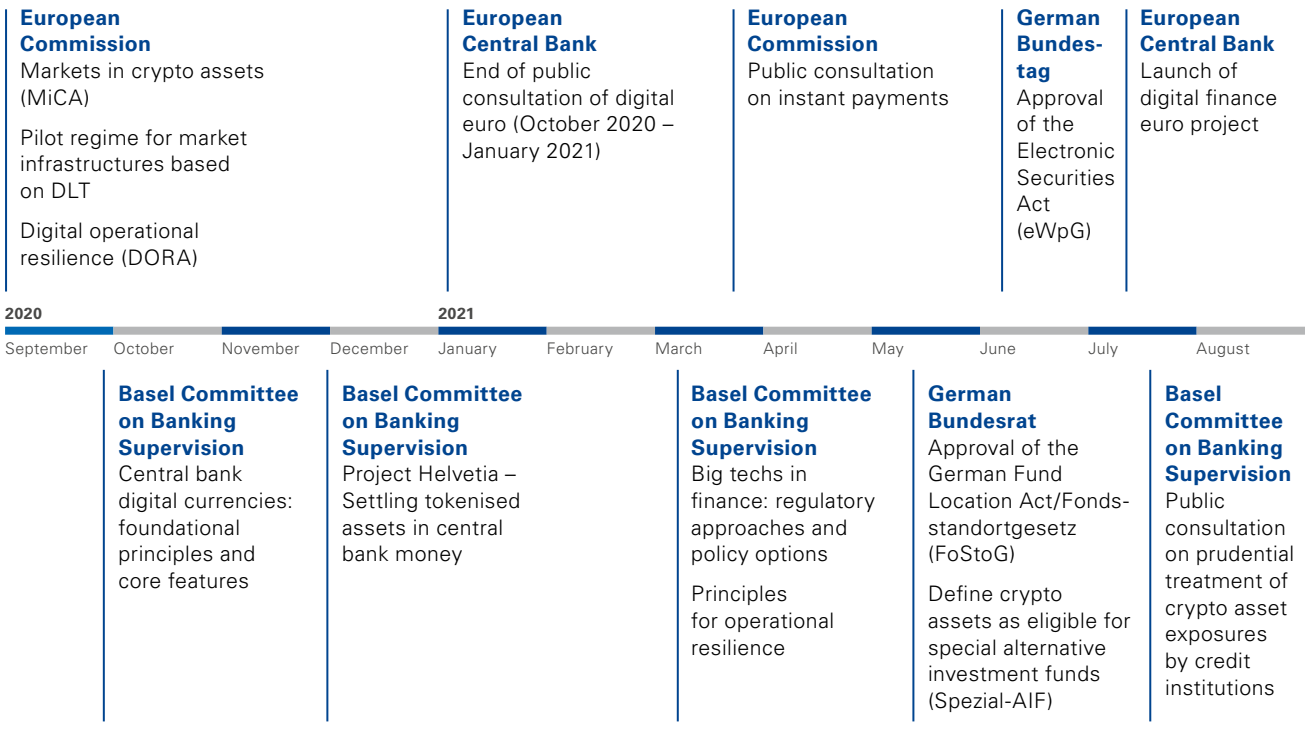
As we outline in the following chapters, which is also recognised by the participants of our opinion poll, the new world of a DLT-based financial system has the potential to offer significant benefits for the issuance, trading, exchange, clearing and settlement of digital assets. Improved liquidity, shorter settlement times and new digital assets will enable new business models. Operational efficiency will be driven across the value chain by lower intermediary costs, increased automation of business logic and workflows with smart contracts along with a reduced need for reconciliation - since every transaction is recorded on DLT. Furthermore, DLT solutions will benefit from improved embedded cybersecurity and data resilience. Finally, the immutable audit trail will enable simpler regulatory reporting and increased transparency of systemic risks. The following chapter gives an overview of current regulatory developments and sheds light on the risks and chances for transforming the value chain and establishing new revenue streams. In this chapter, we discuss different scenarios for DLT adoption. Chapter 3 will then present the results of our unique opinion poll as a report. We conclude with a brief summary and derived strategic recommendations.

2.1 Current regulatory development is creating legal certainty

Over the past year, multiple regulatory bodies, banking supervisors, as well as international and intergovernmental organisations around the world have addressed the topic of digital finance in a substantial number of publications. By doing so, these stakeholders are acknowledging the exponential pace of investments in new technologies (for example: artificial intelligence, machine learning, distributed ledger technology, cloud computing and big data analytics). They also recognise the need to step in and begin to establish a level playing field for all market participants while ensuring consumer protection (Figure 01).

In the following paragraphs we have highlighted some of the regulatory developments in Europe to create legal certainty in the area of Digital Assets, with a particular focus on Germany and France to show how these developments are implemented in practice there.

01 **Overview of current crypto regulatory developments in Europe**



Source: KPMG, 2021

Relevant developments in Europe

On 24 September 2020, the European Commission (EC) issued a comprehensive and wide-ranging package of measures to further enable and support the potential of digital finance in terms of innovation and competition. By setting regulations that are more digital-friendly and increase consumer protection, the EC aims to leverage synergies between highly innovative start-ups and established firms in the financial sector, while addressing associated risks.

The digital finance package is comprised of the following regulations and related objectives (Figure 02).

02 **Overview of the new EU digital finance package**

Digital finance strategy	– Tackle fragmentation in the Digital Single Market for financial services – Ensure that the EU regulatory framework facilitates digital innovation – Create a European financial data space – Address new challenges and risks associated with digital transformation
Digital operational resilience	– Align business strategies with information and communication technologies (ICT) risk management – Harmonise the reporting of ICT-related incidents – Strengthen firms' oversight and ensure sound monitoring of third-party ICT providers – Raise awareness of ICT risk
Markets in crypto assets (MiCA)	– Introduce a taxonomy of crypto-assets – Impose more stringent requirements on "significant" asset-referenced tokens – Grant NCAs the power to authorise and supervise crypto asset service providers
DLT market infrastructure	– Create a pilot regime to allow for experimentation in a safe environment – Introduce DLT multilateral trading facilities (MTFs) and DLT securities settlement system – Limit the size of the issuance or trading of transferable securities on DLT market infrastructure – Forbid sovereign bonds to be included in the pilots
Retail payment strategy	– Promote the use of digital and instant payment solutions with pan-European reach – Encourage innovative and competitive retail payments markets – Advocate for open and accessible payments ecosystem with necessary technical infrastructures – Push for improved transparency of cross-border transactions

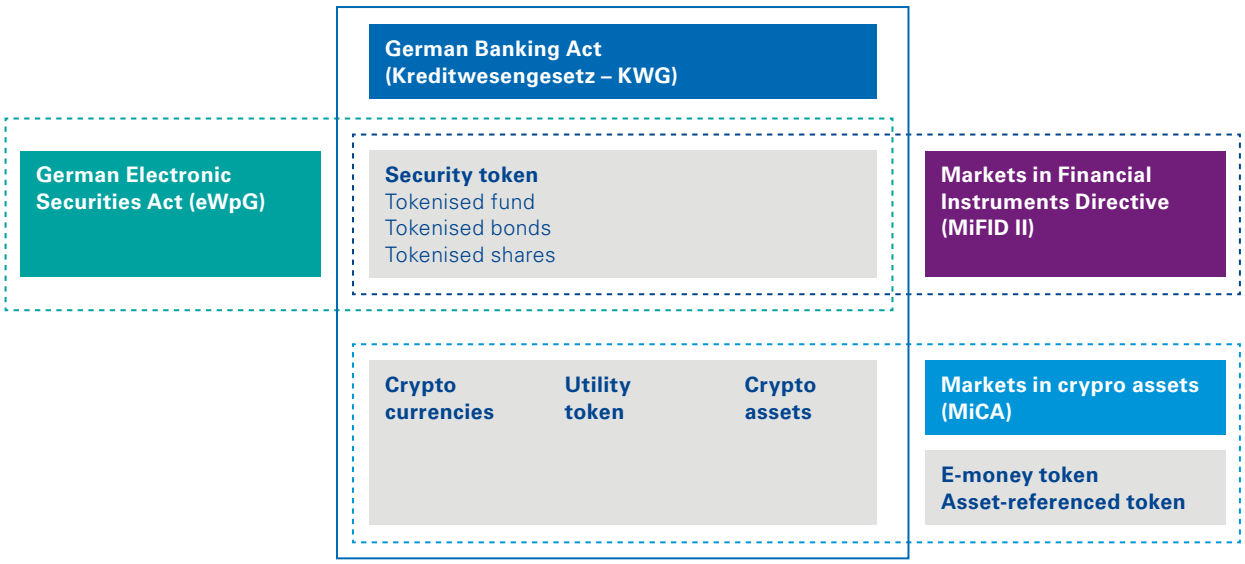
Source: KPMG, 2021

Relevant developments in Germany

In 2021, Germany has also further developed regulations within the digital finance sector. The introduction of the German Electronic Securities Act (eWpG) is a result of the Federal Government's blockchain strategy. In a first step, bonds/debt securities will be recorded in an electronic securities register. For example, the eWpG act makes it possible to issue electronic securities, including crypto securities, based on blockchain technology. Such electronic securities are issued through an entry in a newly established electronic securities register, instead of issuing a securities certificate in paper form. Electronic securities are meant to have the same rights and obligations as physical, certificate-based securities. They can be issued as "simple" electronic securities that are recorded with a regulated central securities depositary (CSD) in a central securities register or as crypto securities, which are recorded at a crypto securities registry.

Currently all financial institutions can issue bonds in a fully digital manner and without any physical certificate. However, this should only be seen as a first step and does not yet cover all asset classes. Some market participants are already piloting digital bonds on blockchain basis. The crypto security registry will possibly allow more securities, such as stocks and fund shares, to go digital as security tokens and the registry itself prevents fraud and falsification of such crypto securities (Figure 03).

03 **Tokens and their regulatory classification**



Source: KPMG, 2021

EXCURSUS CBDC: SCENARIOS FOR IMPLEMENTING A CENTRAL BANK DIGITAL CURRENCY

In addition to the development of payment and security tokens, the central bank digital currency (CBDC) has also been the focus of recent interest.

In contrast to cryptocurrencies and current stable coin projects such as Diem, CBDCs are issued by the central bank and represent the digital form of risk-free central bankmoney. The rapid decline in the use of cash is named as one of the main drivers for introducing this new type of currency.

Apart from the global tendency to marginalise conventional coins and banknotes, below are several other reasons for the inevitable rise of CBDCs (Figure 04).

CBDC's potential design options are no less diverse than the reasons for its adoption. To name just a few categories around which CBDC developers are currently engaged in heated debates: technical realisation (a blockchain or some other form of a distributed ledger technology versus a centralised ledger), anonymity (complete, partial or none), tokens versus accounts and single-tier versus two-tier distribution systems. Despite the many possible forms of CBDC, in any scenario it raises two big issues: the one being the new role of central banks in the financial system and the other the corresponding challenges for commercial banks. The CBDC can be divided into two categories: a wholesale CBDC and a retail CBDC. A wholesale CBDC is only accessible only to banks and can be compared to the current central bank reserves. The use of DLT can enhance the security of sensitive financial transaction data, increase transaction speed through faster processing and settlement and automate numerous banking processes as well as support corporate processes through smart contracts. Unlike the wholesale CBDC, the retail CBDC grants end users access to the digital form of central bank fiat-money and can be considered a new means of payment alongside cash and commercial bank money. The ECB published its "Report on a digital euro"[5] on 12 October 2020 and opened up opportunities to a possible framework for a central bank-issued digital currency. The publication was followed by a period for public consultation on a digital euro, which ran until January 2021. The results show that the public expects the CBDC to provide privacy and security, among other things.

04 Motives for the inevitable rise of CBDC

#1	Private sector (uncontrolled) digital currencies threaten national economical stability due to technologies governed elsewhere, limited consumer choice, risk of personal information being misused.
#2	The cost of managing and transferring cash is high and CDBC technology helps reduce expenses (greater efficiency, lower costs).
#3	Financial inclusion of the unbanked or underbanked population.
#4	Crises like COVID-19, hurricanes (the Bahamas), wars (Ukraine), etc.: immediate money injections instead of week-long delays for deposits or mailed checks to reach the public.
#5	Political sanctions: cross-border interbank payments from e.g. Russia or China could bypass the existing international transfer system SWIFT, thus avoiding the embargo.
#6	Interplay of privacy and anti-money laundering/anti-terrorism measures available only on the level of central banks.

Source: KPMG, 2021

5 As of 08.12.2021 https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf

The key motives for issuing retail CBDCs range from expanding financial inclusion to increasing the efficiency and stability of payment systems.

These benefits come at the expense of a potential loss of privacy in commercial transactions, if these can only be processed through private or government-managed electronic payments systems. Various encryption technologies offer only limited relief, as they are subject to the same technical vulnerabilities as non-official cryptocurrencies. While the question of data protection is paramount for the consumers, the matter of relevance for the central bank is the infrastructure design itself. In addition to the distinction between centralised (one-tier) and decentralised (two-tier) systems, the focus is on the difference between a token-based infrastructure and an account-based infrastructure. There are certain risks that commercial banks and the existing financial system may face in all implementations. We have listed these here.

2021 is the year in which central bank digital currencies (CBDCs) cease being a purely theoretical concept or an experimental playground for developing countries. The main actors have now focused their spotlights directly on them: The Bank of England and the U.K. Treasury have established a CBDC task force, the Governing Council of the European Central Bank is in the process of launching a formal investigation, and even the Fed and the U.S. Treasury are are finally changing their minds. These important shifts in opinion and calls for action are the result of several years of concept development, pilot programs and major cooperations/ initiatives by the various central banks.

EXEMPLARY RELEVANT DEVELOPMENTS IN FRANCE

Experimentations on CBDC by Banque de France (BdF)

In 2021, the BdF accelerated their work on central bank digital currencies, collaborating with different stakeholders across the globe to experiment on various aspects of CBDCs:

- On June 6, 2021, the BdF announced that together with the Swiss National Bank, the BIS innovation hub and a private sector consortium, they will conduct an experiment using wholesale central bank digital currencies for cross-border settlement. "The private sector consortium includes Credit Suisse, Natixis, R3, SIX Digital Exchange and UBS."[6] The experiment will explore cross-border settlement with two wholesale CBDCs and a French digital financial instrument on a DLT platform.

- On July 8, 2021, the BdF and the Monetary Authority of Singapore (MAS) made a joint announcement about the successful completion of a wholesale cross-border payment and settlement experiment using CBDC. "The experiment, supported by J. P. Morgan's Onyx, simulated cross-border transactions involving multiple CBDCs on a common network between Singapore and France."[7]

- Finally on July 13, 2021, the BdF announced that it had carried out a wire transfer between two individuals, located respectively in France and Tunisia, in commercial bank money through transfer of wholesale central bank digital currency between Banque de France and Banque Centrale de Tunisie. "The operation took place on the Instaclear interbanking transaction solution based on the private distributed ledger operated by Prosperus, and both central banks exchanged CBDC tokens in secured conditions."[8]

6 As of 08.12.2021
https://www.banque-france.fr/en/communique-de-presse/banque-de-france-swiss-national-bank-and-bank-international-settlements-innovation-hub-collaborate
7 As of 08.12.2021
https://www.banque-france.fr/en/communique-de-presse/banque-de-france-and-monetary-authority-singapore-break-new-ground-cbdc-experimentation-0
8 As of 08.12.2021
https://www.banque-france.fr/en/communique-de-presse/banque-de-france-cooperation-banque-centrale-de-tunisie-successfully-conducts-experiment-use-central

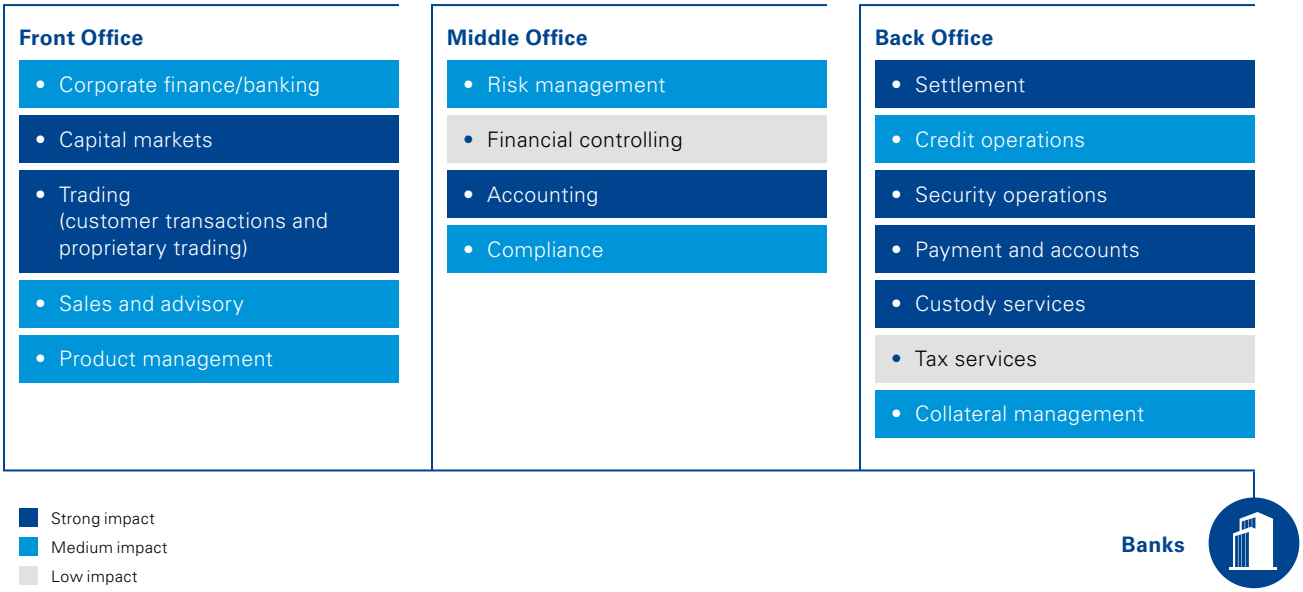
2.2 Distributed ledger technology to slash costs and increase efficiency

Digital assets based on DLT offer financial institutions the chance to counter increasing margin pressure by significantly cutting costs. This is only possible if they rethink their value chains and embark on a transformation journey. The new technology has an impact on all domains and functions of banks and asset managers alike. In the following, we will present an insight on cross-industry benefits. Then we will dive deeper into the respective value chains of banks and asset managers and outline the impact on the specific functions.

The key features of DLT can only be leveraged by building strong ecosystems, setting standards for the entire industry and establishing a reliable regulatory framework. Efficiency gains cannot be achieved through isolated, not fully integrated solutions with different ledgers. This highlights that the greatest challenge is of an organisational nature rather than about implementing the technology itself. Therefore, collaborations of first movers who are able to form overarching, fully integrated ecosystems based on one distributed ledger (higher data quality) with standardised protocols have the opportunity to outperform their competitors by offering customers more user-oriented services (see also Section 2.3, page 15) and significantly cut costs.

The key intention of a distributed ledger is to eliminate the need for coordination of different interfaces within companies and even across market participants. By adding smart contracts as a key functionality, it is also possible to realise event-based cash flows. Therefore, the technology itself can act as a trusted intermediary and standardised smart contracts can be set up as escrow or collateral accounts. This can lead to a less complex financial landscape and further automate processes. Smart contracts can streamline and slim down processes by eliminating certain (manual) process steps. Existing market players, like custodians, may have to rethink services that can be replaced by technical means (disintermediation).

05a **Banking**
Impact of DLT on the functions of a bank's value chain



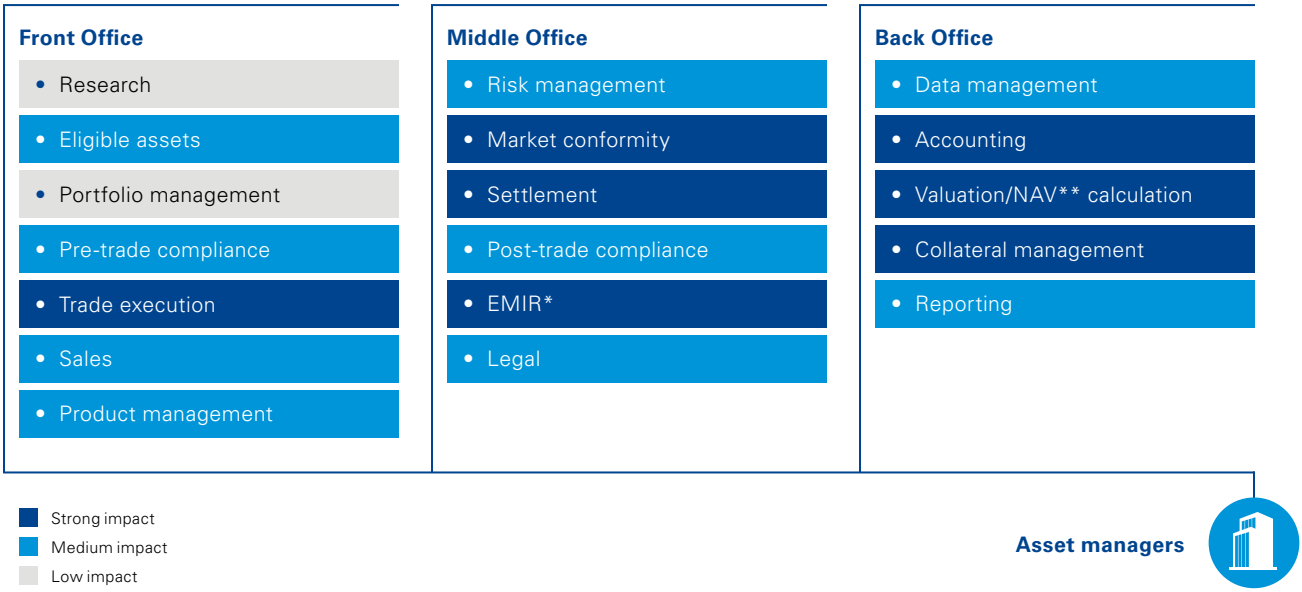
Source: KPMG, 2021

The distributed nature combined with cryptography has the potential to increase security on a ledger lever and lead to a more resilient financial market infrastructure. In a world of increasing cyber-attacks, DLT can prevent damage and decrease costs by not offering one specific target. However, the key to your investment account (wallet) is a vulnerability and a particular target. Consequently, crypto custodians are needed to secure the key but at the same time make it highly available (hot versus cold wallets), to avoid slowing down transaction processes.

Cryptographic chaining of all transactions in one single ledger not only offers greater security, it also creates a complete audit trail for regulatory reporting or even direct access for supervisors (push versus pull). As regulatory reporting has become a major cost factor, this aspect offers an opportunity to reduce additional costs without simultaneously negatively impacting security. Real-time information about markets also promises better macroeconomic monitoring and consequently improved financial stability. When we think about onboarding and KYC, which concerns regulators and financial institutions alike, the connection to DLT frameworks that offer validated digital identity tokens (self-sovereign identity initiatives like ESSIF at the European level) should provide further opportunities.

It is evident that digital assets and DLT can have a significant impact on the financial market landscape and nearly all functions within organisations as shown in Figures 05a and 05b, pages 12 and 13. It is important to take stock of the existing set of services offered and the entire value chain. In the following, we will highlight examples on a more detailed level along the lifecycle of an over-the-counter (OTC) derivative.

05b **Asset Management**
Impact of DLT on the functions of an asset manager's value chain



* EMIR: European Market Infrastructure Regulation
** NAV: Net asset value

Source: KPMG, 2021

Use case "smart derivative contract"

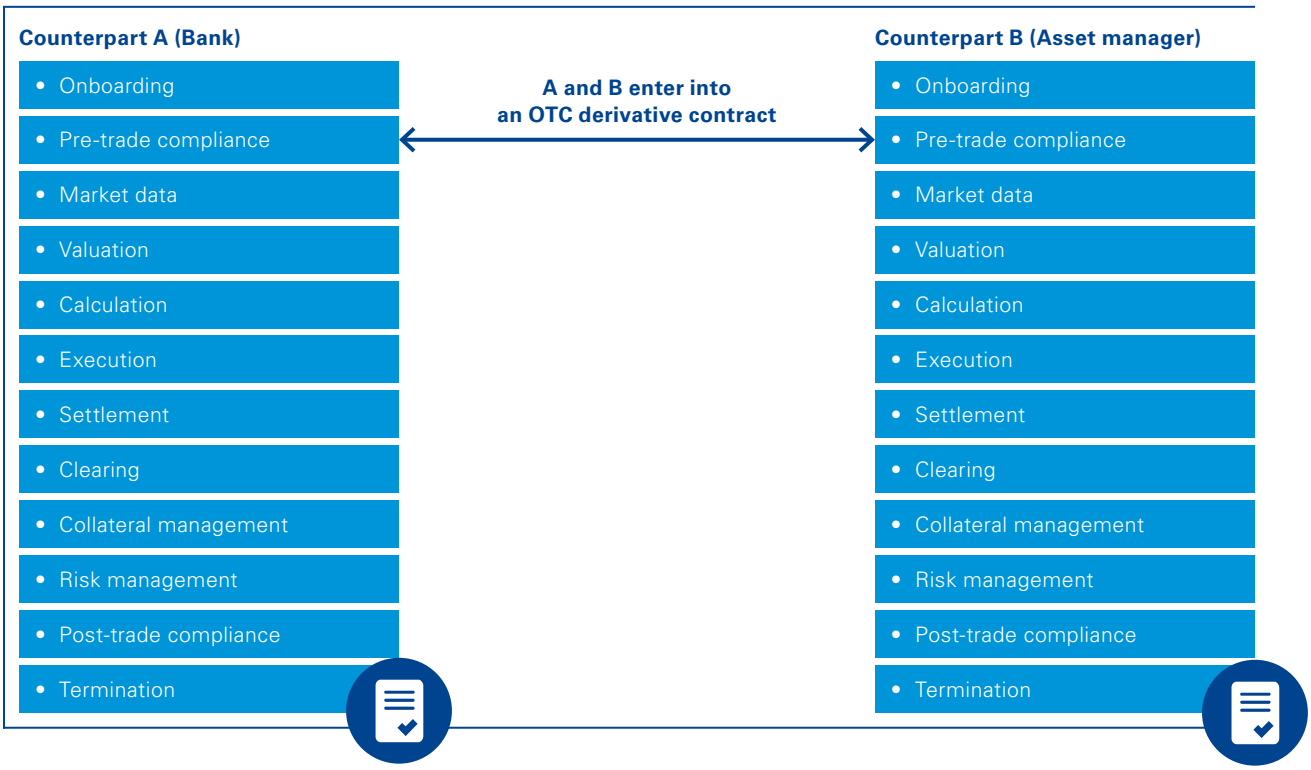
Due to the transparency and unforgeability of the data, the technology has the potential to optimise existing processes or even completely redesign them. For these reasons, the use of blockchain technology is particularly suitable in this area, for example, to avoid costs due to incorrect settlements of OTC derivatives. Therefore, we would like to briefly explain in the following how the use of DLT can affect the trading of an OTC derivative.

Apart from their economic value, OTC derivatives are usually highly customised products due to their bilateral contractual agreements. As a result of the individuality of the transactions and the constantly increasing regulatory requirements (e.g. EMIR), financial institutions struggle with the integration of necessary processes into their existing value chains without adding manual workarounds. If you look at the previous activities along the lifecycle of an OTC derivative (Figure 06a), it quickly becomes apparent that a large number of process steps must be performed individually by both counterparts. To assure accuracy, numerous (manual) reconciliations between counterparts are necessary.

However, instead of the classic arrangement, which involves a large number of paper-based contract documents and often highly manual process steps (e.g. booking, settlement, valuation), the two counterparties decide to digitise and automate key components of the derivative transaction lifecycle using distributed ledger technology, such as blockchain and smart contracts (Figure 06b, page 15). In this type of smart derivative contract, the traditional contract content of the derivative (such as termination date, contract type, notional amount, coupon, etc.) is digitised.

The pure digitisation of the contract content does not yet entail any significant process-related changes, but the programmability of smart derivative contracts makes it possible to automate activities (e.g. coupon payments, daily valuation and

06a **Impact of blockchain on the lifecycle of an OTC derivatives contract**
Current relevant processes



Source: KPMG, 2021

resulting margin payments etc.) triggered by events. In Figure 05a and 05b, page 12 and 13, we have outlined those potential components that can be easily automated. Adding these components to the smart derivative contract can eliminate many of the existing process inefficiencies in the OTC contract lifecycle (Figure 06a and 06b, page 14 and 15).

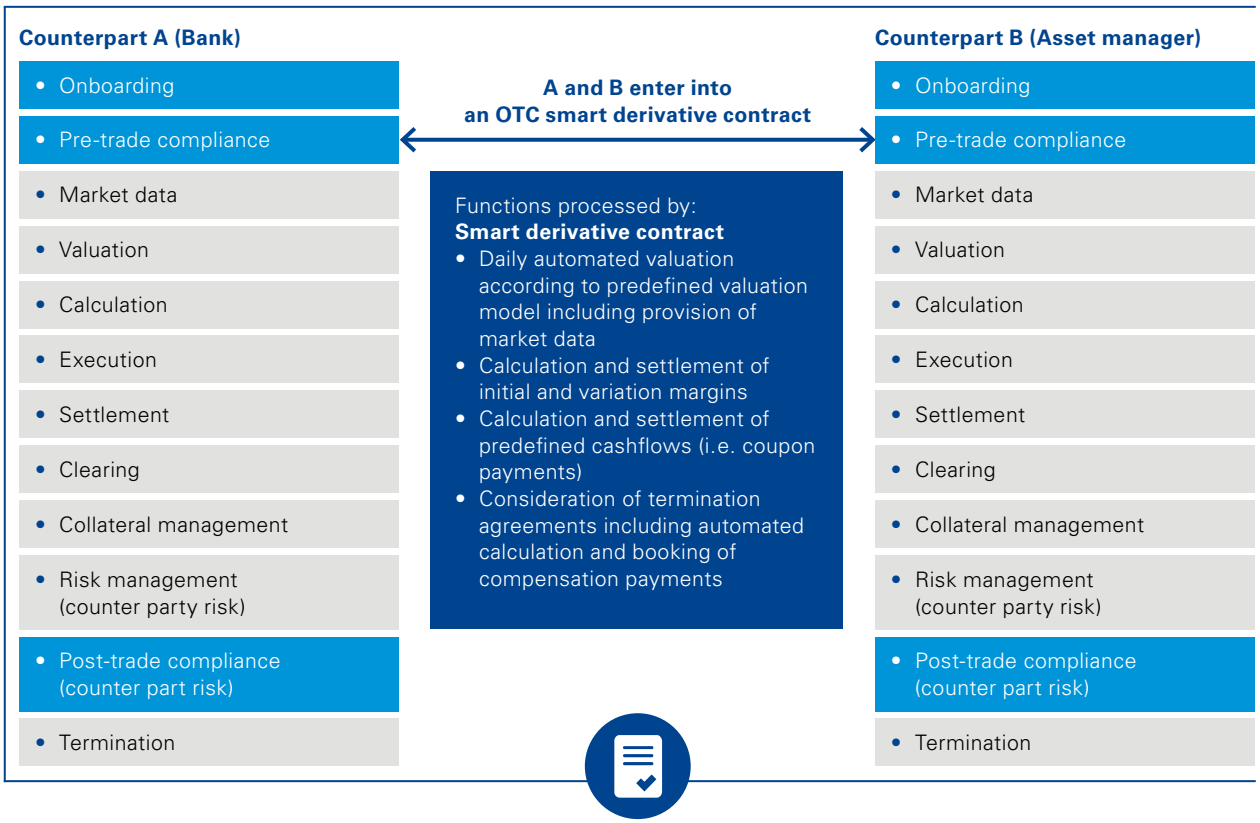
Finally, before the efficiency gains described above can fully unfold of a DLT solution in derivatives trading, there are challenges have to be overcome. First, a sufficiently large share of the market participants must accept and use a decentralised platform (critical mass). Second, the application must meet the requirements of the supervisory authorities and eliminate data protection concerns.

2.3 New revenue streams through distributed ledger technology

The impact of DLT on the financial market and its institutions is not limited to efficiency gains. Financial institutions will also be able to exploit completely new revenue streams through new assets (e.g. art) in form of security tokens and real digitisation/digitalisation[9].

Blockchain enables new business functionalities and revenue streams in the financial services industry. The nature of revenue will not fundamentally change, only it will be extended to new asset classes – making the illiquid liquid. Thus, within the banking industry, cryptocurrencies and security tokens (e.g. tokenised stocks or bonds) will continue to be subject to trading commissions, custody fees, and management fees, depending on the business model. The basis for this is, of course, a competitive digital wallet offering.

06b **Impact of blockchain on the lifecycle of an OTC derivatives contract**
Eliminated process steps (grey) by blockchain



Source: KPMG, 2021

9 Digitisation: converting data to a digital format; Digitalisation: transforming your business model for digital processes

For "new" revenue sources, the DeFi opportunities are particularly interesting. These digital applications are based on digital assets (e.g. cryptocurrencies). These are similar to classic retail business. Here, we can distinguish between deposits and loans on the one hand and staking on the other. For deposits and loans, cryptocurrencies can be invested and lent "risk-free" with the help of DeFi Apps. Staking, on the other hand, generates income from the use of stakes for the verification of transactions via "staking pools". Hence, it is possible to utilise the user's cryptocurrencies to generate income. Staking is the term used in proof-of-stake blockchains (e.g. Ethereum 2.0) to describe the locking of cryptocurrencies over a certain period of time in order to support the network. As a reward, the bank receives a return on the invested coins from the network. To participate, the networks usually require a minimum size. The rapidly developing DeFi sector can enable decentralised banking products without a bank, but the use cases are targeted toward a very specific group. Decentralised loans, for example, need to be backed by a crypto security. While it is certainly impressive that automated decentralised networks allow borrowing and lending without any bank or institution as intermediary, the usage for mass adoption is limited. Most businesses and individuals are unable to deposit collateral for a loan. Even if unsecured DeFi loans exist, it is doubtful that their current alpha-stage development provides enough liquidity to such protocols, since the (perceived) risk is significantly higher compared to bank deposits.

To look at the corporate banking sector with a few thoughts in mind, for corporate clients, banks can generate additional revenue by tokenising bonds and notes. DLT enables small and medium-sized enterprises (SMEs) to issue bonds. These investments can be offered to retail customers as project investments. Today, the pizzeria L'Osteria was already able to issue EUR 2.3 million in debt capital via this method.[10] Once the tokens are developed, the bank can offer customers to invest in bonds to distribute the coins. Of course, potential availability of the coins or tradability of the coins on the secondary market makes them even more attractive.

Looking at the asset management industry in particular, new sources of revenue can also be observed here through the use and adoption of DLT. The distribution of fund products, especially in the area of mutual funds for retail clients issued on a blockchain, can significantly impact the customer approach. Asset managers can potentially distribute their products to new customer groups. Moreover, the possibility of direct sales to retail customers opens up a new opportunity to learn more about individual clients and their needs. Thus, asset managers can use this information to develop more customised services and products for their clients.

Furthermore, tokenisation will broaden the investment universe. By providing customers access to an investment in cryptocurrencies, asset managers give their customers the opportunity to diversify their portfolio more and reach new client groups. This goal can also be achieved by tokenising rather illiquid assets, e.g. art, real estate. By offering their clients the opportunity to invest in these products, asset managers have the chance to respond to the ever-increasing margin pressure by adding new tokenised assets to fund vehicles.

Finally, there are of course revenue streams more closely related to the provision and maintenance of the infrastructure itself, which is not considered as a classical financial services revenue stream. These include, among others, fees for the use of API and infrastructure, fees for subscriptions and transactions, maintenance fees for maintaining the code base of a distributed ledger network, and so on. This is of course first limited to the specialist providers in the digital asset ecosystem and not to traditional market participants.

10 As of 08.12.2021 https://losteria.net/fileadmin/user_upload/Wertpapierinformationsblatt.pdf

3 State of play in Europe – opinion poll results

3.1 Exploring the opinions of Financial Services market players

The beginning of the new decade is also the beginning of a new era in the financial world – The Era of Digital Assets. Leading financial institutions recognise this major paradigm shift. In our opinion poll, we asked 20 leading financial institutions from six different countries across Europe about the trends they see in the digital assets space. The companies surveyed were selected in such a way that the result represents an informative cross-section of the financial industry in Europe.

While the demand for digital assets is steadily increasing, the expected impact on the financial industry is deemed to be disruptive and certain challenges remain of concern for the different players in the industry.

In the following, we have two key statements from our opinion poll: Over half of the market participants asked in our poll are still not interested in digital assets due to regulatory uncertainties. However, as outlined in Section 2.1, the European regulators have taken important steps toward regulating digital assets, which may lead to more certainty in the future. Despite the regulatory uncertainty, distributed ledger technology has shown tremendous potential in several areas. It offers a unique form of transparency and security, which helps companies achieve greater operational efficiency. It also allows companies to attract more customers through new product offerings and asset classes, thus generating more revenue. This is confirmed by the fact that the majority of our participants show interest in investing in the DLT infrastructure.

We will present further detailed results of our survey along four hypotheses in the next chapters.

3.2 Regulatory certainty paves the way for innovation

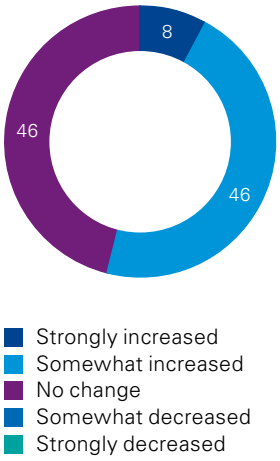
The recent hype in the crypto market has shown that the general attitude towards digital assets is shifting. Demand is steadily increasing among both private and professional investment groups. The surge of the market cap in cryptocurrencies over the past year impressively illustrates this change: It has risen from USD 318 billion to USD 2.279 billion[11], which is equivalent to the GDP of Spain, Belgium and Switzerland combined[12].

The increased demand is also reflected by the results of our poll: More than half of our respondents notice an increase in the interest in security tokens or cryptocurrencies, while not a single respondent reports a decrease in the interest in digital assets among their customers (Figure 08).

But not only the demand is changing – our opinion poll results show movement on the supply side as well. Two-thirds of respondents indicated that they have already launched or plan to launch projects relevant to digital assets, as mentioned in Figure 09, page 19.

08 **Have you lately noticed a change in interest in security tokens or cryptocurrencies among your customers?**
(in percent)

Banks and Asset managers

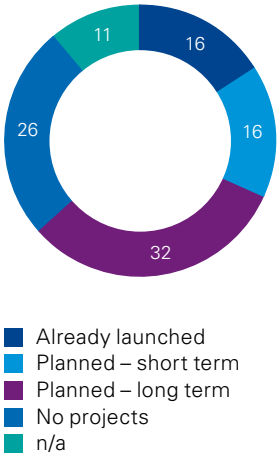


Source: KPMG, 2021

11 As of 03.12.2021 https://coinmarketcap.com/de/charts/
12 As of 08.12.2021 https://www.statista.com/statistics/685925/gdp-of-european-countries

09 **Do you already offer or do you plan to offer services/products considering security tokens or cryptocurrencies?**
(in percent, values deviating from 100 result from rounding differences)

Banks and Asset managers



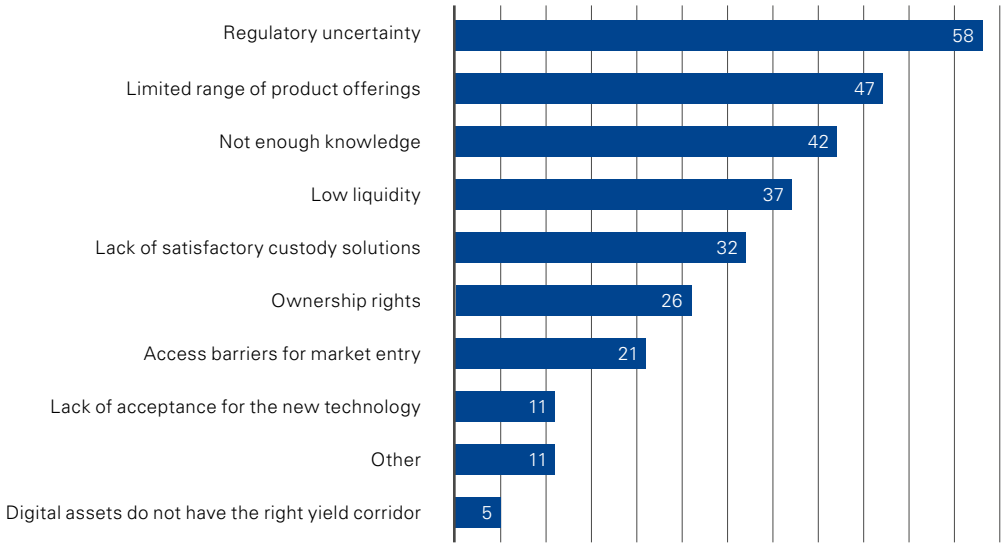
Source: KPMG, 2021

Nonetheless, the question remains why 26 percent of market participants interviewed continue to state that they have no plans to offer services in relation to security tokens or cryptocurrencies.

In our opinion, this lack of supply by financial institutions could be due to a lack of certainty. Our poll shows that regulatory uncertainty is the main reason why customers are not interested in digital assets (Figure 10). Furthermore, there is currently a limited range of digital asset-related products being offered on the market. In fact, almost half of the respondents believe that the limited supply discourages customers from entering the market. This indicates that there is great potential for the introduction of new attractive products in the market.

10 **What are the main reasons customers might not be interested in an investment in security tokens?**
(in percent, multiple answers possible)

Banks and Asset managers



Source: KPMG, 2021

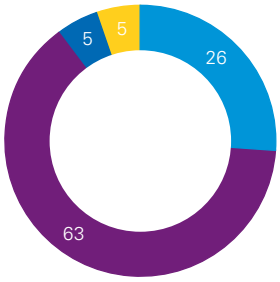
To address the challenges of the fast-evolving digital assets ecosystem, European regulatory authorities have made efforts to provide certainty to investors and institutions. For instance, in September 2020, the European Commission published a digital finance package that includes MiCA and the pilot regime for market infrastructure based on DLT regulation. This package clearly signalises some certainty for the market in the future. Since the regulation of digital asset markets is still evolving under the European pilot regime and national authorities (see also the relevant developments in Germany in Section 2.1), most respondents believe that the regulatory framework will be fully established within the next five years, which can be seen in Figure 11.

Nevertheless, this signal has the potential to trigger a chain of activities for the financial industry to prepare for a new era of digital assets. More than half of the respondents are (at least partly) aware of the digital finance package and have consequently triggered activities in their company (Figure 12).

In summary, the demand for digital assets is growing and financial institutions are also showing their interest in this market by investing in related digital asset projects. However, regulatory uncertainty remains the main reason why some customers are not yet interested in this new asset class. However, the recent regulatory developments in Europe have signalled to the market that there will be a more secure framework in the future. In our opinion, we will see a wide range of product offerings in this area within the next five years.

11 **By when do you expect regulatory certainty to be established enough so that the majority of key players will follow into the crypto market?**
(in percent, values deviating from 100 result from rounding differences)

Banks and Asset managers

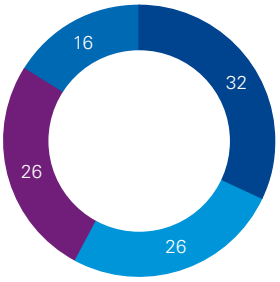


- Less than 1 year
- 1 to 2 years
- 3 to 5 years
- 6 to 10 years
- More than 10 years
- n/a

Source: KPMG, 2021

12 **Is your company aware of the Digital Finance Package (including MiCA and the pilot regime for market infrastructure based on DLT regulation) published in September 2020 by the European Commission, and has it triggered any subsequent activities?**
(in percent)

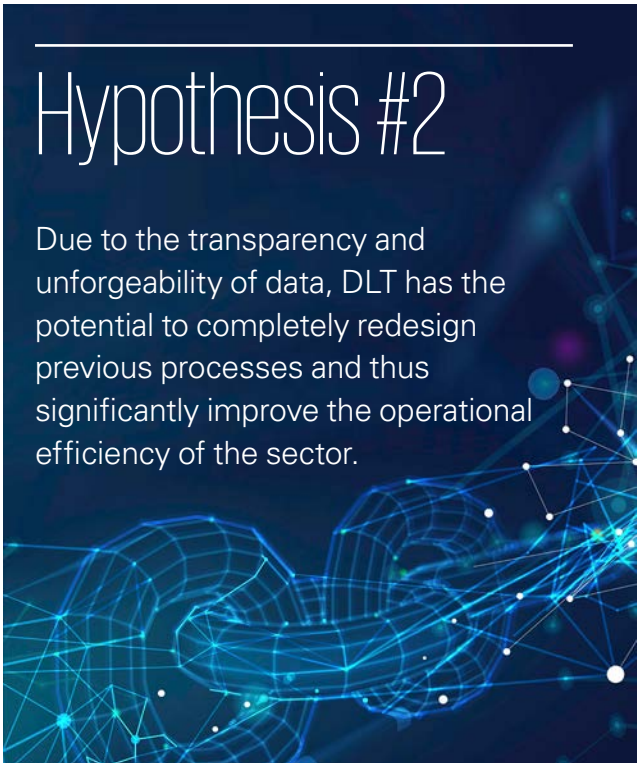
Banks and Asset managers



- Fully aware and subsequent activities triggered
- Fully aware, but no subsequent activities triggered
- Partially aware and targeted activities triggered
- Partially aware and no activities triggered
- Not aware
- n/a

Source: KPMG, 2021

3.3 Distributed ledger technology leads to more efficient financial markets



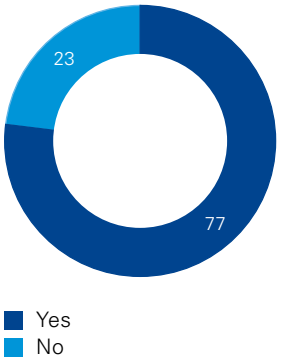
Since the introduction of Bitcoin in 2008, there have been considerations as to whether this new technology can replace the entire financial system. Bitcoin and other digital assets are transferred on a fully decentralised and cryptographic system, namely the blockchain. The decentralised nature of the blockchain provides full transparency to its users and therefore eliminates the need for an intermediary to provide security. In addition, the blockchain uses cryptography to verify transactions, which makes it almost impossible to manipulate the data and thus offers a very high level of security to its users. In fact, most respondents believe that certain roles in the financial sector, e.g. those of custodians, will be significantly changed and might even be eliminated by blockchain. This is also very much assumed by the asset management participants in the opinion poll (Figure 14).

Roles change because the infrastructure and thus the processes change.

In 2013, with the introduction of the Ethereum blockchain, another new feature was added to the blockchain, namely smart contracts. Over the past eight years, smart contracts have shown great potential for optimising financial transactions and automating manual processes.

14 **Do you think that certain roles, e.g. those of custodians, will be significantly changed?**
(in percent)

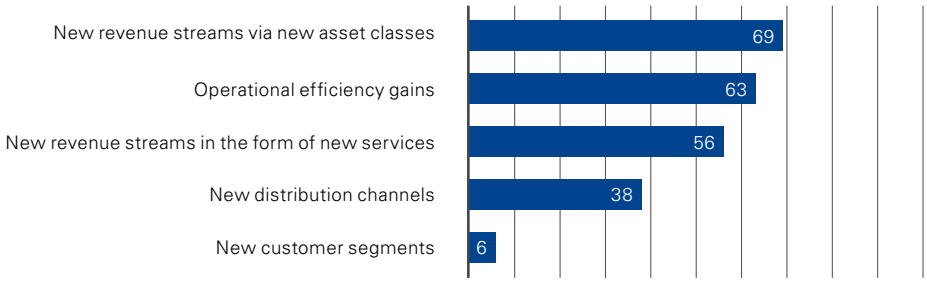
Asset managers



Source: KPMG, 2021

15 **Why are you investing in/considering DLT/blockchain implementation and offering digital assets?**
(in percent, multiple answers possible)

Banks and Asset managers



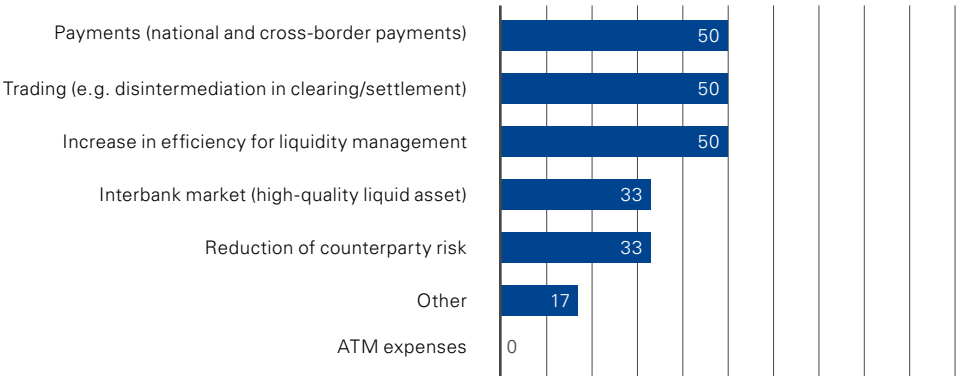
Source: KPMG, 2021

For instance, many transactions are processed through different banks. Since the trading/trade execution and the delivery of the instrument take place in different systems, there is usually a time lag between settlement and delivery. This time gap increases the settlement risk for all parties involved. Since many transactions and the follow-up activities needed to complete the settlement are still executed manually, there are also operational risks involved. Probably based on these facts and other motives, 63 percent of respondents are looking to increase efficiency when investing in DLT (Figure 15).

To dig a bit deeper, smart contracts allow parties to encode their agreements in the ledger and have them executed automatically. As a result, financial institutions can execute payments simultaneously with the delivery of the instruments (Delivery versus Payment, DvP) and minimise operational and settlement risks. An end-to-end solution can enable institutions to set up a real-time reporting system. This, in turn, provides access to real-time data and helps financial institutions make immediate decisions. In addition, customers can also be granted access to the real-time data of their transactions, which gains their trust and builds a better relation-

16 **Where do you feel is the highest cost-cutting potential through DLT in the short and long run?**
(in percent, multiple answers possible)

Banks



Source: KPMG, 2021

17 **Which functions of your value chain will be impacted the most by DLT in your opinion?**
(in percent, multiple answers possible)

Asset managers

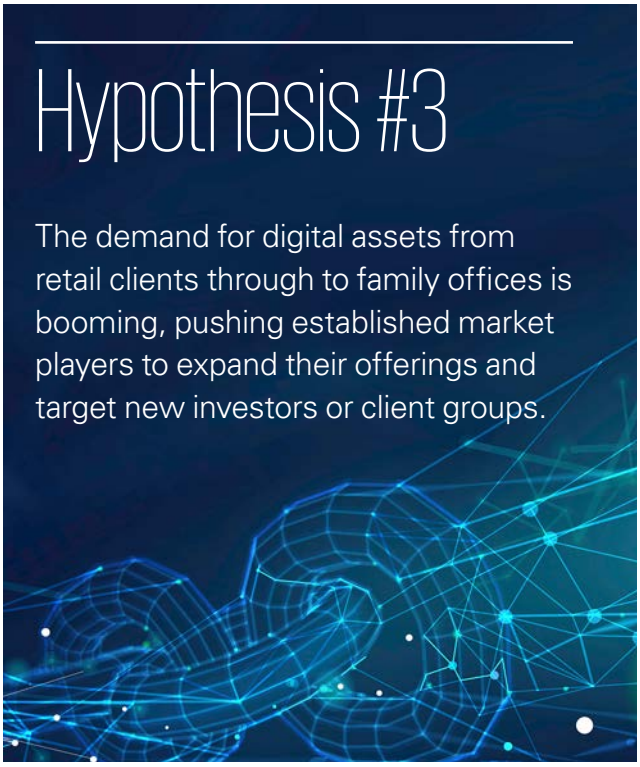
Source: KPMG, 2021

ship with them. Our respondents believe that payments, trading, settlement and liquidity management have the greatest cost-cutting potential, which is the result from the following questions for our banking and asset management participants (Figure 16, page 22, and Figure 17).

Beside those efficiency facts, even though the blockchain is pseudonymous and only the wallet number can be tracked, having knowledge of someone's wallet number allows a person to track all transactions in and out of their wallet. However, recent projects in this area have brought promising solutions for this problem. These new permissioned blockchains allow only approved users, such as supervisory authorities, to have access to certain information. This innovation allows banks and other intermediaries to benefit from the transparency and security of blockchains while maintaining customer privacy. In the current financial system, each financial institution has its own ledgers and reporting system. Blockchain technology, specifically permissioned blockchains, has the potential to consolidate all these ledgers into one system and reduce enormous operational costs. A successful DLT environment also makes it easier to audit reporting data and improve AML (anti-money-laundering) processes.

In conclusion, our results support our hypothesis and our belief that DLT and specifically smart contracts can cut many operational costs and accelerate digitalisation and automation in the financial markets. It is also fair to say that some participants are already going further and seeing not only the asset custody aspect of digital assets (keyword the "new gold"), but also have an understanding of the fundamental capabilities of DLT.

3.4 Truly digital services and products

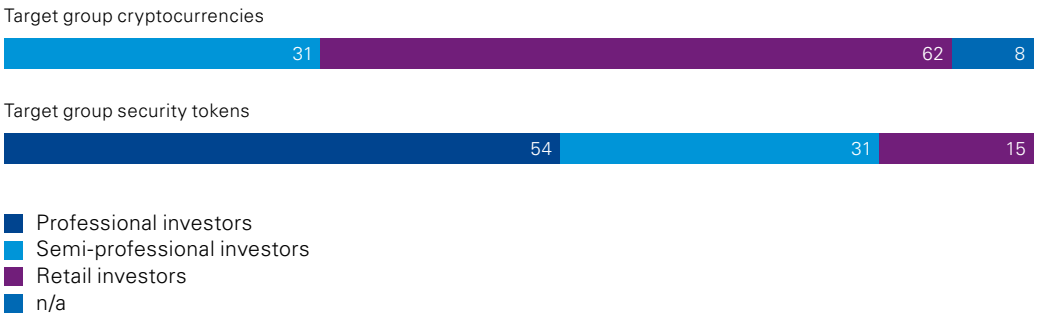


While investing in cryptocurrencies has been very profitable in recent years, it is also very volatile and therefore poses a high risk to investors. Unlike retail investors, professional investors usually have limited risk exposure, which must also be reported to authorities and stakeholders. According to a report published by the Basel Committee on Banking Supervision (BIS) in July 2021, crypto assets are assigned a risk rate of 1,250 percent, which is the highest risk rate among all asset classes.[13]

In this context, security tokens seem to be more attractive to institutional investors, as they only represent assets on a blockchain and pose no further risk to their stakeholders (Figure 18).

18 **Who do you think is the largest target group for an investment in digital assets?**
(in percent, values deviating from 100 result from rounding differences)

Asset managers

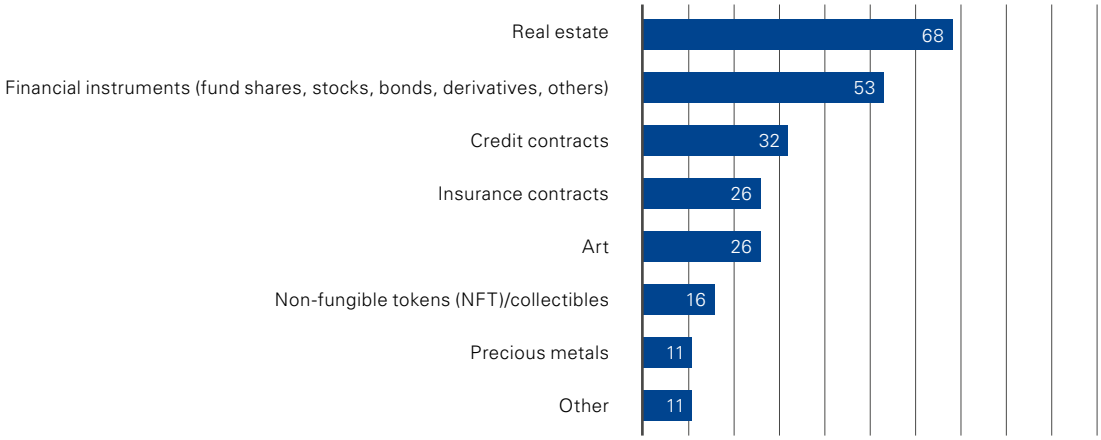


Source: KPMG, 2021

13 As of 08.12.2021 https://www.bis.org/bcbs/publ/d519.pdf

19 **In your opinion: Which assets have the most potential for tokenisation?**
(in percent, multiple answers possible)

Banks



Source: KPMG, 2021

Even before the German law for electronic securities was passed, some companies were testing token-based bonds. One of them was the housing company Vonovia. The Bochum-based company already issued a digital security at the beginning of the year 2021. To date, however, it was mainly startups whose core business revolved around blockchain technology that used such instruments. Companies targeting private investors have also made their first attempts. For example, the system gastronomy chain L'Osteria issued a token-based bond at the end of 2019. With the law now passed, interest from traditional industrial companies is also likely to increase. Blockchain technology can greatly simplify financial markets and investors can benefit from faster and more convenient transactions for their securities. Additionally, to the before mentioned examples, the European Investment Bank (EIB) launched a EUR 100 million digital bond on the Ethereum blockchain, in April 2021. With the technology in hand and regulations developing, we believe further financial instruments like fund shares and stocks will be brought onto the blockchain and open many new markets for financial institutions.

But what do our participants see as tokenisable? According to the responses in our opinion poll, real estate, financial instruments and credit contracts seem to have the greatest potential for tokenisation (Figure 19).

In addition, we believe that many unique artworks and collectibles also have great potential for tokenisation. It's probably no coincidence that non-fungible tokens (NFTs) – digitally protected originals – are among the most influential movements in contemporary art. Tokenisation makes art and collectibles more accessible and affordable for investors. A Swiss crypto bank has already implemented this opportunity in cooperation with an art investment firm, allowing partial investments in a Pablo Picasso artwork for USD 6,000 each. The shares, securitised via non-fungible crypto tokens, grant a right of ownership to the Picasso painting "Fillette au béret". By using blockchain technology, the artwork is therefore not reserved for just one owner but can be used by several investors as an investment product, which attracts new customer groups[14].

14 As of 08.12.2021 https://de.cointelegraph.com/news/master-pieces-swiss-bank-issuing-nft-shares-in-picasso-painting-for-6k-each

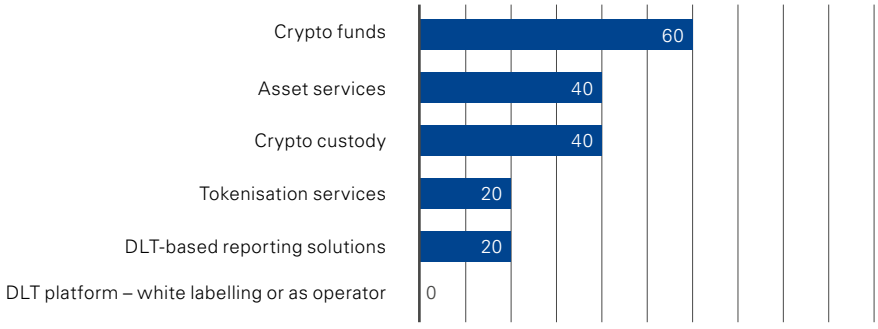
We believe that asset managers can benefit from the tokenisation of assets. Security tokens are not only more attractive for the customers but help asset managers to trade assets in real-time as well as more efficiently. In this context, offering new portfolios containing digital assets can be very convincing for their customers. Furthermore, we believe that asset managers can become more attractive to customers if they offer their fund shares as security tokens. Our report suggests that crypto funds, asset servicing and crypto custody are the services and products that asset managers find most attractive (Figure 20).

In addition to asset managers, banks can reach out to new customers through digital assets as well. Services and products for digital assets are simply more attractive for customers these days. Banks can also trade more efficiently and gain more revenues through trading.

To conclude, we see great potential for both banks and asset managers to reach new customers with products and services related to digital assets, which supports our initial hypothesis.

20 **Which types of services and products do you offer or plan to offer in the future?**
(in percent, multiple answers possible)

Asset managers



Source: KPMG, 2021

3.5 No future without digital assets

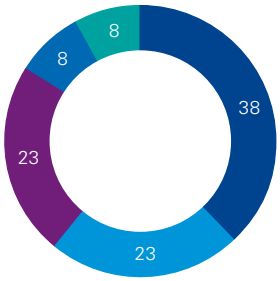
The rise of the crypto market and regulatory developments have created exceptional opportunities. In the absence of the big financial institutions, FinTechs and highly specialised service providers, e.g. crypto exchanges, seem to have been benefitting from this most. As these companies grow, financial institutions tend to worry about their current market position. In fact, most respondents see highly specialised service providers as even more threatening than their traditional competitors (Figure 21).

With more and more assets going digital, customers will most likely prefer the service providers with the greatest number of product offerings in one platform. According to the results in our opinion poll, two thirds of respondents believe that companies with a universal product and services portfolio profit the most from the developments in DLT (Figure 22).

We believe that crypto exchanges will expand their product offering to include tokenised real estate, art/collectibles and even financial instruments. In this context, existing financial institutions need to build the necessary infrastructures to offer digital assets and minimise the risk of losing relevance in the future.

21 **Who do you consider as the biggest threat for your business model?**
(in percent)

Asset managers

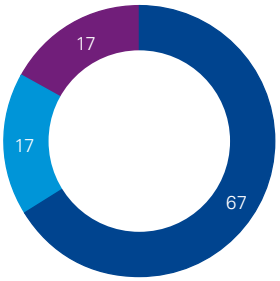


- Highly specialised service providers
- BigTechs (e.g., Google, Amazon, Paypal, Facebook)
- Traditional competitors
- FinTechs
- Other

Source: KPMG, 2021

22 **Who do you think will profit the most from the developments in DLT?**
(in percent, values deviating from 100 result from rounding differences)

Banks



- Large institutions with a universal product and services portfolio
- DLT-focused FinTechs
- Challenger banks
- Small specialised institutions

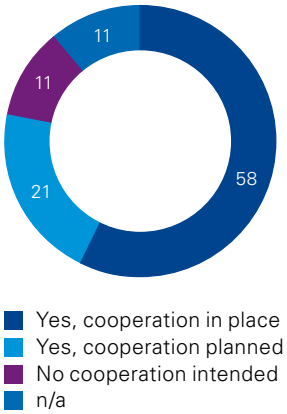
Source: KPMG, 2021

However, the expansion of the product range is associated with high costs. As DLT is still quite new compared to other technologies, it is understandable that many financial institutions do not have the necessary skills. Moreover, many institutions would rather focus their resources on day-to-day business and outsource their new solutions to consultants and FinTechs. In fact, 79 percent of our respondents are already working with FinTechs or at least planning to cooperate with FinTechs in the future (Figure 23).

In summary, it can be said that diversity in the financial sector has increased enormously in recent years. Traditional market players are faced with several FinTechs und BigTechs offering a wide range of financial services. Some focus on a single product or service, while others have used their initial success to expand their service offering. Some FinTechs are converting to financial institutions like banks, custodians or asset managers, while others have become service providers or value chain partners to traditional market players. We believe that financial institutions need to act quickly to minimise the risk of trailing behind their new competitors.

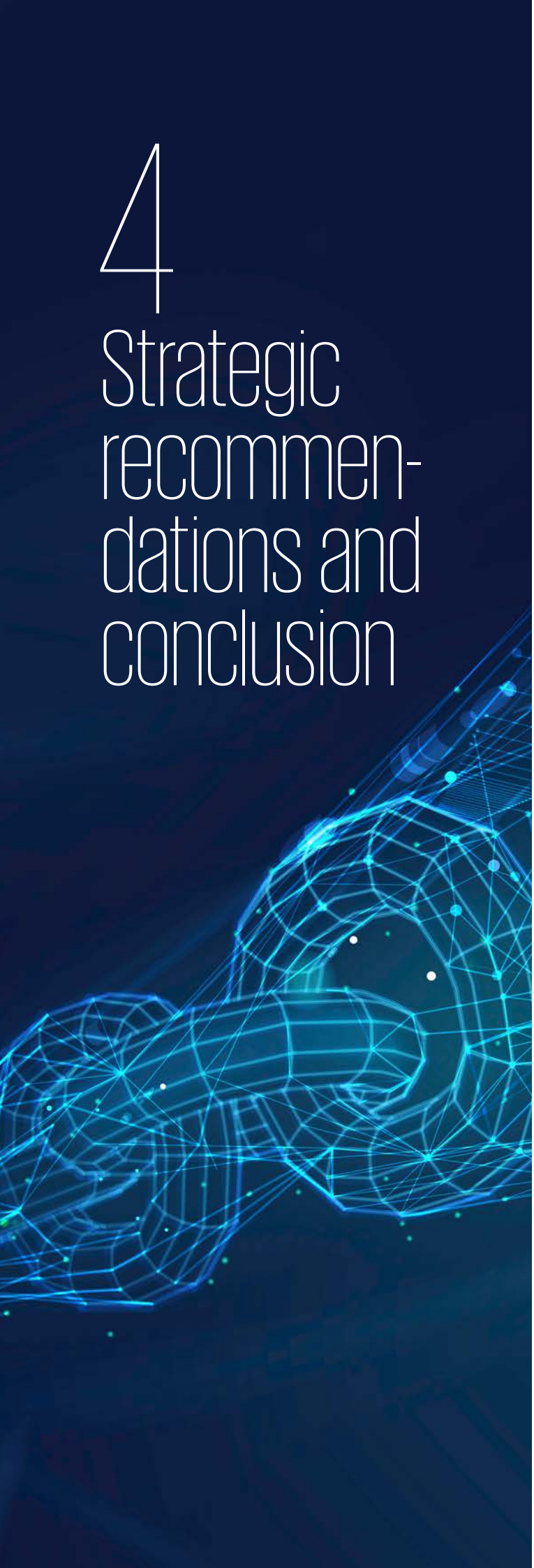
23 **Do you have any or plan to enter partnerships with FinTechs?**
(in percent, values deviating from 100 result from rounding differences)

Banks and Asset managers



Source: KPMG, 2021

4 Strategic recommendations and conclusion



As we outlined in Chapter 2, distributed ledger technology has developed rapidly in recent years, with regulatory initiatives paving the way for adoption among established market participants. The new world of a DLT-based financial system has the potential to offer significant benefits for the issuance, trading, exchange, clearing, settlement, and services of digital assets. In order to back our hypotheses, we analysed the expectations of major financial institutions in Europe by conducting a opinion poll. In Chapter 3, we showed that our four hypotheses are acknowledged, and that banking and asset management market participants expect the DLT to severely impact the industry in the near future.

We have seen that regulatory uncertainty is believed to be the main reason why customers hesitate to invest in digital assets. At the same time, 83 percent of all survey participants expect a sufficiently certain regulatory framework by 2026, allowing the majority of key players to follow into the crypto market. With highly anticipated new regulations arriving, most major institutions are racing to position themselves in this unchartered digital asset territory. While some institutions are progressing rapidly, others are still disregarding the significant impact the industry will experience due to DLT.

Our opinion poll reveals that with 83 percent, most of all participating banks invest in DLT implementation to gain operational efficiency. At the same time, 67 percent of all participating asset management companies specified that they are expecting Asset Servicing and Trading and Settlement to be impacted most by DLT. Thus, there seems to be a consensus among most major institutions that DLT can cut many operational costs and increase efficiency in the value chain.

To make use of DLT, detailed knowledge of all aspects of the value chain is required. However, only when this knowledge about the value chain is combined with proficiency and experience in regard to DLT and smart contracts, can the true potential of reducing costs, accelerating and automating processes be fully exploited.

DLT creates a great potential for both banks and asset managers to reach new customers. 83 percent of all participating banking institutions indicated that financial instruments, such as shares or funds, have the most significant potential for tokenisation. On the other hand, the participating asset managers recognised the most significant potential in tokenising real estate and even art. Asset classes that have been too inaccessible for smaller investors, due to high costs, will experience improved accessibility. With the help of non-fungible tokens, fractional parts of an art piece can be purchased, legally owned and traded. In order to win the newly attracted customers, participating institutions have planned different services and products. The most common among them are tokenisation services, asset servicing, crypto funds, and crypto custody.

With the help of the opinion poll, participating banks and asset managers have confirmed our fourth and final hypothesis. Although digital assets can open new doors to financial institutions, highly specialised service providers and FinTechs currently own an extensive market share. Financial institutions need to act quickly to minimise the risk of trailing behind their new competitors.

Especially in an environment that is as fast-paced as this one, most of our business partners were overwhelmed by the number of topics to consider during the implementation of DLT. To ensure a smooth transformation towards digital assets, we are happy to navigate our clients through each transformation process.

Now that we have explored the opportunities of DLT and backed our hypotheses with a comprehensive opinion poll, it is time to act. Every European bank and asset manager must have a strategic roadmap to position themselves. In alignment with these results, we have expanded our services to include support for market participants and challengers.

Our services

Regulatory – as a driver and basis for change

We advise and assist our clients to thoroughly analyse potentials arising from DLT for the purpose of assuring future competitiveness. To ensure compliance, it is crucial to understand all regulations and their impact on each service offered. With our cumulative expertise at KPMG, we have developed a 360-degree understanding of the major European and German regulatory frameworks such as MiCA, eWpG including KryptoFAV, FoStoG, KWG, MiFID and all other relevant regulations. By combining our many years of experience in the banking and asset management industry with our knowledge in the regulatory environment for digital assets, we protect our clients from potential pitfalls and enable them to explore new services with the help of DLT.

Value chain – operational excellence with DLT

At KPMG, we specialise in the interface between value chain and technology. The insights that we have gained into the value chains of many financial institutions enable us to compare and benchmark processes across the entire banking and asset management industry. With this experience, we continuously help our clients to optimise their operations, to ensure future competitiveness and even market share growth. KPMG already helps its clients to identify the service that ideally complements their existing business model. The implementation of tokenisation brings with it significant transformations to the traditional value chain, which we can precisely navigate for our clients. We assist in the design and implementation of governance and internal control structures to ensure smooth operations.

Entering the competition

Retail and institutional investors are actively seeking ways to benefit from crypto developments. Both established market players and challengers are increasingly competing for the growing crypto clientele. Analysis of the competitive landscape reveals that traditional fiat players are trying to enter the crypto market, while crypto competitors are trying to gain the trust of the mainstream customer base by expanding fiat capabilities. Our expertise includes the strategic design of digital asset-related business models, transformation into operating models and sustainable implementation under applicable regulatory requirements. We are the competence centre at the interface between licensing and authorisation procedures, target image as well as regulatory compliant business models.

Tokenising the stock and bond world

KPMG helps bridge traditional and blockchain systems. The type of blockchain technology that powers digital assets is fundamentally different from the traditional information systems on which the existing financial market structure is built. We provide you with transparency on current market activities, identify end-customer needs and opportunities for digital assets – and support you when you go live. We guide you through your new product/service processes (regulatory screening, licensing support etc.) and provide token design support. In a next step, we ensure the solid and legally compliant implementation of a DLT solution, while also taking cooperation options into account.

Ultimately, regulatory security is the foundation for applications with established players and challengers. The complex topic of digital assets is not easy to understand. KPMG speaks your language and makes the technology tangible through simple solutions. We deepen your understanding of the relevance, by showing you what digital assets mean specifically for your individual industry, your business model and your value chain. We show you how to successfully position yourself on the topic of digital assets and develop a holistic roadmap for strategy, use cases, organisation and regulation.

Glossary

Blockchain

A special type of distributed ledger technology, in which transactions are bundled in chained blocks.

Decentralised finance (DeFi)

DeFi describes the transition from the traditional closed financial systems of banks to a decentralised ecosystem consisting of financial applications based on blockchain technology. DeFi systems are characterised by their transparency, interoperability and permission-free accessibility for private individuals worldwide.

Distributed ledger technology (DLT)

A data base which is decentralised, i.e., distributed across several computers or nodes.

Non-fungible token (NFT)

A non-fungible token is a non-replacable digitally protected object. It can be understood as a unique digital asset, which represents ownership of a certain real world asset, e.g. art, music etc.

Hot wallet/Cold wallet

A hot wallet is a cryptocurrency wallet that is connected to the internet and can be used for instant transactions of crypto assets. In contrast, a cold wallet employs various controls and security measures, including being disconnected from the internet, to create more security for the storage of crypto assets.

Initial coin offering (ICO)

An initial coin offering is when a company raises capital for investments by selling its own cryptocurrency coins or tokens related to its products or services. The coins offered by the company can correspond to a financial stake in the project or offer a benefit for its use.

Node

Each computer connected to a blockchain network corresponds to a node. There are different types of nodes in a network: a full node is a computer that fully validates transactions and fully downloads the blockchain data. A light node (or lightweight node) on the other hand, only downloads individual segments of the blockchain and validates transactions via a different process.

Proof of stake (PoS)

As an alternative to proof of work, the proof of stake system is used to add blocks to a blockchain. In a proof of stake system, validators (instead of miners) can add new blocks to the blockchain based on their value share of the blockchain's native cryptocurrency as their "stake". This helps to ensure their correct functionality and the overall integrity of the transaction ledger.

Proof of work (PoW)

Proof of work describes a system used to decide who can add new blocks to a blockchain. Miners use their computing power to acquire the right to create the next block with their transaction history. Proof of work helps to ensure the integrity of the blockchain as a whole and prevent double spending and Sybil attacks.

Public key/Private key

A public or private key is an alphanumeric string used when sending and receiving cryptocurrencies. The public key can always be derived from the private key according to predefined rules. By combining a secret private key and a known public key, the key holder can provide proof of their unique identity and assert control over or ownership of cryptocurrencies.

Stablecoin

Stablecoins are cryptocurrency tokens that are pegged to a stable asset, such as the fiat currency US dollar, or stabilised by an algorithm that constantly adjusts to supply and demand. In theory, stablecoins are resistant to the volatility of other types of cryptocurrencies because their value is measured against a known asset.

Staking

In a proof of stake consensus system, users must bind (or "stake") their cryptocurrency tokens before they can validate transactions on the network and receive block rewards. Proof of stake blockchains often require users to meet minimum staking requirements in order to validate transactions.

Tokenisation

Tokenisation describes the process of converting an asset into a representation of its value on the blockchain (in the form of a token). The process of tokenisation can involve various legal and technical components and can vary depending on the jurisdiction.

Wallet

Wallets are apps for handling public and private keys used in blockchain transactions. Wallet apps can interact with blockchains in many ways, including sending and receiving cryptocurrencies and signing messages. Common mobile wallet apps often offer their services for multiple cryptocurrencies at the same time.

List of abbreviations

ATM	Automatic teller machine
BdF	Banque de France
BIS	Bank for International Settlements
CBDC	Central bank digital currency
DeFi	Decentralised finance
DLT	Distributed ledger technology
EC	European Commission
ECB	European Central Bank
EMIR	European Market Infrastructure Regulation
EUR	Euro
eWpG	Gesetz über elektronische Wertpapiere (German Electronic Securities Act)
FoStoG	Fondsstandortgesetz (German Fund Location Act)
GDP	Gross domestic product
HQLA	High-quality liquid assets
ICT	Information and communications technology
KryptoFAV	Verordnung über Kryptofondsanteile (Crypto Fund Shares Ordinance)
KWG	Kreditwesengesetz (German Banking Act)
MAS	Monetary Authority of Singapore
MiCA	Markets in crypto assets
MiFID	Richtlinie 2014/65/EU über Märkte für Finanzinstrumente – Finanzmarktrichtlinie (Markets in Financial Instruments Directive)
MTF	Multilateral trading facilities
NAV	Net asset value
NCA	National competent authorities
NFT	Non-fungible token
OTC	Over-the-counter
SME	Small and medium-sized enterprises
USD	United States dollar
WEF	World Economic Forum

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