



SHOULD EUROPE DEVELOP INTO A TOKEN ECONOMY?



The evaluations of the current situation of tokenisation in Europe in this report as well as the conclusions and recommendations drawn upon it are the consolidated individual views of European industry representatives participating in different working sessions and bootcamps. Those were organised by the Tokenise Europe 2025 initiative, founded by the European Commission and the German Banking Association (BdB), moderated by Roland Berger with the participation of more than 20 members from different industries in Europe, which took place during summer 2022. Views do not represent an official position of the European Commission or Commission officials.

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Management summary

Tokenisation is an innovation that is currently being driven by many market participants representing a wide variety of roles and interests. This leads to a very heterogeneous set of definitions, use cases and legal frameworks worldwide. After assessing the overall situation, the present report seeks to derive a target scenario for a tokenised Europe and outlines the steps that must be taken to realise it. A token always represents an asset in a digital form combined with information and assignable digital rights, all of which are connected in a programmable and heavily automated way. A successful token economy has the potential to create new services and business models in many industries. Currently, however, several issues are holding back the development of tokenisation in Europe. These include: an underestimation of the importance of the technology in daily business; a certain general hesitance about innovation among the wider European population; the lack of a broader understanding of distributed ledger technologies (DLTs) and blockchain technology both in the public at large and among decision makers; and a diffuse and unclear legal and regulatory framework.

If Europe can overcome these barriers and fully leverage the potential of tokenisation in the next few years, it can become the backbone for a digitalised industry 4.0 across Europe's economy, merging supply chains, trade finance and logistics into a single seamless process. Yet the transition goes far beyond industrial applications: adopting a token economy in the financial markets would also lead to measurably more efficiency and greater safety, resilience and trust, while considerably reducing costs, complexity and intermediation.

To develop Europe's token economy, all stakeholders, regardless of their economic interests, will have to make a concerted effort in the fields of education, raising awareness and communication. That said, there are also specific obligations for each stakeholder: legislators and regulators will be key to create a simple and harmonised legal framework that facilitates innovation and incentivises corporates and citizens to further drive tokenisation while maintaining high standards of security and protection. Central banks and other financial institutions should prepare for the tokenisation of assets and put in place the infrastructure. Financial institutions must explore the possibility of introducing programmable money with a focus on overall benefits to the (token) economy. Large corporates and small and medium-sized enterprises (SMEs) should analyse their current business models to identify opportunities for tokenisation and assess future opportunities that the token economy might create for their business. Lastly, private citizens will – alongside industry – be the main users of the tokenisation, their demand too can therefore drive companies and governments to adopt and offer relevant solutions.

As yet there is no clear global front-runner in tokenisation, which means that Europe still has a chance to secure its place in the race. Actively pushing the drivers of tokenisation in Europe is crucial to safeguard Europe's future position in the global technological arena and to remain competitive in the global economy. To do so, however, we must start creating the right conditions in good time, i.e. in the next few years. Hence: Tokenise Europe 2025!

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01

What would a tokenised Europe look like?

1.1 TARGET SCENARIO

How will we live and work in the future? Which technological innovations could improve our everyday lives and boost the economy in the years ahead? How can tokenisation change our lives? Let's take a look at a vision of our digital future and how technology could shape Europe. The vision is set in the year 2030, and the past decade has seen remarkable technological advances that have led to numerous improvements not only in individual lives, but also in society and throughout the economy. Thanks to the breakthrough of distributed ledger (e.g. blockchain) technology, tokenisation has spread to many areas. Greater trust in the technology, coupled with practical and scalable use cases as well as regulatory adaptations, has the potential to change business models across a wide range of sectors in Europe.

In 2030, we no longer "go online", because being online is an integral part of life. Technology and digital services are embedded in our daily routines, our work, our lifestyle, 24 hours a day.



1.2

A DAY IN THE LIFE OF A TOKENISED EUROPE IN 2030

07:00 It's getting warm outside. Simon is a European citizen and has a biunique digital identity token stored in his smart watch. Simon's digital personal trainer receives fitness data from his smart watch while he is asleep. Simon's token-based digital twin always calculates the best action for him to engage in next. The trainer creates a daily plan in line with Simon's preferences and fitness condition. Today's plan has already been sent to all his electronic devices before the alarm rings. A micro-payment to his digital personal trainer was made automatically even before Simon woke up. Since weather data has also been sent to his smart home and has been adjusted by his local sensor, the air-conditioning is activated. Simon gets some coins for data collected from his local sensor.

07:30 Time for breakfast! The refrigerator, aware of the weather and Simon's fitness condition, will recommend that he eats light meals today. The refrigerator knows what is stored inside it and also knows Simon's preferences (e.g. for organic food that is digitally certified by the producer via a digital token containing all information about production, transport and delivery). By combining this information with Simon's digital ID and payment data, the refrigerator can reorder missing foods. Simon's grocery supplier delivers the food to his door within 20 minutes.

08:00 Simon receives a suggestion from his electric transport provider: "Simon, you shouldn't be walking the long way to the office in hot weather conditions. We recommend using an eco-friendly carpool. Please confirm the pre-

booking we have made." In 2030, all digital identities – those of people and machines alike – are stored in digital wallets. These wallets also include digital money, driving licences, insurance policies and details of the registered address etc. – in Simon's case all in accordance with his personal preferences and the rules he himself has pre-defined as owner of the data. The electric car, which has recharged itself at the parking space overnight, is ready and waiting for him.

08:15 To ensure an optimal distribution of cars within the city, dynamic pricing modules calculate usage fees based on location and/or nearby events. After the car key has been sent to Simon's smartphone as a digital twin, the usage fee is calculated in addition to the dynamic price-per-kilowatt-hour based on consumption. The insurance fee is payable via a separate insurance token and depending on his driving style. Today, he received a discount, because he is also the owner of a security token from the car sharing company, and today they paid a dividend.

08:30 Simon works in the logistics department of a textile company that manufactures its products outside Europe and has a global supply chain. In the days before tokenisation, global supply chains were challenging to manage because of the many suppliers, intermediaries and public authorities involved across many different countries – complexities that came on top of non-digital/paper processes, language barriers, legal differences and time-zone differences. In combination with digital contracts and transactions, tokenisation has vastly improved the transparency, safety and efficiency of such transactions.

09:00 From his office in Berlin, Simon can track every link in the production chain. Ms. Jin picks the cotton from a field in the Huang-Huai-Hai region and the cotton is delivered to the factory by Mr. Xiao. An embedded token contains information about which workers have worked on the product and been involved in transporting it by truck to the harbour and the ship etc. This is especially useful to ensure that sustainable and ethical production and transport standards have been fulfilled every step of the way. Since the contracts with the suppliers are defined as smart contracts in a distributed ledger technology network, all payments are automated. If the contractual requirements are met, the payment will automatically be booked from the company's wallet while Simon is enjoying a coffee at the office. After making sure everything is fine with the transaction, Simon joins his business meeting, which takes place in a metaverse application.

17:00 At the end of his working day, Simon's digital personal trainer reminds him to attend his sports class, which is also in the metaverse. His trainer, who lives in the USA, will be waiting for him, so both can have a digitally enabled training session as if they were in the same physical place.

20:00 After working out, Simon has dinner with Zeynep. The bill for the delicious dinner is sent directly to Simon's wallet, where he chooses the tip amount and pays in digital euros. The wallet provider – his bank – sends him a notification every time a payment or other change is made in the wallet. Furthermore, his personal electronic wallet consists not only of means of payment, but also of a variety of tokenised assets: stocks, stablecoins, exchange traded funds (ETFs) and corporate bonds. Some of his friends even own

fractions of classic cars, artworks, houses and other items in the same way. This is possible because, nowadays, previously illiquid asset classes, high-priced assets and expensive transactions can be digitally acquired and processed in small fractions at almost no transaction cost.

After arriving home, Simon has a last look at the latest news broadcast in the metaverse based on his self-defined preferences. He then calls it a day.

02

What is tokenisation and why is it so important for Europe's industrial transformation and digital sovereignty?

Tokenisation impacts many areas of our lives: the virtual worlds we live in, the money we pay with, the assets we invest in and the automation of processes in our day-to-day life, for example. Tokenisation also involves many different stakeholders: corporates and SMEs, governments, citizens, banks and central banks.

Governments, legislators and regulators should be primarily responsible for providing an innovation-friendly environment while promoting the necessary standards, protection and competition. They should also drive tokenisation applications within their sphere of influence (e.g. providing digital ID for citizens). Central banks have a role of investigating and promoting the benefits of tokenisation within the financial system, including the potential introduction of central bank digital currencies (CBDCs). The private corporate/SME sector will need to think beyond existing business models, investigate changes to these models and develop commercially viable and scalable use cases. Banks can have a key role in giving their customers access to tokens, creating their own financial tokens and seamlessly integrating financial services in the broader economic value chains. Citizens, the end users of tokenisation solutions, need to familiarise themselves with tokenisation and incorporate it in their everyday lives.

2.1 WHAT IS TOKENISATION AND HOW DOES IT WORK? WHO ARE THE KEY PLAYERS AND WHAT ARE THEIR ROLES IN THE TOKEN ECONOMY?

The term "token" has a long history (predating digital technology) with varying connotations and definitions that sometimes make it difficult to nail down the exact meaning. In the context of this report, a token represents an asset in a digital form combined with information and assignable digital rights, all of which are connected

in a programmable and heavily automated manner. Tokens can represent either tangible physical assets or intangible assets that themselves only exist in digital form. Tokens can be possessed, owned and transferred via distributed ledger technology and are stored in wallets.

Tokenisation is the process of creating this kind of asset representation and the related information and rights in a digital form that can be used via a distributed ledger technology infrastructure. Methods of cryptography are often used in this process – to ensure data protection, for example.

The table below illustrates different types of assets that can be represented by tokens, together with examples of the information they can contain: → **A**

A Categorisation of tokenised assets

<p>Currencies on Blockchain</p> <ul style="list-style-type: none"> • CBDC • Commercial bank Money token 	<p>Digital assets on Blockchain</p> <ul style="list-style-type: none"> • Crypto-assets/currencies • Utility token • NFTs
<p>Digital assets on Blockchain</p> <ul style="list-style-type: none"> • Securities • Stablecoins • NFTs 	<p>Information on Blockchain</p> <ul style="list-style-type: none"> • Machine IDs • Digital twin • Self-sovereign identity

The best-known type of tokens are cryptocurrencies, which exist only as intangible digital assets based on a distributed ledger technology. Unlike cryptocurrencies, stablecoins have a direct relationship to other assets, for example being backed by a fiat currency such as euros or dollars. Since the digitalisation of money has triggered

huge interest all around the world (among both private stablecoin holders and pioneers among central banks), central banks have begun looking into creating a new form of money called a central bank digital currency (CBDC). CBDCs are digital assets that represent a nation's fiat currency in a complementary way and are backed by its central bank. However, not all CBDC projects are based on distributed ledger technology, and commercial banks too can create bank money tokens. These are comparable to the account-based commercial bank money that exists today but are based on distributed ledger technology and take the form of a token. Tokens can also represent other digitalised assets such as securities, real estate, gold and art. NFTs are non-fungible tokens, meaning that they cannot be copied, substituted or subdivided. NFTs are used to certify the authenticity and ownership of digital or digitalised assets (including art, music and in-game items). Utility tokens primarily represent access and digital rights (such as voting rights) and tend to be less focused on representing asset ownership.

Tokenisation is, of course, not the only innovation that is currently shaping the digital world. It is developing both in parallel and in combination with such technologies as advanced analytics, machine learning, artificial intelligence and the Internet of Things (IoT). While the boundaries can therefore be a bit blurred, this fact is also a strength of tokenisation: combining these technologies can create new applications such as digital twins, which are virtual digital models of a physical object (e.g. a machine) and are used to experiment or conduct simulations. Distributed ledger technology, which is the cornerstone of tokenisation, also paves the way to the decentralised possession, administration and sharing of information, data and identifying attributes for natural persons (self-sovereign identity), but also for objects (e.g. machine IDs).

Tokenisation is an innovation that is currently being driven by many market participants representing a wide variety of roles and interests. Only if they all pull together

will a broader market impact ensue, advancing the transformation towards a tokenised Europe.

2.2 WHAT IS THE GLOBAL PERSPECTIVE? A CLOSER LOOK AT THE GLOBAL AVANT-GARDE

The global picture is very varied. Although no one front-runner has yet cemented its dominance in all areas, several regions have already positioned themselves to foster their token economies with innovative solutions and swift policy decisions. While the approaches taken by different countries around the world seem to differ significantly, a few distinct similarities are emerging. Obviously, depending on the overall state of economic development, industrialisation and digitalisation, countries are starting their potential tokenisation journey from very different points. Generally speaking, developed countries are working to further develop the efficiency of their existing economies. Developing countries and emerging economies, on the other hand, are striving to solve fundamental social challenges such as financial inclusion. Furthermore, risk-averse regulatory frameworks always stand in opposition to an innovation and risk-friendly mindset. Some countries try actively to attract token entrepreneurs by means of subsidies and significant investments. Others are growing their token economies by not imposing any regulations and giving innovators entrepreneurial freedom to drive tokenisation forward. Although the latter may be true of some economies in Latin America and Asia, even here the picture is opaque. Countries like China have understood the possibilities of the underlying technologies, but are only fostering its application in line with the perceived overall good of the state or party. Still others, including Europe, find themselves in the risk-averse category. Acting from the position of a well-functioning but technologically conservative economy, the Europeans' main concern is

to limit the potential hazardous effects of tokenisation on their economies. We must therefore take a closer look at some concrete examples from around the world.

Overall, China has a very strict policy on crypto assets and already banned trading more than a year ago. At the same time, the government itself launched the digital yuan (eCNY) in 2017, thus positioning itself as the very first mover in the field. The eCNY is intended to serve as an alternative to private payment methods, but also potentially to the US dollar in specific regions in the longer term. In April 2020, the People's Bank of China started the pilot phase of the eCNY. Since then, China has implemented and tested its digital currency with foreign visitors during the 2022 Winter Olympic Games. This is by no means China's only digital aspiration, however, as China has also initiated its own Blockchain Service Network (BSN). The BSN is a data centre network in which users have easy and affordable (sometimes even free) access to distributed ledger technology solutions. It cooperates with many public blockchains such as Ethereum. The BSN portal is already available via its nodes in many Asian locations, but also at selected locations in the USA, Europe and Australia. In addition, extensive Chinese participation has for years been observed in international standardisation initiatives around distributed ledger technology topics. The strategy behind this is clear: whoever sets the standards dominates the market. From a Chinese perspective, tokenisation has a geopolitical dimension.

While it comes as no surprise that finance strongholds UK and Singapore are aiming to become global crypto hubs by streamlining their regulations, it seems that Canada too could play a significant role in tokenisation in the coming years. The country has several high-profile politicians who see themselves as very tech-savvy and pro-tokenisation. One major party leader indeed recently called for Canada to become the "blockchain capital of the world". Furthermore, the US too has been pushing tokenisation over the past year, especially with

the idea of advancing from Web 2.0 to Web 3.0. Web 3.0 is closely related to aspects of the metaverse, which is driven mostly from the US and Asia. In the Middle East, too, the creation of several technology clusters around tokenisation is an observable fact, with heavy investment from governments.

Some government projects have also failed, the most prominent one being El Salvador's abortive experiment of making Bitcoin the country's official legal tender. One year after the announcement, nearly no one in El Salvador uses Bitcoin as a means of payment. Moreover, state finances began struggling after huge losses on Bitcoin, prompting the country to ask the IMF for help.

Despite all these variations, one central topic in the tokenisation space is being pursued by many countries and regions around the world, irrespective of their general stance on tokenisation: central bank digital currencies (CBDCs). Broadly speaking, CBDC seems to be a topic of singular relevance for a large number of countries and central banks globally, with nine out of ten central banks exploring this option. More than half of all central banks are developing CBDCs or running concrete experiments, and more than two-thirds of them consider it likely or conceivable that they will issue a retail CBDC in the short or medium term. The European Central Bank (ECB) is already a front-runner, ahead of the Federal Reserve and other central banks, with a digital euro project that is now in the middle of its analysis phase. Regarding the reasons, most central banks cite the rise of crypto assets and changing payment behaviours in the wake of the pandemic, for example. Notwithstanding, it is important to note that not all central banks plan to issue CBDCs in tokenised form. Whether their efforts prove successful and, above all, innovative remains to be seen.

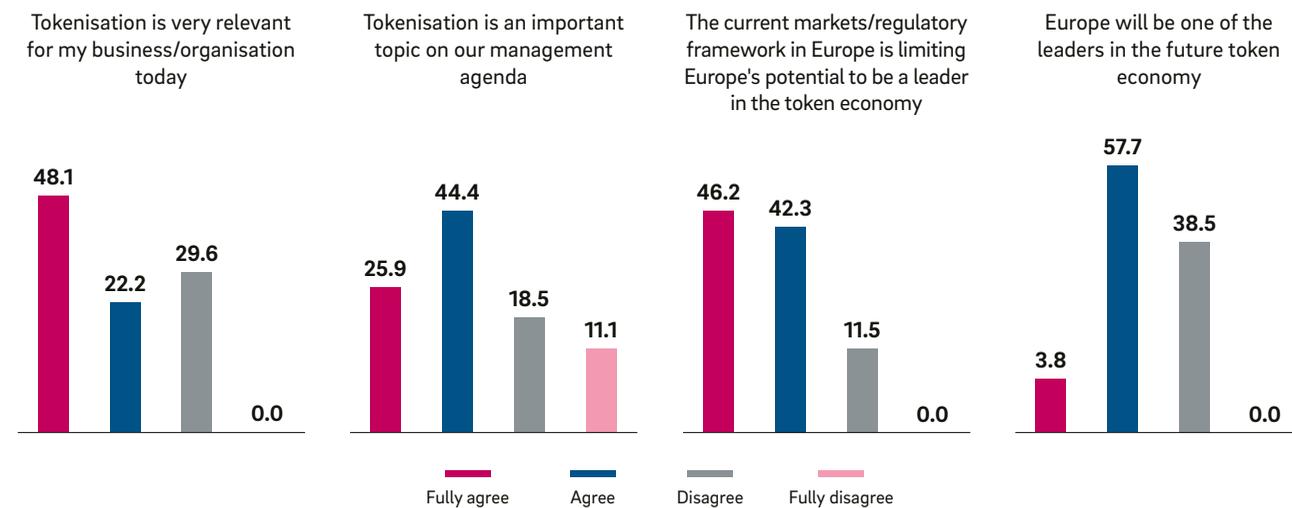
2.3 WHERE DOES EUROPE STAND ON TOKENISATION? AND WHERE AND WHY IS IT LAGGING BEHIND?

Seen from the global perspective outlined above, Europe can be considered one of the more risk-averse regions regarding tokenisation. Stakeholders here often demand a suitable regulatory framework before they are willing to invest in new businesses and technologies. This can be seen as one of Europe's biggest challenges.

To assess the current state of tokenisation in Europe, it is important to look at stakeholder-specific developments on the one hand. On the other hand, the central banks and other banks could likewise play a pivotal role in tokenisation by participating directly in token transactions of all kinds. While many banks are exploring the possibilities of tokenisation for their own offerings, the concepts of (cross-border) collaboration and active cooperation with central banks as possible coordinators of tokenisation in the financial industry are currently progressing only to a limited extent.

Several more issues are currently holding back a stronger focus on the further development of tokenisation. Conducted during our bootcamps, a non-representative survey of decision makers, senior managers of Europe's leading industry and financial services players, and senior public officials painted an unclear picture. Almost two-thirds of our participants do see tokenisation as relevant to their organisation and to the management agenda today. And about half of our participants believe Europe will become a leader in the future token economy. Nevertheless, most also believe that the current regulatory framework in Europe is limiting its potential. A focused analysis to describe the current situation more precisely should be carried out on a broader data basis. → **B**

B Consolidated results of the survey at bootcamp sessions [in %]



What, then, is preventing tokenisation from taking off in European industry? The first issue is a perceived lack of relevance in daily business. Tokenisation is seen not as a topic to be addressed urgently, but as a topic to be developed continuously in the long term. Accordingly, top priority is still given to matters that have a palpable and direct financial impact on the individual company and its daily business. Substantial resources are allocated accordingly. Tokenisation therefore rarely appears on the top management agenda of leading companies, but is usually found further down in the organisational structure and driven forward in somewhat isolated environments by analysts, experts and technology experts. However, considering the importance of tokenisation for industry and its potential impact on business models, it already deserves much more management attention today.

Another factor limiting the development of tokenisation in Europe can be found in our culture. While the market in Europe provides good conditions for successful collaboration and innovation due to

considerable homogeneity and mutual trust, European institutions, companies and citizens are generally rather conservative and risk-averse compared with leading tech players in other regions. There is no lack of new ideas and use cases for tokenisation, due to the constant development engaged in by the experts mentioned above. However, these advances are often viewed skeptically by the public, media and business decision-makers alike. Logically, therefore, they only rarely penetrate spheres in which they can achieve global relevance and competitiveness. Moreover, the sense of urgency and the daily preoccupation with tokenisation among large swathes of the population is currently too low to decisively counteract this development, with the result that many stakeholders too do not yet perceive a pressing need for further improvement. Instead, they continue to trust in more mature solutions that hold back technological progress across the continent.

A third important factor is the educational perspective. Only a minor percentage of society correctly grasps the significance of distributed ledger technology

and blockchain without associating it exclusively with cryptocurrencies. This general lack of awareness around tokenisation itself nurtures a certain level of skepticism. In Europe, the legal and regulatory framework likewise has a pronounced influence on the current situation of tokenisation. Supportive regulations are absolutely fundamental to the successful further development of tokenisation here. On the one hand, regulation should enable technological development and incentivise companies to actively innovate. (To take just one negative example: as things stand, M2M payments cannot be carried out securely for banks in Germany due to existing legal issues.) At the same time, harmonised regulation in Europe should create a fair competitive environment that enables and actively promotes collaboration across borders. Following a collective and collaborative approach to further development in Europe is essential to keep the continent competitive vis-à-vis the global tech leaders in the long term. The current unclear and piecemeal legal framework across different legislatures, varied definitions and inconsistent technical standards complicates such collaboration and needs to be addressed accordingly.

Simultaneously, regulation in Europe should leave enough room for innovators to creatively drive the entire perspective of tokenisation forward without being too restrictive. In this regard, it is of vital importance that the legal framework should continuously evolve with industries in general and be adaptable to new trends and developments. For the future, it is of no use for Europe to be the exclusive regulatory competition leader for tokenisation.

Actively addressing those drivers of tokenisation in Europe is central to its future position in the global technological world and thus the global economy. Behaviour that is too slow and too inconsistent could put various industries and markets at risk and lead to technological dependence on global tech leaders such as the USA and China, just as has happened with Web 2.0 and artificial intelligence, for example. Only through a strong collective positioning can international

standards and regulation be decisively influenced and European interests such as data and consumer protection be adequately represented. Otherwise, Europe would miss out on the tremendous economic potential that comes with the development of new business models and positive synergies with other novel technologies. For instance, current market leaders such as huge sports companies would not be able to attain significant market share in the metaverse, selling tokenised assets in the form of (limited-edition) sneakers etc. And this is a market whose estimated volume growth in the years ahead literally beggars belief. The attractiveness of Europe as a business location for leading, innovative players in the global economy could suffer in the long term if action is taken too late and if inadequate framework conditions are put in place for tokenisation. To meet rising demand, tokenisation must be promoted on all levels and across all industries. Individual stakeholders must not get left behind by focusing only on individual industries.

In conclusion, Europe is still at the beginning of its journey to becoming a token economy. While some awareness has been created, tokenisation is still widely held to be a medium- to long-term development. Currently, we see no stakeholders standing up to become first movers in taking Europe's token economy to the next evolutionary phase. Europe, it seems, is caught in the chicken-and-egg dilemma. Only by combining the capabilities of many stakeholders will Europe find its way forward.

2.4 HOW TOKENISATION CAN IMPACT EUROPE'S ECONOMY BY TRANSITIONING INDUSTRIES AND CREATING NEW BUSINESS MODELS

The successful development and implementation of a token economy in Europe will build a backbone for the

03

What steps can stakeholders in Europe take to foster the token economy between now and 2025?

transformation of Europe's economy into a digitalised industry 4.0. It will also have positive spill-over effects and synergies with many other upcoming business models and use cases, such as IoT applications, autonomous driving, big data, gaming, decentralised finance and the metaverse etc. In principle, tokenisation will strengthen Europe's sovereignty and make it more competitive by reducing transaction costs through a combination of efficiency gains and better identity and verification solutions. The fast, secure and automated execution of business and financial processes with lower transaction costs enabled by tokenisation, coupled with higher data availability, will generally have a positive influence on economic growth.

In detail, industry 4.0 will merge supply chains, trade finance and logistics into one seamless process. It will be shaped by the digitalisation of entire production and supply chains, which will be facilitated by connectivity between machines and machine systems and by the introduction of new process control methods (e.g. digital twins). The substantial transformative value of a token economy will have a powerful impact on businesses. It will be possible to create fully automated supply chains that generate real-time data and increase the transparency of business processes. Automated supply chains imply both self-monitoring and adaptive logistics. Due to the resultant gains in flexibility, the token economy has the potential to support all kinds of collaboration between companies and industries. Moreover, it opens the door to new business models and improved business relations by making business processes more transparent. The successful implementation of smart contracts will enable fractionalised settlement and transfer. Automated processes will scale back the need for intermediaries, resulting in savings on the cost of capital and further savings from automation in cross-border transfers. In a nutshell, tokenisation will underpin the very foundations of industry 4.0.

Nor does the transformation end with industrial applications. The adoption of a token economy in financial markets would be incentivised by measurable efficiencies and related cost reductions; increases in security, resilience and trust; less complexity; and advances in disintermediation. The token economy has the potential to slash the cost of cross-border payments, making it easier to raise funds across borders, open up new markets and, hence, potentially tap new customers. Furthermore, the introduction of a wholesale stablecoin (or even CBDC) could cut the cost of capital market transactions, eliminate settlement risk and increase efficiency. Ultimately, a European token economy makes Europe more competitive as a capital market and gives it an advantage in attracting investment.

Overall, a growing token economy would create new business models in many old and new industries, making Europe a more attractive business location as one of the tech leaders. For example, the banking sector will play a key role in the token economy, getting customers on board, overseeing money transfers between digital currencies and fiat money, tokenising assets, and handling the custody and trading of all kinds of tokens. Examples can also be found in industry. The shared economy – involving car sharing and flat sharing, but also the alternative financing of capital goods such as machines as pay-per-use models – will become important.

Born of efficiency gains and added competitiveness, the positive overall impact on the economy will be significant in the long run, according to the members and participants of the Tokenise Europe initiative. Further analysis is needed to quantify potential.

To move the European market in the direction of a token economy, a set of activities need to be addressed by all key stakeholders in a potential token ecosystem. While some activities are relevant for all stakeholders and will thus have to be tackled by all of them, each stakeholder group will also have certain specific levers to address.

The activities that should be addressed by all stakeholders are laid out below:

Education

As mentioned above, different groups define and understand tokens and distributed ledger technology in different ways. Distributed ledger technology is often seen as a synonym for cryptocurrencies, and its perception is heavily shaped by current discourse in the media. All stakeholders in the token economy should therefore actively push a basic and harmonised education in tokenisation. Explaining the basics, distinguishing it from other terminologies and gaining trust in tokenisation (in the context of data security) is key. Only if companies and citizens alike learn about tokenisation, its benefits and its limitations can Europe advance towards a fully fledged token economy.

Awareness

To drive a successful transformation towards a token economy, it is important to foster awareness of existing

token use cases, benefits and applications. Awareness must be created in companies (in the higher management echelons, for example) by better promoting use cases and benefits, but also in the public arena. Launching lighthouse projects could support the awareness of tokenisation among the populace.

Communication

Simple, non-technical communication about tokenisation should be constantly engaged in by all stakeholders. Communicating concrete use cases and applications rather than technical details will help get a broader audience on board. Consistent use of the terminology would further accelerate and support this communication. → [C](#)

Government, legislators & regulators

Even though private institutions form the bedrock of the token economy in some parts of the world (e.g. metaverse alternatives driven by private companies), legislators and regulators play a crucial role in developing a token economy, especially in Europe.

Their key responsibility should be creating a simple and harmonised legal framework throughout Europe that incentivises companies and private citizens to further drive tokenisation while creating a secure legal space. This could include the promotion of potential new

C Stakeholder-specific needs and calls to action



business models, measures to reduce fraud and scams, environments for testing new projects, and the reduction of anonymity in the individual sector, where necessary. All this would help reduce uncertainty and eliminate gray markets. Furthermore, governments should also support and facilitate technologies that have a direct and positive impact on tokenisation. Examples include digital signatures, smart contracts, distributed ledger technology, authentication and authorisation.

It is also important for governments to promote market-driven lighthouse initiatives to advance innovation and spread awareness by introducing examples of tokenised business models. For example, the introduction of a tokenised CBDC could stake out a large-scale application for programmable payment and enable micro-payments for the Internet of Things. In addition, the public sector should actively support promising use cases to set an example for citizens and corporates and further encourage this paradigm shift.

Furthermore, investment in tokenisation projects should be facilitated by easier access to capital. This could be made possible if the European Commission and member states introduced a variety of measures, including special funds, innovation programmes and investment in academic research. The (subsidised) development of special technology clusters with a focus on the token economy could be another way to attract international professionals and corporates to this space. Actively supporting existing and emerging initiatives and highly relevant use cases is important but not enough. Sufficient resources must also be invested in order to adequately educate both broad sections of the population and (especially) decision makers in the economy. The possibilities and advantages of tokenisation must be made abundantly clear. At the same time, uncertainties surrounding data and consumer protection, for example, should be actively addressed.

Central banks and banks

In a tokenised economy, many of the activities currently performed by financial intermediaries would appear to be obsolete. That said, banks can still play a crucial role in the future token economy.

Banks should prepare for the tokenisation of assets (real estate, stablecoins and securities, for instance) and provide a commensurate infrastructure. Since this task is close to their current role in the market and requires regulatory skills, banks are well placed to assume this role. In addition, they should prepare for further product/service offerings to provide to consumers and companies in the tokenisation ecosystem. Examples include the provision of wallets, custody solutions and access to trading platforms for tokens.

Similarly, banks will play an important role at the customer interface and need to generate high customer engagement with the new technology. Integrating tokenisation in current products, services and channels (such as banking apps) can thus be a key success factor. To give an example, the digital euro could be integrated in existing banking apps/wallets instead of providing yet another consumer payment app.

Central banks should collaborate with commercial banks to explore the possible introduction of a CBDC for retail and wholesale markets with a focus on overall benefits to the (token) economy. While capital markets require the introduction of a wholesale CBDC whose access is limited to regulated financial institutions, a retail CBDC, such as the digital euro, would constitute a new retail payment alternative for consumers. On top of a CBDC, the concept of tokenised commercial bank money could likewise fill the gap for corporate clients' business applications. Tokenised, programmable payment could become key to the development of automated supply chains and processes in industry 4.0. While this is not their exclusive preserve, banks and other financial service providers could put their experience in standardising complex products on digital

markets to good use. They could do this by creating standardised tokens and digital asset frameworks, as well as technical specifications for interoperable distributed ledger technologies. Standardisation would allow tokenised solutions to be scaled within the European market, enabling companies to build attractive business cases for their token offerings. Central banks can help commercial banks arrive at a European standard that supports the entire tokenisation economy.

Corporates & SMEs

In the token economy, most use cases and applications will be provided by corporates and SMEs. Successful implementation of a number of broad-based use cases and best-practice examples will drive awareness of the benefits of tokenisation in the market and therefore boost adoption.

With this in mind, corporates and SMEs should systematically analyse their current business models to identify opportunities for tokenisation and assess future opportunities that the token economy might open up for their business. Tokenisation should become part of the overall corporate strategy, be discussed at meetings with senior management, and receive sufficient resources and funding.

SMEs in particular, as the mainstay of the European economy, face the task of actively identifying the advantages of tokenisation and – in light of limited resources – making focused investments in token solutions that can have a real impact on daily business in the medium to long term. Beyond that, partnerships with token solution providers and other SMEs, plus coordinated activities at industry association level, could help to increase coverage in different industries.

In this context, start-ups could also be important enablers of tokenisation. Many already have the set-up they need to adequately test new use cases and functions before incumbents implement them in broader applications. Active cooperation between incumbents and start-ups and access to venture capital could

accelerate existing developments and tailor use cases even more closely to the needs of the market.

Corporates and SMEs need to actively work with policymakers to craft legal and regulatory frameworks that are practical and use-case-oriented. Given their experience as front-runners, start-ups could also help to fine-tune existing regulations and plug regulatory loopholes by supporting the public sector with first-hand insights.

As discussed earlier, standardisation will be critical to the development of a European token economy. Alongside governments, regulators and banks, the corporate sector will play a key role in this effort. Without the active involvement of various corporate stakeholders, the definition of technical standards cannot succeed. All market players must collaborate in further developing standardisation, emphasising cross-chain communication and enhancing interoperability throughout Europe as a key building block of the European token economy.

Citizens

As shown in our vision of a "day in the life" of a tokenised Europe in 2030, European citizens stand to benefit handsomely as Europe's token economy better serves their daily needs. Besides industry, private individuals will be the main focus of tokenisation use cases.

It follows that popular demand for tokenisation use cases will drive offerings and adoption by companies and governments. Public awareness of a privately issued stablecoin by Meta (formerly Facebook), for example, recently put pressure on central banks to react and initiate CBDC studies.

With the support of government, European citizens would do well to invest in education about the token economy and show an openness to using new technologies. Ultimately, the adoption of lighthouse projects and large-scale offerings will stand or fall with the users – the citizens of Europe.

How could awareness of and education on tokenisation be improved?

- 1 Governments, policymakers and educational institutions should actively standardise the definitions used in official communication, regulation and legislation to increase awareness and enable a common understanding among all stakeholders.
- 2 Token market entrepreneurs should actively communicate with policymakers to exchange knowledge and discuss the future outlook, thereby ensuring use-case-oriented legislation and preventing snapshot regulations.
- 3 Policymakers and companies should actively showcase the feasibility and benefits of tokenisation by providing concrete use cases highlighting lighthouse initiatives that deliver a positive user experience and prove their value.
- 4 Citizens should actively educate themselves and try to educate those around them as well. Workers in specific sectors, for example, can educate their clients on tokenised solutions.
- 5 Governments and educators should generally ensure broad access to information about risks, accessibility, available service providers and consumer protection in the token economy, actively addressing concerns and spreading awareness of the benefits of tokenisation.

A five-step guide

What, specifically, should governments and regulators do next to move towards a European lighthouse initiative?

A dedicated tokenisation working group at EU level should identify suitable tokenisation use cases that meet the requirements of a lighthouse initiative (i.e. pan-European reach and visibility, broad awareness among European stakeholders etc.). For a publicly sponsored initiative, suitable use cases could be found in the area of public services for citizens/ companies that could be digitalised using token solutions (e.g. identity services, voting, declarations of standards/conformity, subsidy documentation etc.).

An innovation vehicle/start-up can be established or acquired and given both the mandate and the means to realise use cases agreed on agreed as lighthouse initiatives. Funding could be provided by EU entities such as the EIB/EIF. In this way, the EU's development agencies can also play a direct role in promoting tokenisation.

The broader European public and stakeholders can play an active role in setting the course for this initiative via the issue of tokenised membership and voting rights in the chosen innovation vehicle. These rights could, for example, be used to make prioritisation and design decisions.

After implementation of the first use case, this model could be continuously iterated to select and realise additional use cases. This would add deeper and broader momentum for the rollout of tokenised solutions, effectively "breaking the ice" and providing greater impetus in both the public and private sectors in Europe.

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