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Blockchain
in the financial sector

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Blockchain is mainly known as the technology behind Bitcoin, but its potential is much greater. **By 2025, the value of the blockchain market is forecast to reach USD 21.07 billion, and 10% of global GDP is likely to be stored in blockchain**, with more and more economic sectors opting to use this technology. Due to its unique properties and resilience to failure and hacking attacks, blockchain is gaining popularity in the financial sector and among Polish banks that are rapidly embracing this new technology and already working on further implementations.

Technology at a glance

What is blockchain? By definition, blockchain is a distributed ledger of transactions across a network that can be accessed and viewed by all network users. To put it simply, blockchain is a special type of database containing an ever-growing volume of information grouped into blocks and linked together. Each subsequent block contains a timestamp of when it was created and a link to the previous block, being an encrypted "summary" of its contents.

The use of blockchain technology allows analytical and control processes between financial institutions to be carried out in an integrated manner, providing unrestricted access for regulators to examine the system as a whole.

Currently available blockchain-based solutions offer:

- cryptographic techniques;
- immutable and tamper-proof transactions;
- a consensus protocol in a decentralised transaction network;
- replicated data and a full audit log of executed transactions;
- digital identities and signatures;
- smart contracts – smart transactions.

Blockchain and Bitcoin

Blockchain technology was used to launch the world's most popular cryptocurrency at present – Bitcoin. It all started in 2008, when the first document to describe Bitcoin appeared on metzdowd.com. Soon after, the first cryptocurrency mining software was launched. The first-ever recorded Bitcoin transaction was made on May 22nd, 2010 in the U.S. and involved payment of 10,000 Bitcoins for two pizzas.

Bitcoin is a cryptocurrency (digital currency). It has no material form, and there are no regulations in place to define its functioning. It also differs from traditional currencies in having no central issuing authority, such as e.g. the National Bank of Poland for PLN. Cryptocurrencies are stored on a computer, with their value being dependent on free market forces. It is decided at the system development stage how many coins of a specific cryptocurrency will be in circulation. Bitcoin has a total available supply of 21 million units, and is increasing towards this limit.

Cryptocurrencies can be obtained by "mining" them in person or buying them from a dedicated exchange or marketplace. Certainly, "mining" sounds more exciting, after all everyone would like to have their own money making machine. To put it simply, Bitcoin "mining" is about using computing power to solve math problems. Can this be done at home? It was possible a few years ago, but today the required computing power is huge and can only be achieved with specialist equipment.

How much is Bitcoin worth? In early 2011, 1 Bitcoin was worth 50 cents, but its value has risen to over USD 30,000 by the end of 2020. The current exchange rate remains high, but its volatility and instability can cause scepticism. This is why the National Bank of Poland and the Polish Financial Supervision Authority (KNF) warn against investing in cryptocurrencies.

It is still unknown whether cryptocurrencies will change the world, but the distributed ledger technology behind them will certainly do so.

2011 – 1 Bitcoin

USD 0,5

2020 rok - 1 Bitcoin

USD 30 000

Blockchain – regulatory background

From a regulatory perspective, blockchain can be considered in three categories: first – as an interesting option for the banking sector; second – as a technology that has enabled the emergence of a parallel financial market for cryptocurrency assets; and third – as a technology setting up a next-gen financial system infrastructure.

From the first perspective, blockchain implementation involves legal aspects typical of introducing new solutions, in particular the processing of data, including data protected by law (if any), which may require meeting requirements for outsourcing, including cloud-based outsourcing. Due to the key feature of blockchain, that is data non-erasability, it is important to protect personal data, in particular to ensure that the right to be forgotten can be exercised. Blockchain, owing to its peer-to-peer architecture, also requires the selection of an appropriate legal structure allowing for coordinating the activities of multiple partners.

Blockchain, used in an open source model, has underpinned the phenomenon of the emergence and growth of cryptocurrencies. The global dispersion of transaction information storage and processing has proven to be an effective way to build an alternative, unregulated financial market for cryptocurrency assets. National regulators are responding to this phenomenon with both interest and great caution.

New EU regulations are currently being drafted to transform the cryptocurrency asset market into a regulated market, fully compatible with the existing financial system.

To this end, the draft Regulation on Markets in Crypto-assets ("MiCA") has been presented. It is intended to create a legal framework for the functioning of the market, harmonise rules at the EU level and remove existing legal barriers. The regulation will govern the issuance and admission to trading of crypto-assets, the conduct of business, consumer protection and prevention of market abuse. It is also meant to separate the legal regimes for different classes of tokens and make them similar to existing regulations. Tokens will include:

- asset-referenced tokens,
- e-money tokens,
- utility tokens.

The Regulation on a pilot regime for market infrastructures based on distributed ledger technology ("DLT Regulation"/ "DLT Pilot Regime") will be another new piece of legislation. It is intended to enable the financial market players to make use of DLT in a secure legal environment, thus leading to the development of a secondary market for financial instruments in crypto-asset form. The Regulation will lay down requirements for multilateral trading facilities and DLT securities settlement systems. In particular, it concerns requirements for permissions, operating conditions for DLT market infrastructures and rules for supervision.

Central bank-issued cryptocurrencies (Central Bank Digital Currency, CBDC) are also appearing on Europe's blockchain radar. The ECB is expected to make a decision on CBDC by mid-2021. In line with this trend, significant regulatory changes can be expected, admitting a digital version of the European currency to trading, and possibly also digital national currencies.

Durable medium - a solution to banks' problems

In the banking sector, blockchain is a response to legal problems associated with the obligation to provide documents on a so-called durable medium. Banking institutions are required to provide documents in a form that prevents subsequent interference with the content of the documents and enables customers to access them at any time (even after withdrawal from an agreement).

According to case law, electronic banking's ability to guarantee immutability of the information provided to customers has been contested. The use of blockchain technology has reduced the costs associated with secure delivery of large volumes of documents to customers.

Sector durable medium solution

Two years ago, the Polish Bank Association (ZBP) published the „Durable Information Medium Report. Sectoral Solution", being the outcome of many months of work on improving electronic banking systems as a durable medium. The document presents a description of the solution developed by ZBP in collaboration with the National Clearing House (KIR) and the Credit Information Bureau (BIK).
The solution has three options:

- **Option I** – an electronic seal and a document repository in an external archive hosted by a trusted third party.
- **Option II** – Hyperledger Fabric (HLF) open source blockchain technology and a document repository in an external archive hosted by a trusted third party.
- **Option III** – blockchain technology in a version controlled by a banking infrastructure company and a document repository in an external DLT-based archive.

It is worth noting that the common element of all options is an archive located outside the bank, containing information provided to customers by the e-banking system. Customers will be able to access the archive through a trusted third party, independent from the bank, which – in combination with the technology appropriate for the given option – will satisfy the requirements for a durable medium, in particular in terms of the immutability of the information addressed to customers. However, ZBP in its communications stressed that the sectoral solution does not encompass all applicable technologies nor prevents banks from implementing other solutions, in particular based on the WORM (Write Once, Read Many) technology.

Blockchain-based interbank settlement systems

Present payment and interbank settlement systems are based on pre-Internet technologies unsuited to the requirements of a modern globalised economy. International payments are especially subject to high levies charged by banks and intermediaries, excessive waiting times (some types of transfers take 3-5 days, during which the parties cannot access the transferred assets) and even susceptibility to transmission errors delaying settlements. With the spread of blockchain payments, it will be possible to e.g. store data on digital transactions, ensure their effective authentication and the creation of so-called smart contracts, being an independent legal bond existing in the digital space.

For instance, JP Morgan is already experimenting with this technology. In 2017, it launched Liink – a blockchain-based payment network, which started processing the first real transactions last September. The platform allows banks to exchange information on compliance checks or other exceptions that prevent payments. Soon, the network is to be augmented with new solutions, allowing e.g. account information to be verified before payments are initiated.

Business scenarios and technology selection

In selecting a particular blockchain protocol, one should consider its ability to address the requirements of network participants, with regulatory compliance also being of significant importance. It is therefore crucial to understand the characteristics of the technology and select a business scenario that best suits your organisation. You can choose between:

- **connection to an existing network**
  - to quickly join a group of operators and achieve economies of scale. E.g.: Bitcoin, Ethereum, Stellar.
- **creation of a new functionality**
  – to use existing functionalities to create new value. E.g.: Hedera Consensus Service integrated with Hyperledger Fabric.
- **establishment of a new network**
  – a transformational element integrating an enterprise with the ecosystem, and giving a competitive edge. E.g.: Fabric, Quorum, Indy, Besu, Iroha, Corda.

Benefits

Selecting the appropriate scenario, and ensuring the regulatory compliance of technology implementation and integration into an organisation's digitisation strategy can deliver the following benefits:

- **security** – elimination of single points of failure thanks to a DLT-based architecture;
- **trust** – cooperation based on a transparent ledger;
- **transparency** – by standardizing processes and creating a shared resource for all network participants;
- **programmability** – enabling reliable automation of business processes by creating and effectively implementing smart contracts;
- **performance** – blockchain networks are designed to sustain a high number of transactions, provide support for interoperability between various separate blockchains by creating an integrated "blockchain network";
- **privacy** – through a selective data exchange between enterprises.

Cryptoheaven: Singapore

It is worth looking at Singapore in the context of the spread of blockchain technology. In September 2019, its parliament passed the Payment Service Act, enabling currency exchange platforms to apply for operating licences, and granting the regulatory authority powers to monitor and supervise enterprises operating in the market. Recently, the Monetary Authority of Singapore (MAS) announced the launch of iSTOX – one of the world's first trading platforms for tokenised securities. Singapore's largest commercial bank, DBS, is launching cryptocurrency trading and storage services and setting up a security token offering platform.

Sandbox blockchain

Poland is also increasingly opening up to a wider integration of blockchain technology into the banking sector. Sandbox blockchain – a blockchain-based product and service testing platform, was launched in November 2020. This is a testing environment for businesses and startups to test their ideas, allowing for reducing technical and operating costs at an early stage of the development of new solutions, and conducting tests to verify aspects such as quality and performance. The platform will also significantly facilitate regulatory consultations. Certainly, this is a pioneering project that will boost innovation in the Polish banking sector by minimising the entry barrier for businesses ready to develop blockchain-based services.

Examples of blockchain implementation in Polish banks:

PKO bank was the first financial institution to implement blockchain technology as a system for verifying the authenticity of bank documents, including regulations and fee and commission schedules. A Blockchain Competence Center was established in the bank, working on areas such as: payments, smart contracts, tokenisation, ICO, interbank consortia and legal regulations. Another aim of the Center is to search for new business models based on blockchain technology and commercialise the developed solutions.

Public blockchain was used for the first time by **Alior Bank**. Just as PKO BP, Alior Bank offered its customers the possibility of verifying the authenticity of bank documents, using the public network. For this purpose, the bank uses the Ethereum blockchain network - linked to a cryptocurrency of the same name. Currently, Alior Bank does not make sensitive information available in this way.

At the beginning of this year, **ING Bank Śląski** announced that it has taken part in a pilot trade finance transaction based on blockchain technology. According to its press release: "For the purposes of the transaction, the bank opened an electronic documentary letter of credit to secure the delivery of goods to the Polish company Granulat - Chmielarz Spółka Jawna from a business partner in Asia." According to the bank's experts, blockchain technology in trade finance transactions and the transfer of documentary letters of credit to an electronic environment may eliminate paper workflow and reduce transaction time.

Co-operative banking is not lagging behind either: in summer 2019, **Bank Spółdzielczy in Toruń** announced the implementation of a solution based on a distributed blockchain system. The implementation is related to a 2018 decision by the Office of Competition and Consumer Protection (UOKiK) requiring information to be sent to customers on a durable medium. The Toruń-based bank was also the first in the cooperative sector to introduce cashless outlets. It offers five different mobile payment systems, including Blik, Apple Pay and Google Pay, and in its branches it has devices for biometric identification of customers through hand vein patterns.

Summary

Blockchain has the potential to revolutionise not only the global foreign exchange market, but also the banking sector. With blockchain it will be possible to remove the intermediary, and replace this with a reliable, transparent and borderless system available to everyone. The question is: are banks ready for this? That will be seen in the coming years. Banks will certainly, however, employ this technology to offer even more innovative services to their customers.

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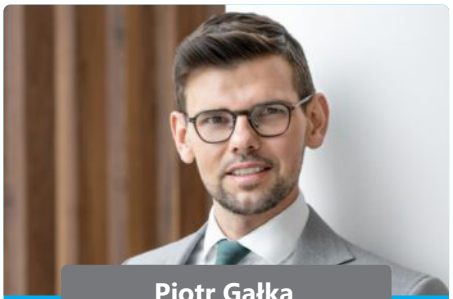

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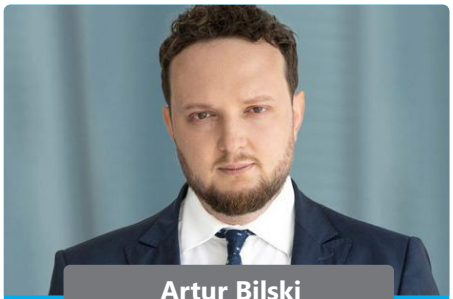

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