

Blockchain in Taxation

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Blockchain is comprised of a scattered database of blocks containing information which is encrypted with special algorithms called hash, that enable data monitoring. The digitization of payment systems as well as goods and services has led to the development of cryptocurrencies such as Bitcoin. However, although it was originally created for bitcoin trading, the potential of blockchain extends beyond cryptocurrencies and is still evolving. The aim of this study is to investigate the use of blockchain technology in taxation. In the study, the use of blockchain technology in taxation was examined and analyzed for selected countries and Turkey. Legal and administrative studies continue to be carried out in countries around the world to reduce the administrative burden in tax systems, allow tax collection at low costs and reduce tax deficits. As a result, blockchain technology will lead to change and transformation of the world tax regimes due to its transparency.

Keywords: blockchain, taxation, Value Added Tax, transfer pricing

INTRODUCTION

Blockchain technology is a secure system that is accessible to everyone over the internet, thus allowing many transactions to be stored electronically. Thanks to this technology, many transactions no longer need to be kept as printed documents.

Satoshi Nakamoto used the word Blockchain indirectly for the first time in his article titled “Bitcoin: A Peer-to-Peer Electronic Cash System” published in 2008. Nakamoto has defined the technology component underlying crypto money as a series of cryptographically chained blocks of data. He discussed Bitcoin contracts on a page published in Cryptography Mailing List. He led the development of Bitcoin by writing articles about Bitcoin until 2010.

With the introduction of the Bitcoin currency, blockchain technology has also emerged and has become the center of attention all over the world. Bitcoin and blockchain mean safe and fast money transfers that work on the principle of approval simultaneously by different sources (Taş and Kiani, 2018, 369).

Cryptocurrencies use cryptography to control transactions, increase supply and prevent counterfeiting. Transactions are confirmed, stored digitally, and saved in the blockchain. Blockchain can be considered as an accounting system that includes all transactions (Karaoğlan, Arar & Bilgin, 2018: 1).

Blockchain technology has initially been applied in the financial sector, then its applications in health, food, customs, insurance, transportation, foreign trade, and accounting have started to be seen.

Its use as a technology providing innovation in many sectors has become increasingly widespread due to its advantages.

Every country in the world needs tax revenues to be able to provide public services and serve their citizens better. No country can function properly and ensure the well-being of its citizens without tax. The more complex the tax systems are, the more taxes compliant citizens will have to pay. It is an important issue to implement blockchain technology efficiently in tax systems, leaving more available income for taxpayers.

It is being debated whether the use of blockchain technology will increase the tax compliance of taxpayers. At the same time, issues that may play an important role both in accelerating tax collection and in preventing tax evasion have started to be brought to the agenda all over the world. Because blockchain technology is a transparent, reliable record-based system, this technology is a very important subject due to its possible benefits in taxation.

In this study, the use of blockchain technology in taxation, its effects, and results worldwide and in Turkey will be analyzed. In the first part of the study, the definition, nature, development process of blockchain will be discussed. In the second part, the taxation process using blockchain worldwide and in Turkey will be examined in detail.

DEFINITION OF BLOCKCHAIN TECHNOLOGY, DEVELOPMENT PROCESS AND QUALIFICATIONS

In our age of information and informatics, the internet has become one of the indispensables of our daily lives and has led to the emergence of new global trends. Cryptocurrency transactions and blockchain technology are increasingly taking place among these trends.

Definition of Blockchain Technology

In substance, blockchain technology is not only limited to financial transactions, but is an intact digital ledger of economic and commercial transactions that can be programmed to find applications of almost any value (Jurowiec, 2018).

Blockchain is a secure data transmission technology. It is a constantly growing fragmented database in which records are linked with encrypted elements. Blockchain can be defined as a digital system that enables internet transactions to be recorded by adding them together like rings of a chain and doing this over a digital network connected to millions of computers, which is why it is almost impossible to delete, hack, imitate or eliminate.

Blockchain is a system that provides encrypted transaction tracking, records all money exchanges, and has high security features and encryption methods. In this database, each information is stored in blocks, by connecting with advanced encryption algorithms, provides the opportunity to operate without connection to a center. Blockchain network is a system where every financial exchange is recorded. Blockchain technology can be used as a high security system in many fields besides banking (İzmir Chamber of Commerce, 2017).

The power of blockchain technology is based on the interaction between three elements: a distributed ledger, a consensus protocol and a new data structure. A distributed notebook is a simple book or computer file that records transactions. This is an innovation in accounting (Center for Global Development, 2017: 8).

Development Process

In November 2008, a strange white paper was published, which is said to be published by someone or a group of people using the nickname Satoshi Nakamoto. This document analyzed a digitalized currency system that was completely dependent on computer technology, which began connecting data blocks without the intervention or involvement of a third party. It was later introduced as Bitcoin.

Bitcoin is the first case to use blockchain technology. Today, technology is used much more widely and takes place in many business applications (Jurowiec, 2018).

The concept of bitcoin and blockchain started to be discussed on the forums in 2010 and began to be consolidated with Wikileaks' acceptance of donations with bitcoin in 2011. Later, the concept of blockchain

started to get out of the shadow of bitcoin and attract the attention of all countries of the world. So much so that the Estonian government has begun work to include blockchain technology in its digital identity work.

Blockchain and bitcoin, which started to spread around the world and attracted attention, saw the level of 1000 USD in 2013. In the same year, the bitcoin ATM was opened and ethereum promotion report was published. Thanks to the advantages of blockchain technology, the star of crypto money has also started to shine. Later that year, the Ethereum Foundation was established. World-renowned companies such as Dell and Microsoft have started accepting bitcoins in their payments.

In 2015, "The Economist" magazine crowned the bitcoin by carrying it to the cover page. 2015 was one of the productive years for ethereum. In the consortium it has established with 9 financial institutions, the ethereum network has reached nearly 40 members. The hyperledger project was announced in 2016. After these developments, which started to attract the attention of China, Blockchain Shenzhen Consortium was declared with 31 members.

By 2017, after China's predisposition to the cryptocurrency market and blockchain technology was seen, countries did not want to lag behind this digital transformation and began to tighten their steps. In this context, the Crypto-Economics Research Institute has started operating in Austria.

In 2018, both international organizations and states increased their operational activities relating to blockchain. The European Union has announced blockchain projects and established a fund. Switzerland included bitcoin in tax payments. Countries such as United States, Singapore; companies such as Google, Facebook and Twitter also decided to take steps to become members of blockchain community.

2019 was a sensational year with Facebook's Libra project. Facebook has created mobility in the cryptocurrency market with the goal of making people who do not have much money and do not use banks a part of the financial market with lower costs. After this effect, it is started to be said that approximately 400 million bitcoin transactions have been executed. It is observed that the star of blockchain shines even more with the effect of both China and Facebook and has become a subject of competition among countries.

In particular, China has made strides in stating that it wants to pioneer competition to make blockchain technology a part of its social life.

As of 2019, it is observed that steps have been taken and pilot programs have been created to monitor tons of commercial goods, drugs, forensic cases, and personal data with blockchain technology. Based on all these developments, it seems possible to think that the development of blockchain technology will continue to increase in the coming years and that integrated systems can be established worldwide (URL 1).

The Qualifications of Blockchain Technology

The data that is blocked in the blockchain system is checked and directed to other networks in the system. Each computer in the blockchain system is called a "node". These nodes control the security and compliance with mathematical operations in the system. If the block is approved by the majority of other computers within the system, the "hash" encryption phase follows. Each block encrypted in this way has a password for the previous block. Encrypted blocks are connected to the previous block and block chain rings are formed (Çiğerci & Eğmir, 2019: 206).

The key features of the blockchain mean that it has a significant potential in tax use:

- Transparency - blockchain makes sure of the source, traceability and transparency of each transaction.
- Control - access to networks is limited to defined, specific users,
- Security - digital notebook cannot be changed, altered or tampered with once data has been entered. Fraud is less likely to occur, and easier to detect,
- Real-time information - when the information is updated, it is updated simultaneously for everyone in the network.

Data and Transparency

The key focus of the debate on the tax authorities of the world with the increasing demand for data was how the blockchain could help organizations at the required data scale. Tax authorities agree that the

ongoing challenge in tax mechanisms is business' access to a range of information that may be tax-related. Organizations are now capable of collecting and blending huge amounts of data, but tax mechanisms are barely involved in this process. As a result, tax mechanisms are applied rather late in situations that may have tax consequences. Blockchain technology can help solve this problem because it provides information in a way that it is captured from many perspectives - information that is reliable because it has been verified by everyone using it. Blockchain technology can help provide information in many ways. It provides more details, more visibility, more useful information and more precise results.

Verifying Transfer Pricing

Technology experts emphasize that blockchain technology is suitable for transfer operations. Considering this, tax experts have suggested that blockchain technology can be applied to transferred taxes, such as VAT, withholding tax, stamp taxes and insurance premium taxes. Whether the technology can help transfer pricing is also questioned. For instance, is it possible to code the results given when determining how profit is attributed to different parts of a business? It has been recognized that this can not be stopped from a technology perspective. A number of other experts have questioned whether blockchain technology can help in the fight against double taxation, and agreed it can provide great convenience.

Can Blockchain Technology Convert Tax Completely?

In blockchain technology, documents such as big books and business books have become another software consisting of smart contracts. Tax administration is an indirect side of smart contracts and can collect taxes through the e-declaration system.

Blockchain technology has the potential to eliminate the informal economy in terms of the tax system and significantly reduce the need for tax control (Jurowiec, 2018).

The focus is on the current state of the tax system and whether application of the blockchain system is the catalyst required to fundamentally transform the system. Blockchain emerged at a time when it was questioned whether the current tax system designed for the trading, buying and selling of physical goods is still fit for this purpose in the modern, digital age. The increase in the sharing economy, digital businesses and new business models caused many people to think again about the tax system. Is it still reasonable for tax authorities to collect taxes as they have in the past? Should the tax system in a world based on digital transactions try to adapt to this? But where is the value that should be taxed created? These questions have no definitive answers, and according to some opinions, these issues apply to tax policy rather than technology. Blockchain is a possible enabler - not a solution by itself. However, it has exciting possibilities and it is recognized that tax can change the way it is charged. According to some experts, the responsibility for collecting income taxes can pass from tax authorities to participants and actual individuals in the sharing economy.

“Blockchain is a possible enabler - but not a solution by itself.”

Blockchain, Error and Fraud

Although the blockchain is protected from tampering and modification, this does not mean that incorrect information cannot be entered at the initial stage. However, experts agree that no system can completely prevent fraudulent behavior: “If you put garbage in the system, you will take out garbage.”

However, the blockchain system makes it much easier to detect fraud and errors, as it provides clear and transparent information about transactions and items on the network. Experts stressed that this could be particularly useful in keeping track of whether VAT was paid and where it would be paid, and in doing so would reduce VAT fraud.

Blockchain can also help guide behavioral change due to the risks and consequences of incompatibility as payers are more likely to be caught and excluded from the blockchain network forever. According to experts, although the vast majority of taxpayers are compatible, especially micro enterprises and individuals do not fully understand their tax obligations. Blockchain can facilitate compliance and at the same time

provide visibility to micro transactions to tax authorities. In this way, it can help reduce the tax deficit (PWC, 2017).

The potential benefits of blockchain to businesses and enterprises are well documented. The Internet revolutionizes the exchange of information, while the blockchain changes the way we exchange value.

Third parties need to establish trust in order to exchange value, such as currency or deed, digitally. Blockchain rules out the need for a trusted third party by making a secure, distributed environment for transactions available on the network.

In essence, the linked transaction groups (blocks) associated with the previous transaction group database (chain) are copied and distributed to everyone involved in the network, so that all copies of the database are identical.

Blockchain records every transaction that takes place and no records are deleted. Blockchain is a technology that can provide ease of application in almost every field in daily life. It provides great convenience in many areas of life, from the legal field to the real estate transactions, from financial records to employment contracts (URL 2). In the current system, we do these operations through "intermediaries". Intermediaries are sometimes a lawyer, sometimes a real estate agent and sometimes banks. We pay money to the intermediaries to make sure that our transaction is correct. In return, intermediaries enable us to believe in the accuracy of our transactions and enable us to overcome the problem of trust created by asymmetric information in the system. On the other hand, the distributed registry blockchain allows people who do not know each other in the system to operate without requiring them to trust each other. For this reason, it is also called as "Trust Machine" (URL 3).

Blockchain has the potential to evolve or at least modernize accounting and tax payments. In this context, however, significant networking efforts are required before it can be implemented.

In the long run, blockchain can significantly increase tax compliance by warranting real-time, automatic tax payments from the taxpayer to the state budget on the date of a transaction. This is accomplished using Smart Contracts, code snippets that are programmed to execute themselves when the predefined set of conditions are met and fulfilled.

In addition to monitoring transactions and verifying information, blockchain can include business logic in value exchange with smart contracts (computer code that automates written contracts, such as "do this if this happens"). Examples of blockchain use are applications such as tracking diamonds from the supply chain, proving the time and presence of clinical trials.

Self-Enforcement allows unrelated parties to trade with each other in the absence of a trusted third party that verifies the validity of the transaction. For example, the salary tax can be automatically captured and paid to the treasury during the transfer of salary, thereby removing the employer's duty to act as a tax collector. Various benefits are available immediately: real-time compliance, a significant reduction in transaction costs, and elimination of the risk of tax evasion and fraud.

Transparency integrated into the blockchain also has the ability to offer solutions to property issues in the context of combating illegal tax flaws and preventing corruption.

Opaque is often used by money-laundering experts in corporate tools to provide 'front' businesses where crime revenues are hidden and injected back into a financial flow. Opacity secured by the 'corporate veil' prevents legal authorities from easily accessing the information on the ultimate utilization of these legal instruments and creates conditions where individuals can hide their assets from tax authorities, including crime revenues such as bribery and corruption.

The availability of verifiable information on the transparent blockchain-based distributed database to identify those responsible for law enforcement and tax authorities or those who may have information about a research, including the identification of the ultimate beneficiary might help.

Multinational companies that operate within themselves using blockchain and thus allow the creation of real-time local files for review of the audit may rely on blockchain-based applications to target a real problem of transfer pricing - the lack of information about comparable transactions between the non-related parties required determines the transfer price.

Depending on supply chain management, blockchain-based applications can be further expanded for customs and consumption use.

Authorities benefit from blockchain in two main ways: the ease of relying on the interests of the goods being transported and sharing customs-related documents among the various departments involved.

However, for the effective integration of blockchain-based solutions, a supportive system and full government support approach are required. This should contribute to the widespread use of blockchain technologies and setting the regulatory standards such as a legal identity that aims to recognize accounting and tax consequences at the time of booking (Institute for Austrian and International Tax Law, 2017).

Two interesting features of blockchain technology can be specified as:

1. Saving certain data and knowing when this data was saved (in a public or private blockchain)
2. The opportunity to make automatic payments through smart contracts, including VAT payment to tax authorities and entrepreneurs from tax authorities (Merkx, 2019).

Besides all these benefits, blockchain technology also has its drawbacks. These can be listed as follows;

- In blockchain systems where proof of work is used as a compromise protocol, the need for a lot of energy requires very expensive computer systems.
- Since adding blocks in the blockchain system takes more time than other systems, its performance remains low compared to traditional databases.
- The possibility of storing and accessing the data in the blockchain network can damage the privacy of users in the system.
- Once smart contracts are created, they remain open to everyone in the blockchain system, leaving them vulnerable to malicious attacks (Tanrıverdi, Uysalı and Üstündağ, 2019: 3).

BLOCKCHAIN IN TAXATION IN THE WORLD AND TURKEY

Legal regulations about digital currencies have been drafted all over the world for a long time. The largest economies of the world such as the USA and China are trying to include them to their systems by executing regulations regarding digital currencies.

China is the pioneer of this issue. In early 2020, the new encryption law (cryptography) came into force in China. A recently published report on China's cryptography law shows that China's efforts to become a global leader in this field have increased. The report in question states that the USA draws an image contrary to its regulatory sensitivity and crypto preparation.

China's cryptocurrency laws are intended to provide a firm grip on blockchain technology. The failure of Bitcoin and Ethereum blockchains to meet the prerequisites of China's latest encryption law predicts that China will focus on implementing its national standard, not on current blockchain conditions. The national standard will enable China's CBDC (China Central Bank Digital Currency) to operate in an environment free of competition such as Bitcoin and Ethereum, while maintaining more control over China's economy (URL 4).

The vast majority of the world countries regard the transactions made with blockchain positively. Although China and Russia have negative views on cryptocurrency transactions, they are countries that have entered into an intense legal regulation on blockchain and try to implement them in almost every field. Turkey, Singapore, Austria, Canada and the UK are countries with an unbiased eye to the crypto currency related transactions. However, these countries have also engaged in research on the use of blockchain technology and formed their authorized institutions in this regard (Topcu & Sarıgül, 2020: 37).

Germany is the best example among countries trying to use blockchain technology to combat tax fraud. A German business news center Woche reported in 2018 that the German Ministry of Economic Affairs and Energy (BMWi) plans to fight tax hijacking plans using blockchain.

BMWi has indicated that distributed ledger technology (DLT) can manage the tax system and be more effective in preventing fraudulence. This was an issue after the European Tax Fraud (CumEx-Files) plan, which was also used by stock market traders, banks and high level of lawyers to generate billions of dollars in dividend tax speculation. The German economy suffered the most in this fraud with 63 billion dollars.

According to Parliamentary State Secretary Christian Hirte, blockchain technology can ensure that tax shares are always fully traceable. The German Federal Ministry of Finance stated that prior to 2012, more than \$5 billion was laundered due to the gaps in tax regulation.

In Thailand, in November 2018, the Thai Revenue Department announced plans to use DLT (distributed ledger technology) and machine learning to track and especially verify the validity of tax payments, and increase the speed of the tax refund process.

It was previously reported by Cointelegraph that the tax software firm Vertex suggested that governments need to implement blockchain to improve their tax systems.

Many countries are already in the process of fully integrating blockchain with tax authorities for business transactions and tax processes. 38 member states of the European Economic Cooperation and Development Organization (OECD) started to apply the data sending process to tax operators in 2005. Some countries in Europe have already implemented the Standard Audit File for Tax (SAF-T) such as Portugal, France, Lithuania, Luxembourg, Norway, Poland and Austria.

There is a basic idea behind SAF-T, which is that companies can inform governments of the company's full public records, payment records, vendor data and software vendor invoices. This also serves to ensure that government tax authorities affect a taxation system based on blockchain technology. It aims to reduce the wave of tax fraud.

The integration of blockchain technology will increase the easy and simultaneous supervision of companies by tax inspectors. Once two taxable companies trade, they can be easily verified. Transparency automation of blockchain technology will reduce tax compliance costs and staff resources (Jurowiec, 2018).

Tax reforms are required to improve the current situation for taxpayers. In particular, applications in the digital age reduce record keeping and verification times and make these operations more transparent. Records held in digital form are intended to store more tax-related data. There are also many digitalized transactions such as automatic payment and online payment via digital payment. In this way, the amount of tax to be paid by the taxpayer can also be calculated on time. Taxpayers will be given a digital tax account for the convenience of individuals and businesses. In fact, the digital tax account can replace the tax refund process.

The application area of blockchain technology in various tax types can be expanded. Wijaya, Liu, Suwarsono and Zhang (2017) developed a blockchain-based tax model for the Value Added Tax (VAT) system. They stated that this technology can be applied in the VAT system and in this way, corruption can be reduced. Accordingly, the VAT payer purchases a blockchain account in the new system and every transaction made during the taxation process is carried out through this account. The VAT system is based on the tax invoice system and ends the use of paper with electronic billing called "e-invoice" through the developed model. The system also prevents fraudulent billing. In addition, a blockchain-based tax system can be used to determine where and when transactions occur during the taxation process. In this way, qualified data can be provided to the authorities regarding the taxation process. In this model, the tax office has more control over the VAT process. Ainsworth and Viitasari (2017) stated that payroll tax will be applied by blockchain technology by 2021. In another study, it is stated that the government will collect taxes using the blockchain system in the expected technological developments in 2025.

Blockchain, which includes a decentralized laptop system, offers many convenience compared to the central system. The central data storage system of a modern tax office includes tax activities covering a period of three years or more, such as declaration, payment and audit. With the blockchain system, central tax management will be replaced by decentralized blockchain technology.

At the World Economic Forum held in Davos between 20-23 January 2016, it was stated that governments could collect taxes with blockchain technology by 2023.

With blockchain-based automated tax regime, 100 percent success can be achieved in tax compliance. Because all wallets will be seen by the authority and money flow can be monitored. In addition, many people will be covered by the tax network and the tax network will be expanded. In this case, tax collection can be increased.

In parallel with the expansion of the tax network, as more people will face tax, the tax burden will be reduced for each taxpayer and each individual will pay less tax to reach the government's tax potential.

In this way, disposable personal income and savings will occur. The authority may receive a certain percentage, called transaction tax, from any transaction performed on the blockchain.

To promote the implementation of blockchain, in 2017 in the US state of Nevada, blockchain was recognized as an electronic form of registration, and the ban on the use or blocking of Blockchain was prohibited by the Uniform Electronic Transaction Act. It is also stated that the information and transactions obtained with the blockchain can be included in the jurisdiction.

Blockchain is intended to be implemented in the United Arab Emirates due to reducing tax errors and tax compliance. Since beginning of 2020, the UK Tax Office has been working on using this technology in the tax system. Italy, a member state of the European Union, introduced the e-invoice tax reporting regime as of January 1, 2017 to speed up reporting and reduce fraud. This way, the details of the invoices for the purchase and sale of VAT will be presented electronically.

The Republic of China announced in its 13th Five-Year Development Plan that it will implement blockchain technology in the tax system by 2023.

According to the European Commission, in 2014 there was a € 160 billion deficit in VAT. This can be attributed to tax evasion. The implementation of Blockchain will provide concrete plans for future tax revenue for tax authorities. This way, a guaranteed and error-free tax system can be created with smart contracts. Taxpayers will also be able to see for what purpose taxes are used (Kükreer & Eđmir, 2018: 642).

Chinese Application

China plays the lead in blockchain technologies. It is the country that invests most in blockchain technologies, gets the most patents and has the most users.

China takes blockchain technology to a very important position in terms of digital strategies and economic growth.

China aims to be the leader in 5G, artificial intelligence, internet of things, cloud and blockchain and other disruptive innovative digital technologies.

Since 2015, China has been describing blockchain as "national priority technology" in its "Five-Year Development Plan" documents and strives to introduce this technology in almost every area of daily life (Lantaugust, 2017). However, cryptocurrencies and blockchain are handled as two completely different topics.

As a result, access to crypto exchanges, making ICO (initial coin offering: initial crypto money idea) and collecting money from the public for ICO projects are banned in China with restrictions that started in 2013 and worsened after 2017.

The reasons for cryptocurrency restrictions can be stated as follows;

1. The interest of large masses without financial literacy as "high risk investment open to manipulation and speculation",
2. Many projects are open to abuse and fraud,
3. China's work on its own national digital currency.

In 2019, the Chinese Supreme Court announced that blockchain registrations will be regarded as binding legal evidence.

In 2018, China has issued new regulations to all blockchain companies that require their users to submit their personal data and activity pages to the authorities upon request.

Many people have said that such an arrangement is against the nature of this technology, and that China is trying to build a "blockchain wall". The censorship applied by China on the internet has been compared to the words of "Great Wall" and called "Great Fire Wall". As a continuation of the same analogy, it is sometimes referred to as "Great Blockchain Wall".

Although it often comes to the agenda that bitcoin mining may be banned, the world's largest bitcoin mining companies are Chinese companies, and the biggest mining activity is in China.

Mainly state-sponsored technology firms and funds are the most important players in the Chinese blockchain market. Especially the Baidu-Alibaba-Tencent (BAT) trio is one of the companies that can benefit from the funds the most and make the most investments. In 2019, China announced that it will support 197 selected blockchain projects. Among these projects, banks and these companies also have projects.

Since collecting funds from the public for cryptocurrency projects is prohibited and only professional funds can invest in these projects, many projects related to blockchain in the country need the support of institutional investors at the initial thought stage.

This situation causes many blockchain projects that are financially problem-free but insufficient in terms of marketing. These projects, many of which are "international community oriented", cannot reach international markets due to their marketing deficiencies (a weak website, poorly prepared promotional documents and insufficiency etc.).

Trained manpower and lack of research are still ongoing problems in blockchain. China has started funding universities on this issue.

Although not very clearly, 20% to 30% of blockchain projects in the world are thought to be ongoing projects in China.

Three projects implemented by China are summarized below:

- *Payment and Invoicing with Shenzhen Metro Blockchain used by 11 million people*

Shenzhen tax administration has launched a blockchain project to meet billing requirements in transport systems, including metro, taxis, and airport shuttles.

The QR code payment system has been used in the Shenzhen subway since May 2018. More than 11 million people used this payment system between May and November 2018. With the project launched in March 2019, users paying with WeChat can receive their e-bills at the end of their journey with a blockchain infrastructure. Tax administration pays great attention to the project, especially since the multi-issue invoices issued for tax and discount purposes called "fapiao" are among the most forged documents in the country.

- *Digital money studies of the Chinese Central Bank and People's Bank of China (PBoC)*

Studies on a legal digital currency in China have been ongoing for a long time. Testing blockchain technology, PBoC Digital Money Research Institute and the Central Bank decided to expand the scope of their work.

It is observed that digital currencies focus on a digital solution to the commercial financing needs of SMEs and projects.

- *A new type of blockchain-based philanthropy emerging in China*

For this purpose, PBoC partners with a number of regional banks and academic institutions, and supports blockchain and artificial intelligence-based fintech companies. According to the State Intellectual Property Office in China, PBoC filed 32 digital currency patents in 2017 and 14 patents in 2018.

There are more than 800,000 registered aid organizations in China. The amount of aid collected by these organizations is over 22 billion USD.

It is the first time that China has enacted an aid law in 2016. With this law, the opportunity to request tax deduction to donors has been provided.

In addition, the Ministry of Internal Affairs authorized 13 companies, including large firms such as Alibaba and Tencent, to act as intermediaries in collecting relief funds. These institutions can collect aid via mobile phones and the internet.

Blockchain technology mainly provides the following benefits within this structure in China:

- The philanthropists can see in a transparent way where the aid they have been spent or to whom they have been delivered.
- Small organizations can start independent relief campaigns. Blockchain platforms enable them to do these activities much faster.
- Community organizations and philanthropists provide an environment of trust where they can take a more active role in solving social problems such as poverty, education and health.

The number of firms called Trust-Tech that work on interpersonal trust and assistance is increasing. It is seen that blockchain technology also contributes significantly to the way these companies do business.

For the first time in 2016, Ant Financial-Alipay organized a blockchain-based aid campaign for 10 hearing-impaired children, and with this campaign, USD 29,560 was collected in a very short time.

Antlove users have more confidence in this system, as the records in the blockchain system are real-time and these records cannot be changed or deleted. As a result, 190 million Chinese donated over 50 million USD in the first 9 months of 2017 through the Antlove blockchain network (URL 5).

China established the world's first smart internet court in Hangzhou city in 2017. The court used technologies called AI and Blockchain to make decisions. According to a report published by the Supreme Court, more than 1 million citizens are registered within the smart court system, together with 73200 lawyers. In September 2018, the Chinese Supreme Court ruled that the evidence confirmed by blockchain technology was binding in legal disputes (URL 6).

Despite its harsh attitude towards Bitcoin and other cryptocurrencies, the Chinese Government has decided to use Blockchain technology to fight corruption.

Before proceeding to the solution that China wants to bring to the billing system, it is necessary to understand the working principle of *fapiao*s (used instead of the official Chinese *invoice* word), which is a legal receipt for goods and services.

Fapiao are issued by Chinese Tax Office for any goods or services purchased domestically. These documents, provided by the seller, are used by the Chinese government to monitor tax payments and prevent tax evasion. Individuals can receive tax repayments thanks to fapiao, while companies do their transactions on these documents.

The degeneration of the Fapiao system established in the 1980s such as the sale of fake versions of these documents publicly on the streets and the use of fapiao that were not understood to be fake at first glance in order to evade tax directed China to blockchain technology. The technology underlying cryptocurrencies is considered one of the most effective weapons to combat this corruption. Blockchain, a constant, decentralized and encrypted accountant, can easily prevent irregularities that may occur during the invoice roaming process by providing a clear record of any transaction that occurs at any time of the day.

In May 2018, the Shenzhen National Taxation Bureau began working with Tencent, one of China's largest technology companies. As a result of this partnership, a "Smart Tax" innovation laboratory was established, which aims to encourage a technological approach in the tax field by researching cloud computing, artificial intelligence, Blockchain and Big Data.

At the beginning of August 2018, Tencent created a pilot blockchain ecosystem for invoices designed to be used by traders and tax authorities. With the blockchain supported e-billing system, the customer requires only one click on the WeChat application during the payment. After that, taxpayers have to wait for a refund in real time through the application. The fact that the process is shortened in this way and transferred to smart contracts prevents possible falsification and fraud on invoices (URL 7).

In late 2017, the main technology as blockchain was in the first place in China. Chinese investors have recently surprisingly increased their shares in blockchain-related businesses.

There are more than 32 thousand companies that use blockchain technology in China as of 2019, but only less than 10 percent of them really focus on technology. Chinese cryptocurrencies like NEO, Ontology (ONT), Quantum (QTUM), VeChain (VET) and more have earned more than 50%. Bytom (BTM) increased by 459%. It is predicted that China will take the first place once establishing the national cryptocurrency. It is observed that commercial banks have started to accelerate blockchain technology applications.

The Chinese government needs blockchain projects to enroll in Cyberspace Administration. Since March 2019, nearly 500 blockchain projects have been carried out by state-owned banks, courts and tax offices and commercial technology companies. China's most popular app, Xuexi Qiangguo, has launched state-run bitcoin and ethereum courses.

China also strives to create new initiatives such as "Blockchain+", a platform for "personal development" in areas such as education, employment and health. It adopted a new law designed to promote research and development in commercial cryptocurrency technologies. It also aims to establish standardized regulations for the industry in preparation for the challenges facing the newborn sector (URL 8).

China plans to invest approximately \$2 billion by 2023 in the development of blockchain-based solutions. IDC is an international company focusing on market intelligence. The country's blockchain

development expenditures are estimated to grow by 65.7% between 2018 and 2023. The country hopes the growth and expansion of blockchain technology. Due to the decentralized nature of its networks, it predicts that the technology can be used to create publicly accessible databases in various industries, including education and healthcare.

China is still not very clear towards Bitcoin. A few years ago, the government banned all crypto exchanges from operating in China. It has banned all crypto-related activities within its borders. However, it is observed that the country plans to create a national encryption currency. A state-owned media company shares content that educates millions of people about Bitcoin (URL 9).

United States Application

Although the U.S. Government still does not recognize cryptocurrencies legally, the Tax Office treats cryptocurrencies as "property" and therefore wants to tax them.

It is claimed that the US National Revenue Administration IRS can track all Bitcoin and crypto money accounts. Rules set by SEC and IRS lead cryptocurrencies to not be as anonymous as before. Not all crypto exchanges accept American citizens. Accepting exchanges collect personal data through KYC (Know Your Customer) or AML procedures.

Coinbase also reports users whose earnings exceeding \$20,000 to the Tax Office. Authorities monitor those who trade 20 thousand dollars or more and request taxes from the accounts that accrue taxes. With the legal regulations, the laundering paradise perception for Bitcoin and crypto money is gradually disappearing (URL 10).

Bitpay company offers blockchain-based payment services and has also introduced the Bitcoin option for tax refund. In accordance with the agreement with the US taxation agency Refundo, citizens are allowed to receive all or part of their tax returns with the CoinRT product.

Citizens' ability to use the relevant service depends on performing the Know-Your-Customer procedure. In this way, the US Revenue Administration planned to prevent money laundering and illegal practices.

It is anticipated that the service offered by Bitpay company will speed up the return process and reduce the cost (URL 11).

Turkish Application

Blockchain technology slowly becomes the center of market-based value change. The rapid development in commerce and tax makes the use of blockchain technology beneficial for Turkey, where a blockchain working group was created by the Central Bank (TCMB). Applications such as e-invoice, e-ledger, e-waybill, e-archive, e-notification in taxation will speed up the transition to a blockchain-based technology.

Turkey does not have any legal arrangements made for the crypto currency assets as of today. In addition, according to the Banking Regulation and Supervision Agency (BDDK) and the Capital Markets Board (SPK), it is not considered within the scope of "electronic money". BTCTurk, Koinim, Paribu, are Bitcoin exchanges that Turkish Lira can be traded.

Identity of individuals trading in the stock registered in Turkey is usually certain as they create their accounts using identity information. However, because private key numbers of non-stock market traders cannot be determined, it is not possible to determine their identity on Blockchain (Ertaş, 2018).

The Reaction of Companies and Organizations to the Application of Blockchain Technology in Tax Regime

For many executives in the business world, it becomes an alarming situation how blockchain can cause change, especially with respect to indirect taxes. It becomes more evident how blockchain technology can transform indices that show how businesses and indirect tax administrations perform and interact fundamentally now and in the near future.

Lately, majority of the major players and companies in the taxation sector are investigating the problems, complexities and effects of blockchain applications in tax management. However, they are still

at the beginning (pilot) levels of these missions. Nonetheless, it is evident that blockchain technology will increase the business benefits and reduce the tax problems, which is usually buried into the tax systems (Jurowiec, 2018).

Expected Effects on Corporate Taxpayers

A company's strength or weakness is measured annually in terms of all its financial statements and information for income tax purposes.

Supposed that all transactions of a company are revealed to the public through blockchain technology. This will mean that every single transaction that generate profit or result in loss can be easily accessed by government tax operators through government software. Consequently:

- On-time tax returns will become the order of the day, because governments will always cut tax payments simultaneously through all informed transaction details available to managers.
- Estimated taxes will be removed as all transaction information is "publicly available" via blockchain.
- Many workers in the corporate tax department may have to include small numbers of blockchain technology experts to install, regulate and maintain the required systems. This does not mean that the tax authorities will become completely unusable. This new approach to tax reporting will optimize its work and do it with fewer errors.
- Full automation of a new tax regime will help end pressure activities (Jurowiec, 2018).

Expected Effects on State Tax Management

- The government will have great advantage using a blockchain-backed tax administration. The extremely difficult task of blending, translating, processing, and documenting a company's periodic transactions will lead to more digital and secure, shareable documents that cannot be doctorated or changed.
- Periodic self-reporting of transactions of businesses such as revenues, expenditures, debts and other information will result in immediate deduction of taxes that must be paid by the tax processing time and the state tax authority.
- Indirect taxes can be changed and simplified by blockchain technology. The transparency and quickness of this technology can allow real-time verification and remittance of taxes in the economy business sector, especially VAT and other sales taxes. This is especially advantageous for both government and companies.
- Tax disputes can greatly reduce and save time for government and taxpayers. Blockchain's transparency can make verification, conflicts and controversy drop to almost zero.
- Today, in some parts of the world, especially in Asia, the Middle East and Africa, tax smuggling and other shady tax manipulation which has turned into a global industrial mystery, can be expected to be eliminated (Jurowiec, 2018).

More than 800 observers and technology managers have discussed when governments will start collecting taxes based on blockchain technology in 2016's Davos World Economic Forum. 73% of countries choose to mark the year 2025, the rest choose to mark the year 2023.

Many experts believe that IoT (the Internet of Things) is for areas suitable for applying blockchain to different areas - from refrigerators and kitchens to cars and boats, and this technology tax scheme is also global with billions of smart devices. These devices will pass various conditions, including manufacturing cases, and some of these terms may be tax benefits.

Experts warn that blockchain is a potential facilitator, but it's not a complete solution. The expansion of the digital world and the shared economy will force technical assistance to seek new legislation, methods and technologies to possibly collect taxes. Blockchain will be a potential partner in these efforts. It is recognized that this technology can change the way taxes are collected: responsibility for collecting taxes on income or sales may likely shift from tax authorities to participants of the common economy (Seco, 2018).

Blockchain and VAT

VAT is a tax applied at the stage of production and distribution to increase domestic income. The difference between the estimated and collected actual VAT collection is a result of the VAT mismatch. The causes of the VAT deficit may be fraud, bankruptcies and finance (Alkhodre, Jan, Syed, and Khusro, 2019: 708).

For almost all states, VAT is the key income factor that makes the greatest contribution to government budgets. Billions of dollars are lost every year due to tax evasion, fraud, tax mismatch and insufficient tax collection. As the global tax environment gets more complicated, new interpretations are needed to increase transparency and end the tax deficit. Tax authorities have invested heavily in data integration and analysis systems in digitalization to increase tax collection and prevent tax fraud (Noor, 2020).

Invoice is the most crucial VAT instrument. A blockchain-based tax system will require each valid VAT invoice to show a digital fingerprint derived from the VAT blockchain consensus process. In this case, the fingerprint will determine that Block 3 is continually attached to Block 2. The entire past of the commercial chain (forward and backward from this cross-border transaction) can be tracked.

A hand-held scanner, similar to the browsers, attached to an authorized tax inspection program will be all it takes to reach the entire commercial chain instantly for a valid postpaid item.

In order to perform its function, each node must have instant access to all standard invoice level data (name, address, VAT ID, price of each item, related volumes) for both parties. In addition, all nodes can perform risk analysis based on independent artificial ground. The best AI (artificial intelligence) systems allow these queries to occur naturally, and AI operators will be trained supervisors who know the relevant industry. Therefore, the use of blockchain at customs is recommended by experts.

Blockchain technology projects a chain of materials and items as it develops across boundaries. It can be used in DICE (Digital Invoice Customs Exchange) blockchain technology to create a safe business transaction train. However, because it is not clear how open the governments are to sharing their databases, there will remain an element that preserves the centralized ledger.

Countries may originate AI risk analysis with confidential data and may not allow the target judicial system to access this material while carrying out their own analysis. The consensus reached by these jurisdictions may mainly belong to their taxpayers and in some cases the threshold may need to be increased to achieve an acceptable level of confidence.

In November 2018, the European Parliament published a draft report including recommendations on combating cross-border VAT fraudulence. The report encourages member states to discover cross-border transaction data on a blockchain and discover a plan to use a secure digital currency that can only be used for VAT payments (Tenan, 2019).

Boston University Law School academics Richard T. Ainsworth and Musaad Alwohaibi proposed GCC (Gulf Cooperation Council: Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain and Oman) to use VATCoin in tax payments. VATCoin is modeled on Bitcoin. Both Bitcoin and VATCoin are distributor ledger applications built on blockchain technology. Bitcoin's notebook is open to everyone; VATCoin on the other hand is private. If accepted, VATCoin could become the world's first state-managed cryptocurrency currency. Unlike Bitcoin, VATCoin will not be a speculative currency. It is always fixed to the main currency that can be applied with VATCoin, DICE or material block.

VATCoins are a digital currency, not physical. They are only recognized for VAT payment. Transactions in VATCoin will be recorded in a chronologically distributed ledger. The validity of each transaction will be verified by the government (tax administration) nodes in each jurisdiction. The number of nodes contributed by a jurisdiction will be proportional to the GDP of that jurisdiction relative to the total GDP of all jurisdictions of the respective economic community. Every business involved in a VATCoin transaction can access the transaction records of all VATCoins it has.

In the GCC offer, the VATCoin blockchain will spread all over the 6 Member States (Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain and Oman). Valid transactions will be cryptographically sealed and added to the next block in the chain approximately every 10 minutes, collected in blocks. The verification and sealing mechanism is done with 75% of the active nodes in the network.

There are two separate legal provisions in the GCC proposal, each of which must be implemented in each Member State:

Currency rules:

- Throughout the GCC, VAT should only be paid (and received) on VATCoin. VATCoin payments will be made by smart contract embedded in billing documents.
- Throughout the GCC, VATCoins should be considered as unusable currency that can be converted into cash only by the government. Governments will be required to refund cash if the VAT refund has a verified negative VAT.
- Tax rules:
- Throughout the GCC, VATCoin input and outputs will be verified in real time and added to the blockchain.
- After the waiting period, a smart contract makes a daily refund when the VAT unpaid balance is negative in the taxpayer's account. Daily balancing of VATCoin accounts will be the norm, but the rules can be applied to delay significant reimbursement amounts until a more comprehensive risk analysis / audit (Ainsworth & Alwohaibi, 2017: 12-13).

CONCLUSION

Blockchain transparency will enable the world tax regime to witness a reform and transformation that will soon change the value of tax production through different tax platforms. In taxation areas, the blockchain will provide fresh air to the business world and offer permanent relief to tax values for reviewing, reporting, and manipulating delayed tax transfers, tax disputes, fraudulent transactions.

Undoubtedly, the tax game will change with the implementation of blockchain technology. Although there are some initial problems in the planning, transmission, and full implementation of blockchain technology, it is a fact that the world economy has great developmental advantages for companies, governments, medium and small businesses. Blockchain technology will have a major impact on the world tax regime in one way or another.

Although blockchain is not a remedy for the tax system, it can be applied in many areas to reduce administrative burden, collect taxes at a lower cost, and help narrow the tax deficit. Blockchain can reduce costs and add value within a business, between businesses, between businesses and consumers, and between businesses and governments.

Monitoring where and when VAT is paid and reducing VAT fraud while doing so, helping multinational companies make consistent data available for multiple tax offices, to increase the trust of tax offices and other administrations in the data, verifying judgments and assumptions about determining the profit of global businesses in different jurisdictions and increasing visibility into micro-transactions such as by individuals and participants as part of the sharing economy are the areas of use that are open to discussion and experiment (Pwc, 2017).

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