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CRYPTO ASSETS USED IN DIFFERENT INDUSTRIES AND ACCOUNTING OF THEM

FARKLI SINAİ KOLLAR İÇİN GELİŞTİRİLMİŞ KRİPTO VARLIKLARIN MUHASEBELEŞTİRİLMESİ

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Abstract

The use and acceptance of crypto assets as exchange, store of value and even more is a possibility that will trigger the spread of Blockchain. The other common view is that there are exaggerated expectations about cryptocurrencies and blockchain. In this context, it is thought that a period of approximately 3-4 years is needed for the transition of crypto assets to the "Productivity Period". There are over 20,000 types of crypto assets designed to represent all types of goods and services. Crypto assets, which were born as a manifesto to the existing financial system, are naturally difficult to account for within the system. The accounting of crypto assets can be started by coordinating the principle of "substance over form", which is one of the main subjects of accounting. Within the scope of this study, it is possible to mention four mainstream recommendations for the accounting of crypto assets: Business using crypto assets as payment instruments, business using crypto assets as investment instruments, business intermediating crypto asset transactions and crypto mining business. IDO or ICO activities, which can be summarized as the "initial public offering of crypto currencies", situations that require different and detailed legislation, and it can be said that the UK has come a long way in terms of legal regulations in this regard. Crypto asset is an inclusive and broad definition of the crypto money. It has been about ten years since cryptocurrencies entered our lives. It is a well-known fact that during this time, those who remained outside the strong ones such as Bitcoin and Ethereum deflated like a balloon. Today, technological infrastructures such as Blockchain, DAG or Hashgraph, which form the basis of cryptocurrencies and industrial branches that develop on the axis of these technologies have a market volume of over 1 trillion dollars. The digital chain technology, which forms the basis of the crypto market, contains an innovation potential that is too important for countries to be sacrificed to accounting and tax procedures. As a matter of fact, in today's world where capital mobility is essential, innovations that go beyond the borders of the country can be regulated efficiently with the legislations adopted because of international consensus.

JEL codes: E40, F02, M41

Keywords: Crypto asset, Cryptocurrency, Blockchain, Accounting of crypto assets, Bitcoin, Ethereum.

Özet

Kripto varlıkların değişim, değer saklama aracı ve hatta daha fazlası olarak kullanımı ve kabulü, Blokzincirin yayılımını tetikleyecek bir olasılıktır. Bir diğer yaygın görüş kripto paralara ve blokzincire dair abartılı beklentilerin olduğudur. Bu bağlamda kripto varlıkların "Üretkenlik Dönemi" için, yaklaşık 3-4 yıllık bir zamana ihtiyaç duyulduğu düşünülmektedir. Günümüzde her türden mal ve hizmeti temsil etmek üzere tasarlanmış 20 binin üzerinde kripto varlık çeşidi vardır. Zaten mevcut mali düzene adeta bir manifesto olarak doğmuş olan kripto varlıkların, sistem içinde muhasebeleştirilmesi doğal olarak zordur. Kripto varlıkların muhasebeleştirilmesine, muhasebenin temel kabullerinden olan "özün önceliği" ilkesinin eşgüdümlenmesi ile başlanabilir. Bu çalışma kapsamında kripto varlıkların muhasebeleştirilmesi için kurumlara dair 4 ana akıma yönelik sınıflamadan bahsetmek mümkündür: Kripto paraları ödeme aracı olarak kullanan kurumlar, kripto varlıkları yatırım aracı olarak kullanan kurumlar, kripto varlık işlemlerine aracılık yapan kurumlar ve kripto madenci kurumlar. "Kripto varlıkların ilk halka arzı" olarak özetleyebileceğimiz IDO veya ICO benzeri faaliyetler ise, farklı ve detaylı mevzuat gerektiren ticari

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girişimler olup, İngiltere'nin bu konudaki yasal düzenlemeler bağlamında oldukça mesafe kat ettiği söylenebilir. Kripto varlık, kripto parayı kapsayıcı ve geniş bir tanımlamadır. Kripto paralar ise hayatımıza gireli yaklaşık on yıl oldu. Bu süre zarfında Bitcoin ve Ethereum gibi güçlülerin dışında kalanların bir balon gibi söndüğü de bilinen bir gerçektir. Bugün kripto varlıkların temelini oluşturan Blokzincir, Hashgraph veya DAG gibi teknolojik altyapılar ve bu teknolojiler ekseninde gelişen sınai kollar 1 trilyon doların üzerinde market hacmine sahiptir. Kripto piyasasının temelini oluşturan dijital zincir teknolojisi ise ülkeler için muhasebe ve vergi prosedürüne feda edilemeyecek kadar önemli bir inovatif gizilgücü bünyesinde barındırmaktadır. Nitekim sermaye hareketliliğinin esas olduğu günümüzde; ülke sınırlarını aşan yenilikler, ülkeler arası uzlaşı sonucunda kabul edilmiş mevzuatlar ile düzenlenebilir.

JEL Sınıflandırması: E40, F02, M41

Anahtar kelimeler: Kripto varlık, Kripto para, Blokzincir, Kripto Varlıkların Muhasebeleştirilmesi, Bitcoin, Ethereum.

1. Introduction

It was finally understood in the 1970s that "Tokens[1]" made of small clay, with a history dating back to 5000 B.C., were much more than artistic particles and represented goods and services in the old period (Vatan & Benli, 2018). Today's crypto tokens[2] are a current version of historical Tokens used before Christ. While crypto tokens in essence crypto coins that have gained the status of "coin" by finding a place in the network; Just like their ancestors Tokens, they are on the way to customizing all kinds of goods and services (Arıkan, 2020). It is predicted blockchain and crypto assets will actively exist in dozens of different areas (Lemieux, 2016). Alpagu (2018) argues that an application like "selfcoin" will be the basis of the financial system with this privatization process. On the other hand, the predictions about the future of crypto assets are quite different from each other. For example, among the crypto assets of more than 14 thousand, it is thought that only one or a few of them will survive in the long term by erasing them from the market. It can be said that the volatility and insecurity created by ponzi ICOs[3] in the market was effective in the emergence of this view.

There are also successful infrastructure systems alternative to blockchain such as DAG and Hashgraph but the technology that underlies most crypto assets is blockchain. The invention of Bitcoin has become a milestone in the context of the awareness of the blockchain and the studies about it. Therefore, it is very difficult to predict a future for crypto assets independently of the blockchain. The possible usage areas of blockchain and crypto assets soon and exaggerated expectations about them are examined based on pilot applications in this paper (Arıkan, 2021).

Accounting for crypto assets is a global issue that all governments work on. Indeed, global issues require global laws that bind all governments. It seems that a good distance has been covered in terms of legal base for England. Crypto assets have a structure that tax authorities have not been used to before. For example, Ethereum (ETH); It is a crypto asset that is in demand both as a means of payment, as a security on digital exchanges, and as a commodity due to its increased value. In this context, any company's tax records will not be sufficient for Eth. Ethereum; For whichever of these three commercial areas is used, it would be more appropriate to make the accounting for that area. We can express and account for other crypto assets just like ETH. Below, under the headings of some sectoral areas, sample crypto ecosystems are examined, and theoretical accounting suggestions are made. We can collect these propositions under 4 main headings: Institutions that use crypto assets as a means of payment,

[1] In this study, "Token" whose initials is capitalized refers to historical symbols used before Christ, while "token" with lowercase letters represents cryptocurrencies.

[2] Crypto token: Cryptocurrency that has not yet settled in its own network.

[3] Ponzi ICO: New and speculative crypto project, pyramid scheme.

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institutions that use crypto assets as an investment vehicle, institutions that broker cryptocurrency transactions, and crypto mining institutions.

It is seen that the crypto assets are classified as cash and cash equivalents, non-cash financial assets, intangible fixed assets, investment properties, inventories in the literature (Ağ & Gülhan, 2022). The global accounting institutions and organizations such as IASB, AICPA, ACCA, AASB, ASBJ agree on the classification of cryptocurrencies as intangible assets. However, there is no official consensus on crypto assets and their accounting among global professional accountancy organisations, regulatory authorities, and large audit firms (Aslan, 2020).

This study will contribute to the literature by determining the current status of crypto-asset projects developed for different industrial branches and making suggestions for accounting for crypto-assets.

2. Blockchain and Crypto-asset Applications in Different Areas

Blockchain and crypto assets can likely to play a leading role in many different areas of life now and soon (Gomber, 2018). The mainstream sectors that are thought to have the most potential and volume are examined in this part of the study.

2.1. Finance

There are publicly announced studies of more than 63 central banks around the world regarding the Central Bank Digital Currency (CBDC), and approximately 10 percent of these banks have pilot applications (Tokyay, 2019). However, the official digital currencies are under the control of the central banks from which they will be issued. The supply will be done by central banks. Therefore, it should not be forgotten that cryptocurrencies which are based on the concept of decentralization, are different structure from CBDC.

In the financial sector, possible change areas expected from blockchain, and cryptocurrencies are fast payment opportunity, contribution to improved compliance processes, cyber security (such as anti-cybercrime, digital identity verification), increasing efficiency in capital markets (crypto remittance, convenience and cost savings in intercontinental payments), facilitating loan and loan approval processes (Takaoğlu, Özer & Bright, 2019). According to Statista's data (2020), while the market volume of the blockchain will reach 23.3 billion dollars in 2023, the financial sector that will invest the most in the blockchain industry will constitute 60% of the market. Decentralized exchange and finance (DEX) is another financial topic that draws attention with its rising market volume in the crypto market.

It is seen that crypto assets have assumed a historical Token-like structure over time and are moving towards becoming digital assets representing all kinds of goods and services.

It is a well-known fact that cross-border payments are a major revenue item for banks. As a matter of fact, half of the transaction revenues and 20% of all transactions consist of cross-border payments according to 2015 data. Traditional banking practices may change and develop with the widespread use of e-trading, mobile banking and e-wallets, the current structure of banks, especially cross-border payments. The emergence of the blockchain can lead to fundamental transformations in the cross-border payments system, as in most financial areas. Because the blockchain community claims to offer increased transparency, lower transaction costs and safer payment opportunities to the current system (Prakash, 2020). Bank for International Settlements noted that the current cross-border payment system is slow and expensive, and reported that they are considering different solutions (BIS,2020). The report focuses on the future of payments and envisions the future of central bank digital currencies, DLT, tokenized securities, cross-border payments and P2P innovations. Financial institutions may adopt one or more of four titles in the accounting of their crypto transactions nowadays:

-Institutions that use cryptocurrency as a payment tool,

- Institutions that use crypto asset as an investment tool,

- Institutions that act as an intermediary in crypto asset transactions,

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- and even financial institutions that contain mining.

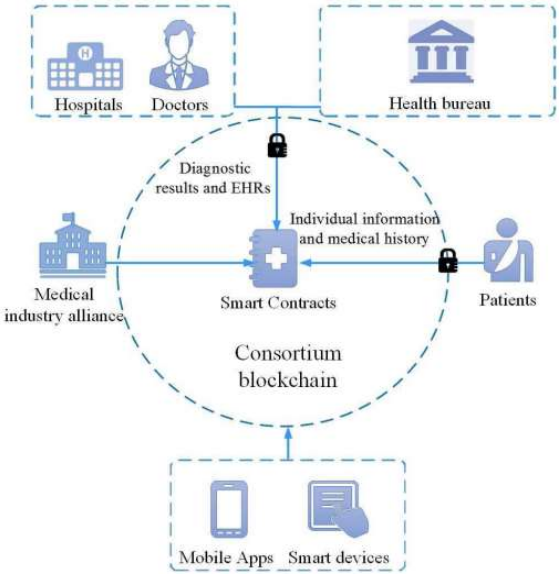
However, it can be said that more than that is needed for the efficient accounting of crypto assets. As a matter of fact, blockchain-based innovations with applications such as decentralized finance (DeFi) or Metaverse trigger change for the classical system as well.

2.2. Healthcare

Blockchain can provide that medicine tracking through the health supply chain, combating fraud in the pharmaceutical industry, managing patient data and sharing it with the relevant authorities, efficient structuring of the national health system, storing data, organizing the blood banks, sharing information with stakeholders, etc. As a matter of fact, some companies have started pilot apps the use of blockchains to store electronic health data. The applications are progressing in a way to reduce the general expenses and to increase the data privacy and accuracy.

Studies continue the adaptation of health systems to blockchain in the world. Many technology companies such as Holland-based Traxion, Cyberprint, Compumatika and Tymlez have announced that they have made their software aimed at combating COVID-19 available to the government and healthcare professionals. Estonia keeps patient data with the blockchain-based "X-Road" application and defines patients as the absolute owner of their own health data in this app. Criminal sanctions are imposed on those who access their information without the patient's consent (Ekin & Ünay, 2018). Leakage of patient data by hospital staff and theft or alteration of data from outside access are potential security problems, and low-cost new solutions based on blockchain can be introduced. For example, Figure 1 shows a high security blockchain model based on smart contracts designed for the healthcare industry.

Figure 1: Blockchain Model Designed for the Healthcare Industry



Source: Wang (2018)

As seen in the model above, in the blockchain-based health system, it will not be possible to keep the accounting of crypto assets in the usual order. The healthcare institution in the model, the crypto asset integrated into the blockchain-based system; It can be accounted for as institutions using crypto assets as a means of payment. As seen in this example, it is difficult to say that the current accounting system will be efficient in the models developed for the health system.

Studies on under which conditions and by whom the patient's EMR records can be seen are go on with the blockchain model developed through Ethereum-based smart contracts in the MedRec project of Massachusetts Institute of Technology. In addition, there are currently blockchain-based pilot models such as Medical Chain, MediLedger, Simply Vital Health, Robomed Network, Block Medx, Patientory,

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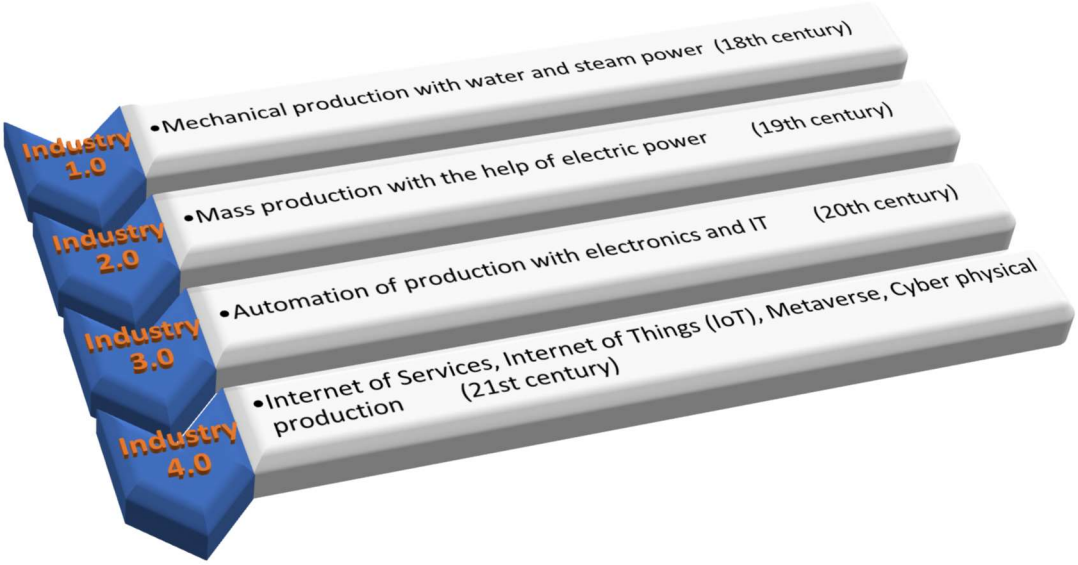
Dok Chain, Healthureum, Gem, Medi Bloc, and many of them using crypto tokens. It can be said that blockchain applications developed for the health sector are designed as a private portal that places emphasis on privacy, unlike public records, which are generally used as digital notebooks.

2.3. Internet of Things

Industrial periods can be symbolized as in Figure 2.

Figure 2: Industrial Periods and IoT



Source: Created by Researcher

IOT is the communication of devices among themselves via the internet. It is reported that devices communicating via the internet reach 20 billion. The security of IoT networks is an increasingly difficult issue due to the increasing number of devices, heterogeneous structure and limited resources. Work on providing security with less cost and IoT-based blockchain applications continues. It can be said that the IoT (Figure 2), which is one of the pillars of Industry 4.0[4], and the blockchain are a natural association. As a matter of fact, it has been stated that 75% of companies working on IoT in the USA have already adopted the blockchain or aim to experience it within 1 year in the research conducted by Gartner with the participation of 500 technology companies. 86% of companies working on blockchain are currently working on projects that use IoT and blockchain together (Litan, 2019).

Blockchain technology can enable organizations to save and process the data collected by IoT devices in a low cost and transparent way, which cannot be changed by converting to information. In addition, it can provide a suitable platform infrastructure for machine-to-machine (M2M) applications with different security options and crypto money projects. In IoT studies such as smart homes, smart cities, smart industrial organizations, smart contracts, which are programmable solutions based on Ethereum, are mostly used. Since the blockchain is an infrastructure where transactions on it can be

[4] Industry 4.0: The fourth industrial revolution was first heard in 2011 at the Germany / Hannover Fair and it was reported by a consensus of some German companies in 2012 was submitted to the German Government. Cyber-physical systems, internet of services and internet of things (IoT) can be listed as the three basic components of Industry 4.0. Metaverse is a popular sub-title.

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performed and recorded in an intermediary, reliable, and accurate manner, studies continue to integrate with IoT. Many companies such as Bosh, Turkcell, BMW are known to invest in blockchain-powered IoT networks. Another view is crypto assets Industry 4.0 will stand out as an account, exchange and store of value and will be more than money with smart contract derivatives. The crypto asset project called IOTA which based on Tangle tech is a pioneering IoT themed platform (Eyel & Gün, 2020).

IoT-themed technological companies can develop an architecture based on the digital chain infrastructure. crypto asset as exchange and store of value used in this infrastructure; It can be accounted for as a payment instrument, accounted for as an investment instrument, and even the companies in question can be examined under the title of institutions that act as intermediaries in crypto asset transactions, taking into account their fields of activity. Governments always want an interlocutor from companies for the continuation of their financial order. It seems that the reconciliation of global companies and governments, which put the human-based workforce factor in the background and transitioning to cyber-physical production, will be more difficult in the future.

2.4. Supply Chain

Supply chain industries such as shipping, logistics, or supplies are strong alternative industry areas for blockchain applications. However, according to a study by Gartner in 2019, 90% of blockchain-based supply chain projects will be idle by 2023. The main problem is supply chain oriented pioneering pilot applications following the models of different successful fields such as banking or insurance. However, it is thought that unique algorithms should be developed for supply chains with a complex structure (Egham, 2019).

On the other hand, the global organisations such as Toyota, JD.com, AliBaba, Provenance, Walmart are known to invest and test on blockchain-based supply chain infrastructures (Kshetri & Loukoianova, 2019). The recording and tracking of the stages of transformation of the product from the raw materials to the industrial goods, warranty, user feedback, repair history, changing hands and recycling by completing its life; can be done more efficiently with blockchain-based supply chains.

There are additional and more efficient chain needs to existing supply chains. An example of this is the food supply chain. As a matter of fact, World Health Organization (WHO) reported that more than 600 million people lose their health every year due to low food contamination. There are some expectations that, examples such as the blockchain-based food supply chain can contribute to social benefit soon (Matthews, 2020).

It is known that specialized crypto assets for supply blockchains are developed and included in the system. VeChain, a blockchain-based supply chain management platform that enables users to track logistics and inventory, and VET, the cryptocurrency of Vechain are examples.

It should not be ignored during accounting that the main token used in the infrastructure of a supply chain established on the basis of a digital chain is more than a simple exchange tool.

2.5. Insurance

Today persons, commodities or institutions are insured in many areas such as engineering, liability, life, health, traffic, theft, personal accident, automobile insurance, transportation, fire, earthquake. Blockchain-based insurance company called Etherisc, operating since 2016; It offers its customers a licensed flight delay insurance as a dApps application under the “Decentralized Insurance” service. The blockchain-based insurance company Chainsecurity provides an automatic audit platform service for smart contracts. Issues such as IoT, cloud, artificial intelligence, the effects of local regulations on smart contracts, how image processing techniques will contribute to damage detection, the effects of the emergence of crypto assets belonging to the insurance industry, or the principles of insurance of digital assets; Blockchain and crypto currency themed topics discussed in the insurance community (Fintechistanbul, 2018). What is expected from the blockchain system for the insurance industry, increasing the fairness of remuneration, detection and disclosure of fraudulent policies, recognizing profitable customer accounts and making the conditions attractive to them, reducing costs, calculating and distributing loyalty premiums effectively and fairly, improving customer experience. It

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is possible to use the blockchain for insurance operations such as microinsurance, premium calculation, data entry and identity verification, risk assessment. Insurance-themed crypto assets such as Digital Insurance Token (DIT) are currently traded in the crypto market. Crypto assets promise radical changes in the insurance sector, on the other hand, it cannot be said that the current financial system offers the options to account for these changes.

2.6. Transportation

It is seen that many mobile applications are used worldwide in daily life with the success of the Uber application. @taksi, iTaksi, BiTaksi, Scotty, Olev are similar applications to Uber. Mobile applications such as BlaBlaCar, roadway, Martı and TAG are also widely used. A blockchain-based structuring is possible in transportation, including car rental and public transportation services. It was announced to the public in 2019 that the cryptocurrency Libra (Diem or Meta) which Uber will jointly with Facebook and Mastercard use in their systems within 1 year. But it is clear from the constant change of the project and roadmap that everything is not going as planned.

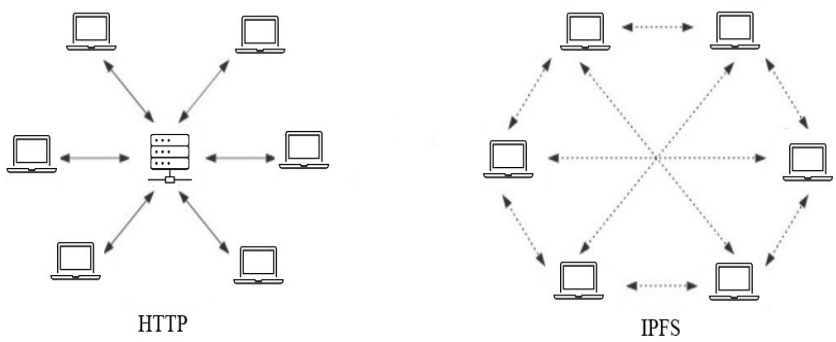
While some cities of Argentina offer the opportunity to pay with Bitcoin in public transport such as buses, trains and metro, blockchain company Vottun is a blockchain-based 'all-in-one' developing approach that combines all public transport in Madrid under one application system. Turkey Konya Metropolitan Municipality has announced a similar and more comprehensive blockchain based crypto money, transportation and supply network project to the public. Transportation network studies based on blockchain infrastructure of companies such as Ubs, ZF, Innogy continue.

By using crypto wallets which are part of the crypto ecosystem; buses, ships, trains, planes, etc. tickets, car rental and taxi fares, payment items such as fuel, parking, insurance, tolls, can be available on crypto payments. It is possible with Blockchain's smart contracts that provide peer-to-peer reconciliation, it is possible to eliminate intermediary commissions with cryptocurrency payments by making car rental agreements only between trading parties. For example, instead of firing the taxi driver, the blockchain dismisses Uber, allowing the taxi driver to transport the customer without a middleman. The striking difference here; While most technologies tend to automate and centralize common tasks; blockchain automates the centre.

2.7. Online Data Storage

Online data storage operations are mostly done with the help of cloud technologies today. It is known that there are companies working on local and cloud technologies such as Buluthan, Cloudeos and VestelCloud. Blockchain is an option that offers solutions to the security, privacy and cost concerns of cloud technology. Distributed Ledger Technology (DLT) which is a natural association with blockchain at its basis is advantageous in terms of cost, but it is theoretically compatible with the idea of "distributed internet". In this context, there are platforms such as Filecoin, Storj, Dlt, Siacoin, which are developed on blockchain-based online data storage and they have their own crypto assets.

Figure 3: HTTP & IPFS



Source: Created by Researcher

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Chinese-based data company Filestorm; He is known for his work on blockchain-based IPFS (Inter Planet File System), which is a peer-to-peer member of the distributed file storage protocol (Figure 3). The IPFS protocol basically enables multiple storage rather than client / server streaming by managing all kinds of data such as pictures, videos, music, documents from different computers at the same time. SquareTech is another blockchain-themed data storage company that aims to build data centres to monitor DLT nodes in real time. Another blockchain company YottaChain offers a different business model that is not IPFS based. Data storage on their platform; It claims to be made 10 thousand times more secure than traditional central storage by eliminating unnecessary data that can be copied on the YottaChain official website.

In such business models where the human-based workforce factor is in the background, we see that the income in terms of crypto assets begins to take a serious amount. In such business models, it is obvious that there is a need for innovations in the current financial system in the accounting of income. Considering the reports of international organizations such as IMF, WB, BIS; it can be said that they have the common suggestions.

2.8. Foundation and Donation Procedures

Most charitable organizations around the world strive to go further in transparency and governance. Blockchain infrastructure can contribute to optimizing the fundraising and management of charities. For example, Blockchain Charity Foundation (BCF) is a blockchain-based organization that claims to be a non-profit and aiming to provide aid worldwide by trying to achieve sustainable development goals in combating inequality and poverty. “National Donation Chain Project" system, which is currently under study, is another local blockchain-based donation system. The aim of the system is to meet people who want to donate directly to those in need without the need for any intermediaries.

2.9. Energy

There are opinions that after generation, energy is distributed primarily to long-distance centres and subsequently to consumers, and a path is followed that leads to energy loss by using resources relatively inefficiently in conventional electricity networks. This loss can be prevented by the decentralized structure of the blockchain. As a matter of fact, pilot application projects in which consumers are "producers-consumers" using blockchain technology have been tried and succeeded in the USA and Netherlands. It is thought that personnel and operation costs will decrease in decentralized new pilot applications. Global energy companies are working on blockchain-based pilot projects. US origin LO3 Energy, Transactive Grid, Consen Sys; R&D activities of EU origin Enervalis, Bax & Company, Centrica and Bankymoon operating in South Africa, Spanish company Bax & Company and Belgium origin Enervalis are important blockchain studies.

In Dutch city of Eemnes, people who produce solar energy are on the way of "producer-consumers" using blockchain. The city has attracted attention with its municipal approach where personal solar panel usage stands out. Eemnes is the first city where the blockchain-based pilot software developed by Enervalis and Bax & Company was tested, allowing peer-to-peer energy exchange. The pilot application was implemented with blockchain-based software installed on smart meters. The energy generated can be seen by each house with this software. Thus, energy supply and demands are optimized. In addition, it is predicted that the energy price in the whole city will decrease between 5% and 10% and removal of intermediaries so the more efficient use of resources by blockchain-based system.

British-based Centrica company is another energy company working on blockchain. Centrica predicts that the renewable energy to be provided on the platform it developed can reach up to 10% of the total energy produced in England (Uğurlu, 2018). The battery charging works are followed and easily paid with the "BlockCharge" application developed by the energy company RWE in Germany together with the technology company Slock.it. With the "PowerLedger" project in Australia, electricity consumers provide electricity from the supplier they want and pay as much as they use. Electricity

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generating households can exchange energy between their neighbours without including any electricity supplier in the contract and receive fees within the terms specified in the smart contract with the work named "Brooklyn Microgrid" implemented in USA / Brooklyn.

The energy sector can naturally fit in with the blockchain infrastructure. Energy networks also become a micro-scale network where both producers and consumers exist in large numbers with the emergence of micro production in the modern world. A new energy market can be built with blockchain applications prepared with Uniswap-like smart contracts. However, this revolution requires fundamental changes in traditional energy practices. For example, existing energy networks are designed for unidirectional power flow. The biggest challenges in possible blockchain transformation are the restructuring of the physical infrastructure network, which is the product of this one-way flow, and the rebuilding of the payment network (Tormen, 2018).

It is thought that positive and efficient results can be obtained with blockchain technology in the production, distribution, consumption and management of energy, from electricity used in residences to giant power plants. For example, the amount of energy produced in power plants, the most efficient and fastest distribution of this energy to the field, systematic monitoring of its distribution and distribution process can be recorded with blockchain. Blockchain offers a natural and cost-free defence for cyber-attacks by its algorithm. Currently, crypto asset projects such as Energycoin, SunContract, E2C are marketed with the claim that they will be more than an exchange tool in blockchain-based energy initiatives.

2.10. Intellectual Property

It is often stated that intellectual property owners such as musicians, photographers, e-game creators, artists, e-authors, or designers nowadays have difficulties in getting their work paid off due to cyber piracy, unfair use or non-payment of their rightful copyrights. Solutions based on applications such as patents and copyrights have been used until today to eliminate the grievances. However, such options only work when the product is a great success and remains cumbersome in the product development process. The blockchain technology, which has a distributed and unchangeable structure, can be transformed into a platform where creative intellectual products can be leased, sold or user records can be stored transparently and at low cost. Such a portal can facilitate pricing with smart contracts, deactivate brokerage houses and make the trade more profitable for producers and consumers. Although not accepted by official institutions, applications such as Vaultitute and Binded are currently developed blockchain solutions for intellectual property, while LISK and POE are copyright and intellectual property themed and blockchain-based crypto assets.

2.11. Real estate and Deeds

In the real estate market, which seems easy at first, the purchase, sale and transfer of real estate with crypto money becomes complicated contrary to what is thought. For example, does the property exist physically and how can this asset be confirmed? How to know if the partners are real and not money laundering? How can the partnership obligations to be provided by the counterparty of the trade be approved? How will the final agreement on real estate be achieved in the case of a new partnership? Is the real estate title deed suitable for transfer? Does the cryptocurrency to be used for shopping have a real value? In what way will crypto money be exchanged for official currencies? Will it be possible to exchange official money 24/7? Is the blockchain platform where the handover works will be done reliable? Who will be the addressee if problems arise in the transfer or partnership in the future? What will happen if the platform crashes? Will only cryptocurrencies be used in trade, or will there be other barter products subject to trade? The solution based on blockchain-based smart contracts belonging to the Swiss origin Blockmimo platform is visualized in 4 stages in Figure 4.

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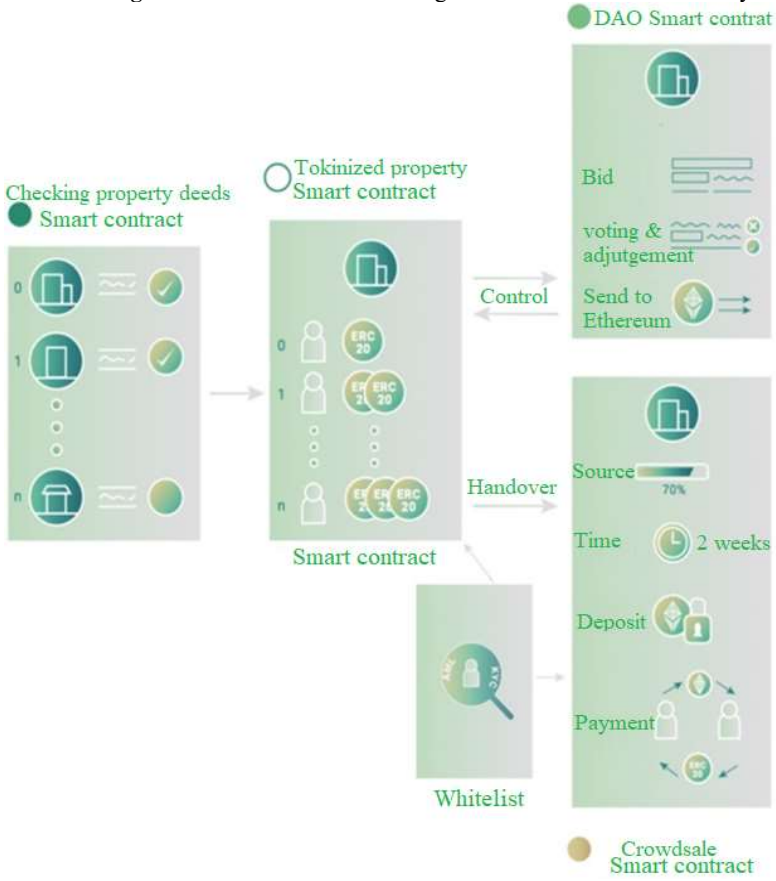
Figure 4: Blockchain Model Designed for the Real Estate Industry



Source: (Yalçın, 2018)

Figure 4 show that 1. smart contract in this connection; platform where title deed information is monitored, 2. smart contract; platform where partnership shares are listed and reported; 3rd smart contract; The platform where real estate owners vote, and the 4th smart contract is the payment platform where the buyer and seller are together. The money remains in escrow account until the conditions in the smart contracts are met, when the condition is met, it passes from the investor to the seller. In the 4th smart contract, it is possible to perform transactions with Metamask and Ethereum. It is normal for buyers to be wary of the real value of the cryptocurrency to be used and the possible exchange rate differences immediately after the purchase. At this point, the Blockmimo platform offers a solution with the Swiss Crypto Token indexed to the Swiss franc via the Bitcoin Suisse exchange, which exists in the Cryptovalley crypto asset. Platform aims to ensure the value of the cryptocurrency requested through the Bitcoin Suisse exchange and Swiss Crypto Token and the guarantee of conversion to fiat money (Çağlar, 2019). "Swiss Real Coin" is also another blockchain-based crypto money project that has come a long way in the Swiss real estate industry. As can be seen, in blockchain-based models designed for the real estate industry, crypto assets are not only used as a simple medium of exchange. This situation demands more up-to-date solutions for accounting for blockchain-based assets that are used in this sector.

2.12. Smart Cities

The smart city phenomenon is a field of study directly related to smart public applications, smart energy, smart health applications, smart agriculture, smart education services, smart transportation, tourism, etc. (Figure 5). Especially developments the wireless connections and Internet of Things (IOT) accelerate the intellectual and structural development of smart cities. The smart city works that are set out with the idea of a city in communication with all its units; It is thought that if there is sufficient resources and determination, it will make a great contribution to the solution of problems such as traffic

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accidents, sudden health problems, famine, population planning, education, employment, security, and urban infrastructure (Takaoğlu, 2019).

Figure 5: Smart City Application Areas

Source: isbak.istanbul

Features such as transparency, distributed database, low cost, peer-to-peer transmission and the inability to change records make this technology ideal for smart cities. For example, OpenCerts, an open-source project sponsored by the government of Singapore, is one of the largest official blockchain-related projects to date.

On the other hand, students graduating from 18 educational institutions can obtain digital certificates verified with blockchain through the platform called "OpenCerts" after 2019. Once the certificate is created in the system, the data is converted into fixed-length data sets and kept in the Ethereum block. OpenCerts is expected to issue digital certificates to thousands of people in the coming years.

The example of Singapore Airlines digital wallet for the storage of digital records, Swedish property management example for the exchange of assets is among the pilot application areas of smart cities. It is ensured that the health records of 1.3 million people are stored safely and cheaply with blockchains and shared only with the relevant units by the X-ROAD project, which integrates blockchain technology in Estonia into the healthcare industry. Dubai's smart city vision is associated with blockchain and the Dubai Blockchain Platform, which has emerged with the initiatives of private companies such as government and IBM since 2013; is working to integrate blockchain-based systems into Dubai (Tekir, 2020). Crypto projects specialized for smart cities such as IOTA and City Coin are currently in use as a currency for their respective platforms.

2.13. Law

Smart contracts are different from traditional contracts. They are directory of commands which supposed to work designed depending on triggers and conditions. Smart contracts to be issued in accordance with contract law are likely to be accepted as valid over time.

Security of evidence is another legal area which the blockchain tech can contribute. As a matter of fact, the platform offers permanent and unchangeable storage for records. Verification of documents can be made faster, easier and cheaper on the blockchain. The document may not only be printed, but also an audio, visual or other record.

Legal evidence and transparency are possible legal potentials of the blockchain. The addresses of the fund can be determined with the open distributed ledger technology in resolving financial disputes.

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Patents, copyrights, intellectual property rights and trademarks can be secured with blockchain technology at low cost and without the need for intermediaries such as notaries.

Legal control and management are specific topics which both governments and private enterprises can benefit from blockchain technology. Possible reform areas include the monitoring and management of charity funds, distribution of public funds, tax payments or elections.

2.14. Education

The high cost, low transaction speed and scalability problems in the production or mining phase have not been fully overcome, brings different opinions on whether blockchain applications can make a significant contribution to the field of education. If the blockchain will be used in education, it can bring about changes beyond keeping records and payments. Pilot blockchain applications are seen in educational area such as degrees, certificates, diplomas, digitization of educational credentials, record keeping, payment, accreditation. For example, it is known that Cornell and Georgetown Universities have educational programs based on blockchain infrastructure. Woolf University, founded by a group of academics leaving Cambridge and Oxford, aims to be the first "unlimited" university based on blockchain. The organization that places blockchain and smart contracts at the foundation of the relationship between teachers and students is non-profit (Frunze, 2020). As part of a pilot project, MIT used blockchain to distribute diplomas awarded to approximately 110 graduates in 2016. The University of Nicosia (UNIC) currently distributes diplomas and certificates in its departments digitally through a blockchain-based system. Holberton software school in San Francisco; actively uses the blockchain application for students' grades, diplomas and documents. The State Medical Boards (FSMB) in the USA allow students and graduates to obtain digital certificates through a blockchain-based infrastructure within the framework of the pilot program. Malta Tourism Research Institute is planning to issue certificates to graduates of the College of Art Science and Technology digitally through the blockchain system. Malta National Commission for Further and Higher Education uses this system to certify education and graduation certificates and issue new certificates to replace lost original certificates. If the system can be successful, Malta is considering implementing this pilot project in various government agencies, for example connecting personal records such as health or title deeds to the blockchain infrastructure. Delft, EPFL, Boston, ANU and UBC universities have established a common blockchain-based platform that enables the sharing and storage of certificates and documents within the scope of pilot project in the USA. It is a possible thought that the platform can cover all universities around the world.

The European Commission Joint Research Center (JRC) stated the possible blockchain-induced changes expected in the educational field as follows in its 2017 report titled "Blockchain in Education":

-It will accelerate the termination of printed documents related to diplomas / degrees and transcripts.

-Documents and certificates issued by educational institutions can be stored permanently and securely.

- Academic certificates and documents can be verified automatically and quickly without the need for users to apply to the institution that issued the document.

- It will reduce data management costs of educational institutions by enabling users to have and control their own documents.

-Graduation information stated on the CV and the projects they participated in can be verified in job applications.

- Education fees of universities can be paid with blockchain-based cryptocurrency.

Migration is a reality that concerns the whole world. As with other information of immigrants, records such as diplomas, transcripts and certificates held by blockchain related to education can be verified worldwide, regardless of geography (Takaoğlu 2019). Educational-themed platforms such as

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Edu CTX, EduCoin, EdgeCoin , Open Cert, Krypt Ed, ODEM, Disciplina, Ed Chain, Bit Degree, NTOK, Live Edu, Blockcerts, Experty, Academy can be listed as blockchain-based works.

2.15. Governance

Blockchain can be a tool in the field of governance as it is in industries. Blockchain-based applications may reduce costs, increase transparency or directly contribute to areas such as anti-corruption, tax collection, distribution of public aid. Blockchain can be used to increase participation and confidence in elections or other constitutional processes for a fair, reliable and democratic administration (Sullivan & Burger, 2017). For example, blockchain tech was used to verify the votes in 2018 General Election held in the West African country Sierra Leone.

Immigration policies can be arranged and a legal access to irregular asylum seekers can be provided with the acquisitions such as cost-free identity verification systems offered by the blockchain (Manski, 2017).

3. Certain Studies That Realize Exaggerated Expectations on Blockchain and Cryptocurrencies

Undoubtedly, it is not true that almost every matter, from financial inequality to defining irregular refugees, from supply chains to unmediated property exchange, is waiting for blockchain and that global financial problems can be completely solved with blockchain.

Current study on the content (Vincent & Davenport, 2021) and cycle of future expectations is as in Graph 1. The study describing the stages of high cycle on blockchain was published in the report prepared by research company Gartner in September 2019. 5 basic development season and the industries interacting successfully with blockchain are reported in the study. It is thought that triggering of innovation in the 1st time period, the increase of exaggerated expectations and peak in the 2nd time frame, falling with disappointments in the 3rd time period, recovery and rising again expectations with enlightenment season in the 4th time period, the productivity season will appear in the time 5th time period. it is estimated that a season extending to 2, 5, 10 years or more will need to complete for all blockchain-themed industries. According to the report the cryptocurrencies will be regulated within 2 to 5 years (Stamford, "Hype Cycle for Blockchain Business" 2019).

Graph 1: Hype Cycle for Blockchain

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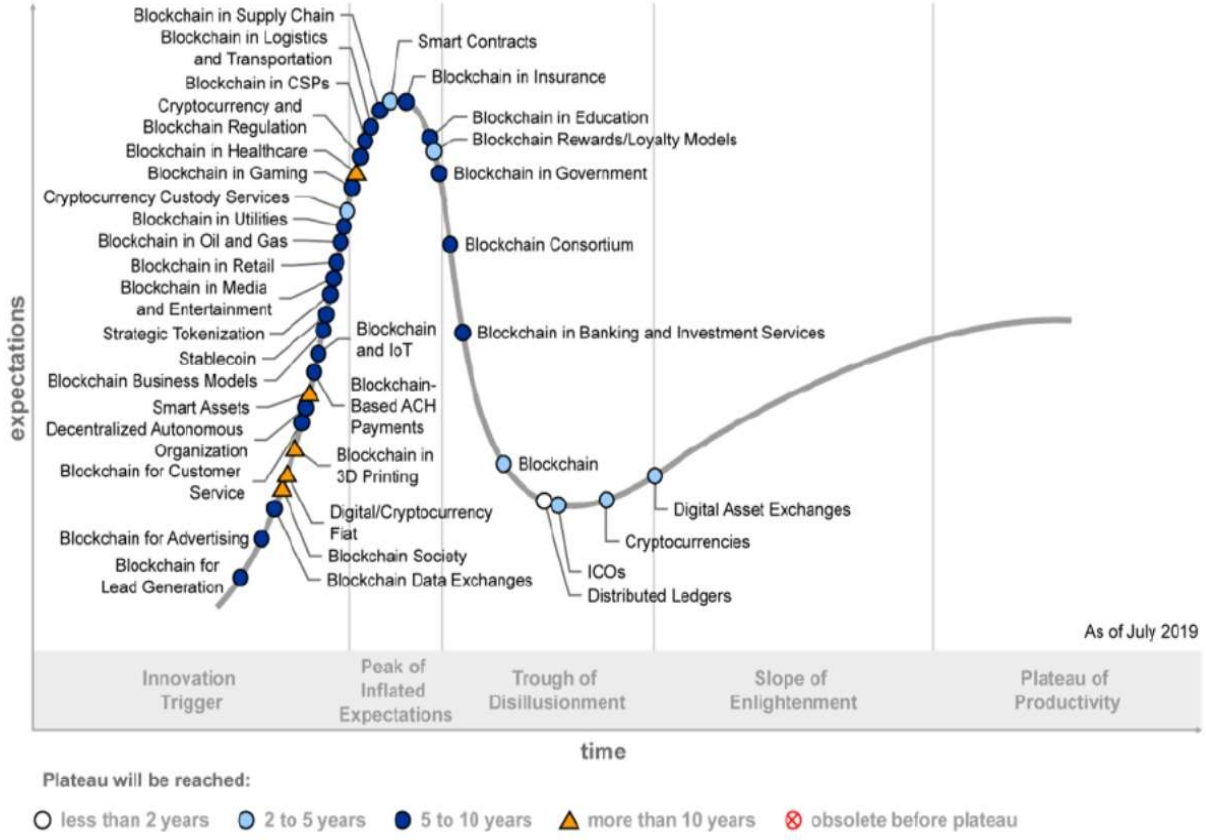
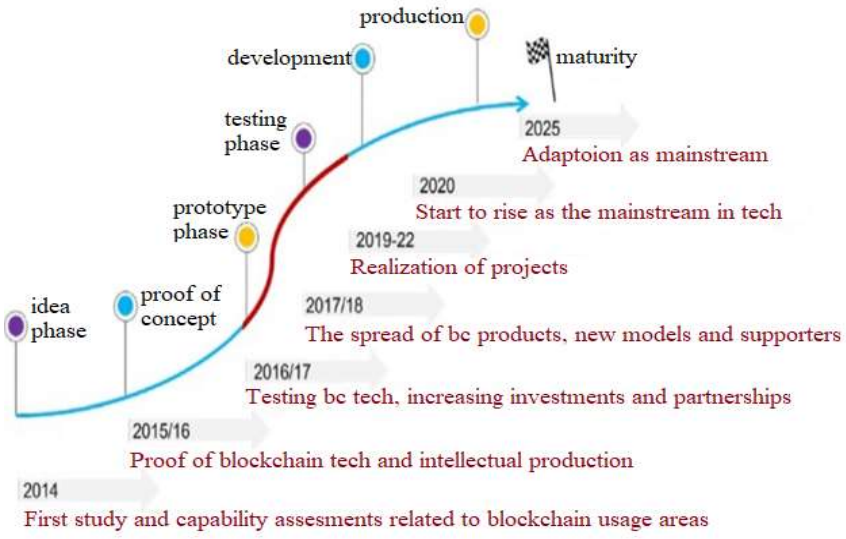


Source: Gartner (September 2019)

In another study (Graph 2), ideas, concept, prototype, testing, development, ultimately production stages belong to blockchain are expressed periodically. It shows that the implementation of the pilot applications of the blockchain will date 2022 and a 3-4 years period is needed for to be adopted as mainstream. (TÜBİTAK 2020).

Graph 2: Stages of Blockchain



Source: TÜBİTAK (2020)

4. Conclusion

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Accounting for crypto assets is a compelling option in the current financial system (Brukhanskyi, 2019). As a matter of fact, crypto assets emerged as a manifesto to the system. In this context, it is understandable that they are unregistered in the economy.

The fact that international capital mobility is essential results in a digital displacement of capital in seconds. In this context, it would be appropriate to have an international consensus, which is legally binding, for the accounting of crypto assets. The entry and exit points of crypto assets into the economy are well known to governments. many government banks even collaborate with crypto exchanges to convert cryptocurrencies into local currencies. However, it is a well-known fact that prohibition can increase the usage.

The current accounting system, crypto assets cannot fully meet the demands such as tracking and recording. Both the usage areas and the internal acceptance of crypto assets will increase with the increase in blockchain applications. The most optimist scenarios for the future are

-Sustainable social and commercial progress for blockchain like the internet example,

-The acceptance of individual crypto assets in accordance with Satoshi philosophy,

-The replacement of the US dollar as the reserve currency with the elite cryptocurrency,

-The widespread and permanent transition from bad money to good money by Bitcoinization[5] and Cryptocurrencization[6],

- To symbolize all kinds of goods and services in the future with digital tokens, as in the historical tokens used thousands of years ago.

-Transforming into much more than money along with the productivity process after Industry 4.0, Money 4.0 and Blockchain 4.0 periods.

The most pessimistic scenario is the transformation of cryptocurrencies into a ponzi scheme that causes great losses to some inexperienced investors and offers high returns to experienced stockbrokers in certain periods. The pessimists exemplify crypto assets with the “Datcom Crisis” and “Tulip Bubble” in history.

Undoubtedly, successful financial institutions will make optimum transformations for themselves considering the cost and efficiency analysis of the blockchain. However, it is worth noting that; Bitcoin and similar cryptocurrencies produced as an alternative to the banking sector seem to be a financial instrument that cannot be converted into cash without banks today. It can be said that possible blockchain hybrids to be seen in the banking sector will not be completely untraceable like existing cryptocurrencies. For example, Ripple (XRP) is a traceable crypto asset in which basic information can be stored in banks.

It would not be correct to claim that the only exit point for digital money and cryptocurrencies is blockchain. As a matter of fact, there are infrastructures such as DAG, Tangle or Hashgraph and crypto assets based on these systems. In addition, it is seen that central banks and governments are working on centralized digital currencies instead of decentralized assets such as cryptocurrencies. Also, the blockchain is thought to be an infrastructure that can potentially respond to most demands.

It can be started to be taxed by classifying as commodities, securities, or money in the current financial system. There is no consensus on this issue among Institutions and worldwide for crypto assets yet. However, the implementation of the recording and tracking of transactions made with crypto assets

[5] Hyper Bitcoinization: In environments where financial imbalances are intense due to problems such as inflation or selfish monetary politics leaving the monopoly money market and turning to Bitcoin (Krawisz, 2014).

[6] Cryptocurrencization: It is the term that refers to the transition to cryptocurrencies for similar reasons, such as "dollarization", which means an escape from the local currency to the US dollar with the lack of resources, trust or monetary balance.

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within the current accounting standards depends on this. Another option is to create a new standard and watch it in a determined account.

Although the milestone that increases the awareness and use of blockchain is the invention of Bitcoin, it is difficult to develop a perspective independent of the blockchain to make inferences about the future of cryptocurrencies. In this context, evaluations accompanied by blockchain studies in predicting the effects of crypto assets on the global financial order will make the aim easier.

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