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A Conceptual Foundation for Blockchain Development: The Contribution of Ibn Khaldun

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ABSTRACT

Blockchain is a game-changing technology that has the ability to solve plenty of real-world issues in the digital age. Blockchain is a subject of huge interest in many industries and academia in terms of discovering technology and classifying challenges and innovative practical application for the industry. This study addresses the challenges that are of main concern in designing a Blockchain platform. In this regard, the problems such as privacy, regulation, security, lack of adequate skill sets, energy consumption, inefficient technology design, the criminal connection, scalability, energy consumption, and public view are discovered to be important. Due to such challenges, the blockchain technologies have emitted a negative impression due to its incapability to be successfully applied while, at the same time, its benefits could not be fully gained by its investors. The objective of this study, hence, is to assess the blockchain advantages and growth in light of the eight foundations for economic development as advocated by Ibn Khaldun. Expending Ibn Khaldun's philosophy, each challenge is deliberated and investigated to find the answers and solutions for addressing and overcoming the afore-mentioned challenges.

Keywords: Blockchain, Distbuted Ledger, Bitcoin, Cryptocurrency, Ibn Khaldun Economic Growth idea.

INTRODUCTION

The Fourth Industrial Revolution or Industry 4.0 is a technological transformation that is changing how people work and interact in general. It will have an impact on the regulation and governance of all technology-based activities and transactions (Mahmood and Mubarik, 2020). The excitement for blockchain is that the potential benefits of blockchain extend beyond economics to the political,

humanitarian, social, and scientific domains, and that the technological capacity of Blockchain is already being harnessed by specific groups to solve real-world problems (Sakız and Gencer, 2019). The goal of blockchain technology is to create an open, universally accessible decentralised ledger that can be used to establish confidence in an insecure environment without relying on a third party. The ledger holds the blockchain shared and agreed-upon state, as well as an unchangeable list of all previous transactions. It can also be used in conjunction with other technologies, such as encryption, business rules, and identity management, to make technology more suitable for the difficulties at hand (Subramanian, Chaudhuri et al., 2020). The term "blockchain" belongs to a collection of technologies that includes the blockchain structured data, public-key cryptography, distributed ledgers, and consensus processes. A blockchain is made up of blocks, each of which contains data (something of value), its hash value (a unique cryptographic value combining characters and numbers generated by a sophisticated computer algorithm), and other information (Rabbani, Khan et al., 2020). In this regard, a well-designed blockchain, as a distributed, tamper-proof ledger, not only eliminates intermediaries, reduces costs, and increases speed and reach, but also provides more transparency and traceability for many business operations. By 2030, it is estimated that blockchain would be able to generate more than \$3 trillion in yearly corporate value (Chang, Iakovou et al., 2020). Furthermore, Blockchain can also be classified as public, private or hybrid variants, depending on their application (Sultan, Ruhi et al. 2018).

To explain, public blockchains have no single owner; they are visible to everyone and accessible by anyone; their consensus process is open to all who intend to participate in, and they are fully decentralized. Bitcoin is a first practical example of blockchain implementation. Bitcoin is a digital currency that was first introduced in January of 2009 (Segendorf, 2014), (Böhme, Christin et al., 2015). It is based on ideas presented in a whitepaper by Satoshi Nakamoto, a mysterious and pseudonymous figure. The identity of the individual or people behind the technology is still unknown. Bitcoin promises reduced transaction fees than existing online payment methods, and it is controlled by a decentralised authority, unlike government-issued currencies. The bitcoin system consists on a network of computers (also known as "nodes" or "miners") that execute bitcoin code and store its blockchain (Bouoiyour and Selmi, 2015). A blockchain can be viewed of as a collection of blocks metaphorically. Each block contains a set of transactions. No one can trick the system because all computers running the blockchain have the same list of blocks and transactions and can watch these fresh blocks being filled with fresh bitcoin transactions transparently (Narayanan, Bonneau et al., 2016).

Bitcoin is an example of a public blockchain. Private blockchains (also called permissionless), on the other hand, use privileges to control who could read from and write to the blockchain (Pieters and Smith, 2021). Consensus algorithms and mining usually aren't required as a single entity usually has ownership and controls block creation. Hybrid (also known as a consortium), is the blockchain that is made public only to a privileged group (Benedetti, 2021). The consensus process is controlled by known, privileged servers using a set of rules agreed to by all parties. Copies of the blockchain are only distributed among entitled participants; the network is therefore only partly decentralized (Komalavalli, Saxena et al., 2020). It is also called a federated blockchain, which operates under the control of a specific group of organizations that are allowed to perform the role of full nodes (Pieters and Smith, 2021). There are many challenges in the growth of blockchain technology (Patel, Khatiwala et al., 2020). To explain, Government interferences, underdeveloped ecosystem infrastructure, unclear regulations, privacy and lack of standards, human resources, data privacy, managing storage capacity, standardisation challenges and social challenges, scalability, cost issues, long-term security, and software infrastructure are just a few of the issues raised by the report (Zakaria, Kunhibawa et al. 2018). As a result, these issues have harmed the development of blockchain technology as well as investor confidence. In this regard, a dynamic blockchain development strategy must be formed in order to promote blockchain technology and reap its benefits. Hence, this study recommends implementing Ibn Khaldun's economic expansion ideas into blockchain development methods in order to boost the benefits of the technology.

METHODOLOGY

In order to achieve these goals, a qualitative research methodology that includes three methodologies was used: exploratory study, observation, and doctrinal analysis (Hutchinson, 2015). Mainly using library and online databases, exploratory study and observation analysis were conducted in which primary and secondary data sources, primarily articles, and textbooks, were examined and analysed in blockchain challenges on Ibn khaldun economic thought, elucidating the subject of blockchain and Ibn khaldun economic thought (Mayer, 2015). Furthermore, using a doctrinal approach, content analysis was carried out by carefully studying the data from the specified sources to identify concerns that might arise in comprehending blockchain challenges and solutions Cownie and Bradney, (2013). The study is divided into five sections. Following the introduction, second section two is on understanding blockchain literature. This section reviews blockchain, its nature, possible implementation, and its inherent risks. The section also explains the literature on Ibn Khaldun economic thought. The third section identifies and examines the challenges that blockchain technology will face. The fourth section explains the idea Ibn Khaldun economic idea, whereas the fifth section offers some solutions for blockchain challenges and direction for future research. The sixth section concludes the paper.

Literature Review

The review of the literature here would be focusing on two points, namely blockchain adoption challenges and Ibn Khaldun economic development model, in which firstly, the blockchain challenges' literature review is presented below:

A study by Zhang, Zargham et al., (2020) have assessed Blockchain networks have grown in popularity as a means of creating cryptocurrencies and decentralised economies based on peer-to-peer protocols. On the other hand, the complexity of the dynamics and feedback processes within these economic networks has made reasoning about their growth and evolution difficult. Therefore, adequate mathematical frameworks are required to model and understand the behaviour of blockchain-enabled networks. In this regard, a model of a generic token economy is created to demonstrate our concept, in which miners supply a commodity service to a platform in return for a cryptocurrency, and users consume services from the platform. We simulate and test two different block reward systems to demonstrate the dynamics of token economies.

As well, Berg, Davidson et al., (2019) have evaluated the uses of transaction cost economic paradigm developed by Ronald Coase and Oliver Williamson to explain why. Nonhierarchical commercial organisations attempted to avoid contractual complications in the face of potentially opportunistic behaviour. Trust technologies are an institutional instrument for preventing opportunism on the margins of trust. The study claims that blockchain technology may be used to coordinate economic activities and implement the electronic marketplace hypothesis.

Another study by Aoyagi and Adachi, (2018) described the smart contract in the blockchain protocol mitigates uncertainty in an economy with asymmetric information. Because the blockchain, as a novel trading platform, causes market segmentation and differentiation of agents on both the sell and purchase sides of the market, it reconfigures asymmetric information and generates asset price and quality spreads between itself and existing platforms. We show that the smart contract's marginal innovation and sophistication have non-monotonic impact on the trading value. Whilst, Mazlan, Daud et al., (2020) have highlighted a number of initiatives aimed at maximising the use of blockchain-based technologies in the healthcare system. Not only that, but this research has also identified many workflows for improved data management that have been developed inside the healthcare ecosystem using blockchain technology. In this way, the Ethereum blockchain platform has been used to design and implement a variety of medical workflows, including sophisticated medical processes like surgery and clinical trials. Many parties in the

medical system would benefit from this, since it would allow them to better cater to healthcare facilities while also reducing costs. Besides, Kolb, AbdelBaky et al. (2020) have described the extensive examination of Ethereum and its smart contracts, and explained the core blockchain ideas that are driven by Bitcoin as a case study. The capabilities and limitations of blockchains are then contrasted to older distributed architectures. Following that, they began a high-level investigation into four key blockchain challenges: improving consensus effectiveness, making blockchains more scalable, ensuring strong privacy in transactions, and confirming the security of smart contracts without losing the blockchain essential components. Similarly, Schuetz and Venkatesh (2020) have also emphasised financial inclusion, adoption, and blockchain in India, arguing that the four obstacles of geographical access, high cost, inadequate banking products, and financial illiteracy must be overcome in order to resolve financial exclusion. In this regard, they have also said that blockchain technologies have the potential to overcome the majority of these issues. To add, another study by Ningrat (2018) has portrayed poverty elimination as the ultimate aim of the United Nations' Sustainable Development Goal (SDG 2030), which was endorsed by 193 countries. Meanwhile, there is a \$2.5 trillion funding shortfall for the Sustainable Development Goals, and Zakat and Waqf are seen as a good solution in Islamic finance to close this gap, despite significant obstacles in their collection, management, and distribution. In this sense, Blockchain technology may be able to shed light on the issue because it can trace where your transactions are going, when they arrive, and where they are being used.

Furthermore, (Zakaria, Kunhibawa et al. 2018) have looked into the benefits and drawbacks of using blockchain technology. This study discovered that this technology has the potential to improve political, social, and economic efficiency and transparency. The study, on the other hand, discovered several hurdles in terms of cost and IT issues. Additionally, this study mentions incidents such as criminal trade, extortion, money laundering, terrorist financing, online gambling, and get-rich-quick schemes, all of which are linked to blockchain-based Cryptocurrencies. On the same note, Siyal, Junejo et al. (2019) have also talked about how blockchain technology can be used in a variety of ways. However, some technological issues such as scalability, privacy leakage, and selfish mining continue to exist. As such, one approach by Herian (2018) has advocated that blockchains be viewed as the next step in the ongoing mass socioeconomic digitalization, in which blockchain-based applications might enhance the Internet stack's capabilities while refocusing the energies of existing network technologies and electronic working methods. The study also identified some barriers, including issues with blockchain cost, speed, scalability, and long-term security, as well as environmental and climatic costs due to massive growth in computing power demand, which is essential for enabling blockchain-based applications to operate on an industrial scale, as they do (much like many traditional means of production).

In contradiction, Maghdeed, n.d. (2019) has presented the idea of the Sukuk chain, which is a framework for running a programmable security token or smart contract within a network pool maintained by Blockchain communities like Ethereum. In current era of blockchain technology development, the evolution of Smart Contracts has shown a significant improvement. However, blockchain still has several technical limits and issues that need to be handled thoroughly, such as transaction speed, integration of modules with various business cases, securities, and consistent standards across countries. In relation Rabbani, Khan et al., (2020) have described Smart contracts, cloud storage, digital currencies, Zakat collection, greater Waqf utility, efficient Halal supply chain, cryptocurrency remittance, Takaful, Smart Sukuk, and other blockchain-based applications. Government involvement, underdeveloped ecosystem infrastructure, unknown rules, security, privacy, and a lack of standards, human resource and cost constraints, immature middleware and tools, and scalability are all existing and unavoidable barriers.

In particular, asiablockchainreview (2019) has emphasized on the Halal food market, where blockchain allows users to track the origins, traceability, and quality control of food throughout the whole supply chain. Consumers will be more assured as they will be able to verify food quality simply by using or scanning the QR code using mobile applications. The halal industry's market value is anticipated to be \$2.6 trillion till

2023, which might be utilised to track legal and tax operations. In this way, rather than focusing solely on cryptocurrency, the study tried to present a broader view of blockchain technology uses. Further elaboration of these factors by Iredale, (2020) has highlighted the challenges of Blockchain implementation that are slowing down the system; Inefficient Technological Design, The Criminal Connection, Scalability, Energy Consumption, Privacy, Regulation, Security, Lack of Adequate Skill Sets, Blockchain Can Be Slow and Public Percept.

Challenges facing Blockchain

Inefficient Technological Design

While the benefits of blockchain technology are undeniable, the system's shortcomings in many technological aspects must be addressed (Pedersen, Risius et al., 2019). A code fault is an important factor to consider in this regard. Bitcoin, as many people are aware, is on the cutting edge in this sense, but the entire system reeks of wasteful design. Despite the fact that the Ethereum blockchain is working hard to address bitcoin's flaws, the effort is still insufficient.

The Criminal Connection

The unique feature of blockchain technology, namely anonymity, has drawn not only experts but also criminals. Criminals are using cryptocurrency to buy illegal equipment and payment methods in this case. Not only that, but they have asked for cryptocurrency in exchange for the purchase charge. The only way to deal with this negative link is to prohibit illicit connections and create a high-quality blockchain implementation (Li, Jiang et al., 2020).

Scalability

Blockchains, a Distributed Ledger Technology, are thought to work very well for a small number of users. What would happen if there was a mass amalgamation? This is a topic that should be considered. Ethereum and Bitcoin now have the largest number of users on the network, and they are having difficulty dispensing and managing with the situation. As a result, these flaws must be corrected immediately, as they are causing the entire system to become repetitive (Mazlan, Daud et al., 2020).

Energy Consumption

Another barrier to blockchain adoption is energy consumption. Nearly other blockchain technologies have adopted bitcoin's structure and used Proof of Work as a consensus mechanism in this regard. Mining necessitates the use of your computer to solve difficult equations; as a result, once you begin mining, your computer will consume more and more electricity to cope with this undesirable circumstance. Other consensus approaches may have been used to authenticate the transitions instead of blockchain (Sedlmeir, Buhl et al., 2020).

Privacy

The privacy concerns associated with Blockchain technology do not work well. Because the public ledger system promotes the system, total privacy is no longer an issue. In the case of cryptocurrencies, this is a vital need. On the other hand, this position has resulted in certain potential disputes between governments and businesses. For a variety of reasons, governments and businesses must always preserve and restrict access to their records in this situation (Mohanta, Jena et al., 2019).

Regulation

Many corporations have begun to use blockchain technology as a form of transaction, and certain commodities have become reliant on it. However, there are currently no explicit regulations governing the usage of blockchain technology. As a result, when it comes to the blockchain rules, consumers are left in the dark. As a result, in order to overcome these provocations, the government and key industries should

begin the process of enacting legislation, expressly for blockchain technology (Pashkov and Soloviov, 2019).

Security

One of the most crucial factors in the adoption of Blockchain technology is security. Many people are aware that each blockchain technology has its own level of security. However, much like any other technology, blockchain has a few security rings to contend with. One of the security flaws is the 51 percent assault on the network. In this battle, hackers might seize control of the network, altering the transaction process and preventing others from forming blocks. Additional security is required at the protocol layer to address these concerns (Nabben, 2021).

Lack of Adequate Skill Sets

It is needed of qualified individuals to manage blockchain technology in addition to software and hardware, as it's still a relatively new advanced technology of the twenty-first century that's still fast evolving. Only a small number of people currently have the expertise required to maintain such technology. The blockchain, like any other technological innovation, will undoubtedly continue to grow. Disagreements on this subject are natural, but they are not impediments to the advancement of Blockchain technology (Kaal, 2021).

Blockchains Can Be Slow

The blockchain technology is definitely complicated, as transactions take longer to complete. Similarly, the system's encryption has made it even sluggish. Despite the fact that they have been claimed to be faster than traditional payment systems, the claim is currently debatable. In this sense, completing a transaction could take several hours, causing individuals to become anxious, even if they merely wish to pay for a cup of tea. This explains why it is critical for technology providers to make it possible for people to conduct large transactions without being constrained by time constraints. Of course, there is a level of danger involved. Nevertheless, despite increasing equity, it is still vital to eradicate the 'unsecured' types of blockchains. In this context, financial institutions such as banks have gained significant profits through intermediaries, resulting in lower costs than traditional methods. As a result, if blockchain can take over and solve this problem, the expenses will undoubtedly be substantially cheaper (Fitzi, Gaži et al., 2020).

Public Perception

The general public is still uninformed of the existence of blockchain technology and its potential applications. In this environment, blockchain adoption is only conceivable if it gains public acceptance. Even while technology has a good track record, it is still insufficient to attract additional buyers. The difference between bitcoins, other cryptocurrencies, and blockchain should be understood by all members of the community. This is critical in order to eliminate Bitcoin's negative consequences and keep the technology alive. As a result, the deployment of blockchain technology should be accompanied by a greater willingness on the part of the community (Fridgen, Guggenmoos et al., 2018). Importantly, this study deliberated the top ten major blockchain challenges, because these challengers are most serious issues that hinder the blockchain development and implementation. It is fact that, there is many other challenges which affects the blockchain application and growth (Upadhyay, 2020).

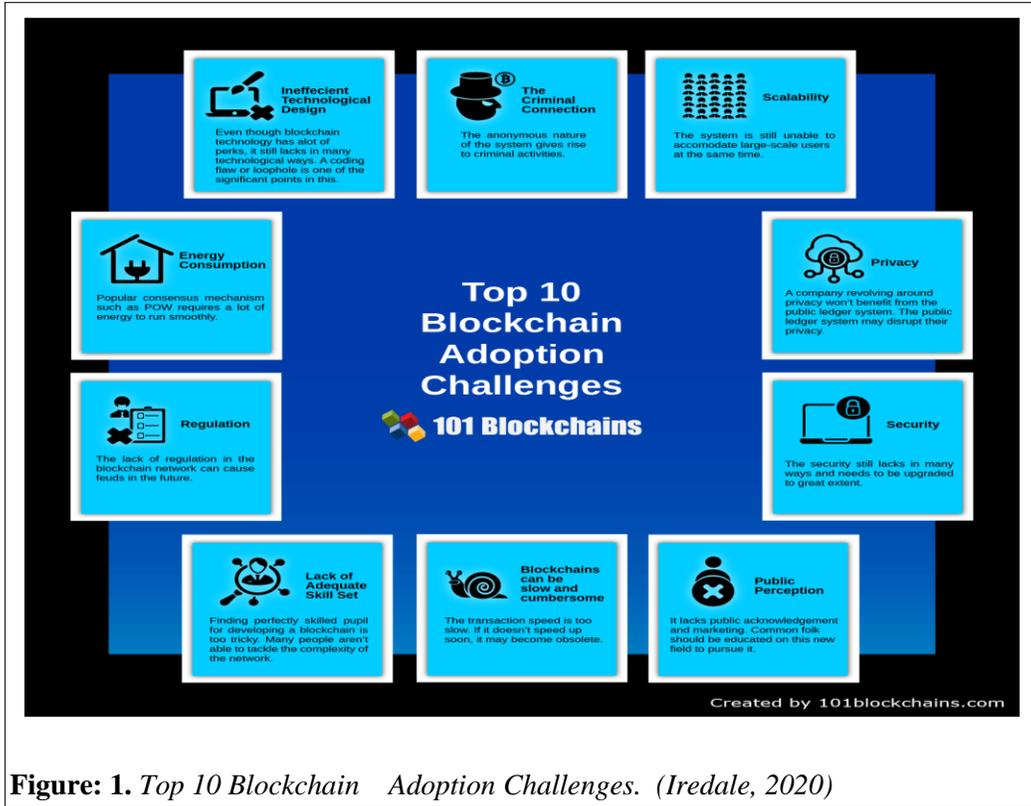


Figure 1. Top 10 Blockchain Adoption Challenges. (Iredale, 2020)

The next literature would be addressing Ibn Khaldun's Economic Thought on Development, as followed: A study by Abdolhamid and Esmaili (2020), have considered, the ten modules of Sustainable Development-Asabiyyah, which focus on nature, good governance, citizenship rights, rationality, population growth rate, poverty reduction and welfare generation, scientific growth, and justice, were extracted from Ibn Khaldun's perspective. The author ignores Ibn Khaldun's eight smart economic growth models, which are a central purpose of this research. In recent study by Zakaria (2020), it is discovered that Khaldunian economic opinions have paid special attention to observing the essential features of three thoughts of *kasb ma'ash and jibāyah* (*Kasb-ma'ash*) motivation is a self-evident move of work to earning money, whereas *jibāyah* concept is expressing about collecting custom and advising how a nation can economically develop). as to how these three objects, if established and refined in an equally unique structure, would create a nation that flourishes and blossoms, while avoiding any flaws, particularly in rigging *jibāyah* (taxation) rules, which could destroy business production, causing the respective country to grow disastrously and vanish from the face of civilization. In particular, Listiana, Alhabshi et al. (2020) have provided Ibn Khaldun's perspective on the role of the state in socioeconomic development, in which Ibn Khaldun's stance on how to support moral principles that require a sustainable and rational condition in society is analysed and discussed. So far, Jarrar (2020) has advocated to link contemporary art market marketing models to Ibn Khaldun's economic viewpoint because of the significant theoretical and revolutionary role he has played in the remarkable advancement of essential economic concepts that are still applicable in understanding recent diverse marketing implementation.

Another study by Gueye (2019), looked at Ibn Khaldun's successes while investigating at the building procedures of nations in North Africa during the Middle Ages. In this regard, he has evaluated the compliance of states founded in Morocco and North Africa throughout the Middle Ages to Ibn Khaldun's state concept, with a particular focus on the Marabouts.

In this regard, Ibn Khaldun has specified and presented various dynamic and specific terms of the theory; as a result, we are learning terminology like *Asabiyyah*, *irtizaq*, *Hadarî*, *bedevi*, and their effects within the context of the Marabout state. Furthermore, Süngü (2019) evaluated Ibn Khaldun's perspective on judging men's capacity to bring a nation to the advanced level of humanity. Inspired by the visions of his previous Islamic philosophers on the workings of the mind, Ibn Khaldun has stated a diverse and quite unusual manner of thinking known as the smart mind, empirical, and intelligent mind in the pursuit of creation development. He claims that using Agent Intelligence to gain actual knowledge is impossible in this world. This is because human rationality has a limit and cannot achieve and acquire actual knowledge beyond logical beliefs. Notwithstanding that, Babacan and Yılmaz (2019) have emphasized that the combination of traditional and modern, which supports the validity of Turkey's social growth, can be found in Khaldunian's idea of *Asabiyyah*, as well as in Fukuyama, Coleman, Putnam, and Bourdieu's well-known concept of social capital. Despite the fact that modern lifestyles have atomized individuals in society, social capital has emerged as a new means of reuniting people in order to restore social harmony and collaboration.

On the other hand, Barut and Duran (2019) have also clarified that Ibn Khaldun's insights are linked to a variety of topics, including general education, curriculum, and instruction, as well as teacher certification and child education. In this regard, Samuel's suggestion of a "Clash of Civilizations" has been used to investigate Ibn Khaldun's educational ideas. Evidently, Mohammad (2010) has discovered that Ibn Khaldun, as a historian and scientist, has highlighted the emergence and fall of civilization in a variety of issues. The sovereign or political authority, people, money or stock of resources, development and justice in a circular and interconnected manner, beliefs, and standards of behaviour or the Shari'ah; each influences the others and is influenced by them. In this regard, He has promoted an all-encompassing and fruitful economic concept that includes the socioeconomic environment in this regard. Besides that, Huda (2016) has divided Ibn Khaldun's economic thought into two categories: first, a sociological approach, which is a detailed description of Ibn Khaldun's observations and examinations of various ongoing economic activities in society, and second, a juridical approach, in which legal provisions are used to validate and enable economic activities to function properly. On a side note, according to the study Mujahidin, (2018), Ibn Khaldun was the Muslim scholar and father of the world economy, who invented many ideas in the field of economics, including such as the law of supply and demand, tax and public expenditure macroeconomics, trade cycle, agriculture, property rights and prosperity, doctrine of values, division of labour, pricing system, production, money, capital creation, and population increase. These ideas, as proposed by Ibn Khaldun, are extremely important in ensuring a nation's progress, and his social welfare judgments are truly unique.

The idea of Ibn Khaldun Economic Development

Ibn Khaldun, a well-known Muslim intellectual scholar, has made numerous contributions in subjects such as civilisation, politics, culture, and economics. With this in mind, the purpose of this study is to consider Ibn Khaldun's conceptual underpinning for blockchain development using expressive and evocative analytical methodologies. Ibn Khaldun's ideas in this area are undeniably important to intellectual progress, as his viewpoints had a considerable impact on the future development of blockchain (Irijanto, Shah et al. 2013). Ibn Khaldun is regarded not just as a historian and sociologist, but also as the father of economic sciences, as most of his economic ideas predate and transcend those of Adam Smith and Ricardo (Mohammad, 2010). To describe, Ibn Khaldun made significant contributions of economics, income, spending, demand and supply, the price mechanism, and development studies, necessitating Ibn Khaldun's status as a forerunner to Malthus, Khan, and Keynes (Mohammad 2010). Before, Ronald Reagan, the American President at the time, was wrongly associated with the concept of "fewer taxes and greater revenue," which happens to be the conservative ideology in the United States. Therefore, this study examines Ibn Khaldun's economic thoughts on eight conceptual underpinnings for blockchain development in order to address ten blockchain problems, as follows.

Al- Mulk (Collective Entity) Sovereign

Ibn Khaldun thought that all successful financial development must meet certain essential characteristics, one of which is *Al-Mulk* (Collective Entity/Sovereignty) (Khaldun, 2012). In this respect, Ibn Khaldun has identified that the sovereign's (*Al-Mulk*) strength does not develop unless *Sharī'ah* is implemented, and *Sharī'ah* cannot be implemented unless the sovereign is present (*Al-Mulk*) (Chapra 2008). This issue is described as a collective (state). In this regard, he has stated that the development of a state, society, or economy is dependent on the support of the people, and that people's support is dependent on their feeding (interpreting state to mean the political cooperative plus its laws, organisations, or the civilization that State has as such, or a sort of national economy managed by State and society) (Mohammad 2010). Despite the enormous capability of blockchain technology, it is feasible that one of its issues is inefficient technological design (Chang, Iakovou et al., 2020). Regardless of the many benefits of blockchain technology, it currently needs some technological foundations, such as coding errors or gaps. Although Bitcoin was the first in this regard, the entire structure reeks of wasteful design. While Ethereum has attempted to support and cover all of Bitcoin's problems, the effort has been insufficient (Berg, Davidson et al., 2019). For example, in terms of decentralised implementation development, Ethereum has allowed developers to create Daaps based on their system, and many Daaps have emerged as a result. However, the majority of them have been discovered to have incorrect code and flaws, which anyone can use to quickly hack into the system (Nabben, 2021). Consequently, the concepts of information and safety are absent in this case. Henceforth, Ibn Khaldun *Al-Mulk* (collective entity) and expert (*Ar-Riajl*) have argued that people may be a solution to the problems that Blockchain development poses in terms of inefficient technology design. Things would become much more convenient and easy if we could solve the Blockchain adoption problem (Khaldun, 2012).

Sharī'ah (Rules and Regulations)

The *Sharī'ah*, Rules, and Regulations have never been ignored in Ibn Khaldun's development strategy (Gule 2015). Ibn Khaldun has always considered the function of law and justice in defining their significance to the evolution of society as a philosopher, and his conceptions of the content of justice and law are widely Islamic (Gule 2015). To relate, the social goal of law and justice is to develop and maintain a stable social order, which is necessary for sedentary civilizations to flourish. The content of religion, Islamic law exists to assure not only a stable social order, but also the salvation and peaceful afterlife of believers. Both of these aspects of law and justice are present in Ibn Khaldun's concept. The most significant tool for ensuring the stability of global blockchain technology is the adaptation of *Sharī'ah* and rules-regulations (Laabdi, 2021). Several businesses have begun to adopt blockchain technology as a transactional tool because it offers high transactional efficiency (Ali, Ally et al., 2020).

Nevertheless, there is a significant problem in blockchain technology that should be considered: the lack of legislation that should control the entity (Mohsin, 2021). It has been noticed that the necessary specific regulations for adopting blockchain are simply non-existent, which has led in many of the problems. While one of the benefits of blockchain is visibility, there is no guarantee of safety (Tatar, Gokce et al., 2020). To relate, the 51% attack on the network is one of the faults of the system, in terms of security. In this attack, hackers could cross the network and abuse it with their own technique. They could even change the transaction process and control other people from creating a block. This has portrayed that privacy and blockchain don't go well with each other (Sayeed and Marco-Gisbert, 2019). Because the system runs on a public ledger, perfect privacy is not a top priority; however, is it feasible for any organisation to function without privacy? The answer is simply no. Several businesses that deal with and manage sensitive information constantly want to maintain a strong feeling of privacy because their clients have placed their trust in them (Shrestha and Nam, 2019). Accordingly, if the information is stored in a public ledger, it is no longer deemed private. In the case of bitcoin and other cryptocurrencies, this is a crucial necessity. On the other hand, this has caused some worry among governments and businesses (Zhang, Xue et al., 2019). For a variety of reasons, governments and corporations must constantly protect and control access to their data.

Thus, Ibn Khaldun's Shari'ah and law application would play a significant role in the development and stability of the blockchain market (Khaldun, 2012). Therefore, the government and other key sectors may need to adopt blockchain technology legislation.

Al-Rijal (People/Nation)

People have a significant part in a nation's growth, according to Ibn Khaldun, because civilization's rise and fall is dependent on their prosperity or misery (Khaldun, 2012). Ibn Khaldun stated that, people are the cause of economic germination, but only if they are motivated to engage in the economy (Chapra 2008). According to Ibn Khaldun's analysis, labour diversification and specialisation are more likely to occur in a well-regulated market where people can change and fulfil their needs; the more glorious the specialisation, the more distinguished the growth of money will be, as production and crafts will continue to thrive (Khaldun, 2012). Henceforth, today's corporate and cooperative enterprises can benefit from Ibn Khaldun's help idea. Ibn Khaldun believes that one cannot meet all of one's requirements on one's own, so one must collaborate with others in society to meet one's own and others' needs. This would also generate residual wealth, which could be used to acquire pleasures such as nice clothing (Khaldun, 2012). Besides, the sovereign would be unable to acquire power unless it came from the people (*Al-Rijal*), which would be achievable if wealth was accessible to the general public (Khaldun, 2012).

As can be seen from the remarks above, standardisation of blockchain technology is still a difficult task. Blockchain technology is still in its early stages of development. At the moment, the number of people with the necessary abilities to support such technology is still limited, despite the high demand for such workers (Zhang and Zhou, 2020). Consequently, if one wishes to hire qualified workers, one must pay a promising and acceptable sum of money. The blockchain, like any other technological innovation, will undoubtedly advance. Despite the fact that challenges are unavoidable, they should not be regarded as roadblocks. In this regard, new law and standards must be implemented (Pashkov and Soloviov, 2019). Thus, the people's concept of Ibn Khaldun (*Al-Rijal*) is a significant concept in the development of blockchain for enabling individuals to learn skills or become "people of blockchain" and innovating constructing its institutions (Khaldun, 2012).

Al-Adl (Justice)

Another important pillar of development is fairness, which can distinguish between Islamic and non-Islamic development in a variety of areas (Gule 2015). "Within Ibn Khaldun's new science of civilization, his thoughts on law and justice form a coherent totality, integrating scientific analysis and values or a descriptive method with a normative viewpoint, both based on his Islamic beliefs." This demonstrates the significance of justice in the development of a country (Mohammad 2010). To illuminate, construction, industrial, trade, agriculture, and technology are all examples of development activities. According to a solid interpretation of Ibn Khaldun's concept, all such development operations must be fair and just for all groups of people (Khaldun and Rosenthal 1967). The blockchain technology's potential attracted not only authorities but also criminals. As a result, the network's nature is decentralised, and no one can know your specific identify. Because bitcoin is utilised as a money in the underground market and on the dark web, it is the primary target. This bad reputation has imposed logical concern among many people, which they need to think twice before looking into the whole system (Kethineni and Cao, 2020).

Likewise, it is common for people who are aware to avoid any illicit connections. Criminals are now using cryptocurrency to purchase illegal equipment and payment methods. They also accept cryptocurrency as a form of payment (Brown, 2016). That is why, Ibn Khaldun believes that justice is the standard (*Al-Mizan*) by which God will judge humanity, and that the ruler is charged with carrying it out (Khaldun, 2012). As a result, Ibn Khaldun's (*Shari'ah*) Rules and Regulations, as well as (*Al-Adl*) Justice theory, could be

considered as a solution for illicit linkage in a blockchain transaction. Stopping illicit or black transactions is the only way to solve this problem, guaranteeing a better blockchain application (Khaldun, 2012).

Al-Imarah (Development)

The importance of Ibn Khaldun is primarily focused on the formation of the state, in which the development is incorporated (Abozeid, 2021). This includes major factors such as: (a) the establishment of acreage rights and freedom of enterprise, because a nation with relatively poor acreage rights will remain poor indefinitely; (b) the rule of law and the reliability of the judicial system for the establishment of justice, because a lack of justice will result in the extinction of the human species; and b) The safety of trade routes and the safety of the peace (d) Less bureaucracy and lower taxes to boost employment, manufacturing, and earnings (Mohammad 2010). (e) No government involvement in trade, production, or commercial concerns, as well as no price fixing by the government, and no monopoly by anyone in the market. (f) A stable monetary policy and an independent monetary authority that does not manipulate the currency's value. (g) "Encouragement of a larger population and market for more specialisation. (h) A creative educational system that promotes independent thinking and behavior, (i) as well as I a shared sense of duty and inner feeling for the establishment of a just system that promotes good actions and discourages vice (Hasan, 2020).

This was highlighted by (Sandner and Schulden, 2019), who also mentioned another barrier to blockchain adoption: energy usage. The majority of blockchain technology is structured similarly to bitcoin and uses Proof of Work as a consensus process. Proof of Work, on the other hand, is not as impressive as it appears. To keep the system alive, it requires computational power. You'll need mining if you want to use your computer to solve complex equations. Hence, as you begin mining, your PC consumes more and more electricity to deal with the problem. In this case, it has been discovered that 0.2 percent of miners consume the majority of the entire electricity. If the current trend continues, miners will require far more power than the globe can supply by 2020. As a result, it has now become one of the network's primary challenges, leading in a slew of new institutions (Nartey, Tchao et al., 2021). Properly, blockchain might use alternative consensus systems to legitimate the transitions, such as consensus algorithms that only require a little amount of energy to process. The blockchain is complex, which is why it takes longer to complete any transactions. Similarly, the structure's encryption slows it down even further (Labazova 2019).

In this regard, Zhang, Xie et al., (2020) claims that, although claiming that the technology would be faster than existing payment systems, they were unable to deliver in some circumstances. It may take several hours to complete a payment. As a result, even paying for a cup of coffee would cause anxiety. As a result, the act of doing large transactions should not take up too much time. The standard has theoretically expanded to blockchain systems, where the store value is ignored. For example, in an IoT setting, logging transactions or communications. These networks, and even computer documents, can become inefficient and unusable. However, this is not a permanent state, as the system only slows down when there are too many operators in the system (Iredale, 2020). It becomes slower as it rises higher. If not adequately addressed, these blockchain implementation concerns may pose a number of problems in the future. As a result, we should anticipate a quick settlement. Nonetheless, some modern technologies claim to be faster than older ones. The group has focused on the blockchain's failure. To be honest, it might well evaporate faster than we think. Therefore, finding a solution to these blockchain implementation issues is critical.

Consequently, this scalability, energy consumption, and slow blockchain system problem could be overcome using Ibn Khaldun's (*Al-Emarah*) Development principle. The four pillars of Ibn Khaldun on this subject are: (1) Rule of law and the dependability of the judicial system for the development of justice as the absence of justice eliminates. (2) The safety of trade routes and the security of the peace. (3) Promoting a larger population and market for greater specialisation, as well as (4) collective responsibility and internal feelings for the establishment of a just system to inspire good deeds and prevent vice, can all help to

overcome the blockchain challenges of scalability, energy consumption, and slow blockchain systems. These are the only ways we can truly turn blockchain technology into a blessing once more (Khalidun, 2012).

Al-Mal (Wealth of economic empowerment)

Another significant pillar of Ibn Khaldun's economic empowerment is his emphasis on the directions of a market mechanism, price determination, demand, supply, market structure, a theory of wage difference, and the role of government in blockchain growth (Hasan, 2020). Thus, this study will be founded on his ideas on demand and supply in order to improve the current Blockchain technology. In this regard, Ibn Khaldun stated that supply and demand determine product and service prices. When a product is scarce and in high demand, its price rises. Customers would buy things when they are "cheap" and plentiful, then "sell them at a high price" when they are rare and in high demand (Ali 2006). Ibn Khaldun also illustrated that in the market, costs are determined by the interaction of supply and demand. He's talked about how supply fluctuations affect the rate (Ali, 2020). Not only that, but Ibn Khaldun has considered the impact of demand on prices, labour division, and growth. This is what he refers to as coercion: "People need food, and the money they spend on it is imposed upon them; they had no choice but to spend it, which is a kind of compulsion" (Ali, 2020). Importantly, according to Codementor.io, developers charge two kinds of hourly prices: average and median. Average hourly rates range from \$81 to \$100, while median hourly rates range from \$61 to \$80 (Codementor.io, 2021). This sign has demonstrated that blockchain is capable of assisting almost all segments and assisting us in providing and storing data in a more brilliant manner. Nevertheless, what precisely can we do with blockchain, and how much will it cost? Unfortunately, there is no simple answer to this question. Because blockchain is a feature-dependent technology, the actual cost will vary depending on the project's needs. A blockchain venture's development costs might range from \$5,000 to \$200,000, according to some estimates (Codementor.io, 2021). Below figure 2 explain the blockchain developers hourly charges.



Blockchain is an open-source electronic ledger that allows users to construct an unchangeable transaction record. Engineers working on blockchains must create protocols, account for adversarial incentives, and test a lot of assumptions. Blockchain developers were in second place among the top 20 fastest-growing occupational skills in 2017 (Codementor.io, 2021). There was a 115 percent increase in job posts for

blockchain developers with experience in JavaScript, C++, Python, encryption, and/or machine learning between 2016 and 2017. On average, blockchain developers charge \$81-100 per hour. As the demand for blockchain coders grows, so may their hourly rate (Codementor.io, 2021). When hiring Blockchain engineers, consider the differences in hourly pricing for different engagement types, such as temp, part-time, and freelance. Depending on whether you want someone on-site or completely remote, developers recruited for full-time employment may charge different prices (Codementor.io, 2021). Admittedly, the need for blockchain experts is still high (Chandra, 2021). Regardless of the bear market and current industry discharges, the quantity of blockchain job postings has been on the rise, and searches for roles involving blockchain, Ethereum, Bitcoin, and cryptocurrency have increased. Startups are offering top payment packages, in particular for blockchain developers, as they contest for talent in a production where supply is limited. As well-known firms, such as IBM, Amazon, Facebook, and new players develop blockchain technology and discover blockchain applications, the need for blockchain capacity has skyrocketed. Salaries in the blockchain industry have risen to be among the highest in the industry. As a result, the data below shows the blockchain wage by country and company (Daniel, 2019). The Big Picture: blockchain Inventor Salaries are as follows:

- The average base salary for a blockchain developer in Asia is \$87,500 per year, with a low base salary of \$60,000 and a high base salary of \$120,000.
- The average base salary for a blockchain developer in Europe is \$73,300 per year, with a low base salary of \$55,000 and a high base salary of \$91,000.
- The average base salary for a blockchain developer in the U.S. is \$136,000 per year, with a low base salary of \$70,000 and a high base salary of \$200,000.
- The average base salary for a remote blockchain developer is \$123,750 per year, with a low base salary of \$70,000 and a high base salary of \$200,000.

JOB TITLE	ASIA	CANADA	EUROPE	U.S.	REMOTE
Backend Developer	- ¹	-	\$85,000	\$110,000	\$102,300
Blockchain Developer	\$87,500	-	\$73,300	\$136,000	\$123,750
Business Development	\$105,000	-	-	\$122,500	-
Community Manager	-	-	\$57,000	\$80,000	\$61,000
Customer Support	-	\$40,000	\$55,000	\$77,500	-
Developer ²	-	\$67,500	\$72,000	\$125,700	\$103,000
Engineer ³	\$87,500	\$86,000	\$80,700	\$127,000	\$128,400
Frontend Developer	-	-	\$70,000	\$115,000	\$85,000
Full Stack Developer	-	\$62,500	\$66,000	\$100,000	\$90,000
Graphic Designer	-	-	\$74,000	\$70,000	-
Office Manager	-	-	\$40,600	\$59,000	\$40,000
Product Designer	\$76,500	-	-	\$112,500	\$100,000
Software Engineer	-	\$90,000	\$94,000	\$119,000	\$107,000
Solidity Developer	\$125,000	-	-	\$127,500	\$145,000
UI/UX Designer	-	\$55,000	\$77,000	\$107,500	\$75,000

¹ "-" Indicates no data available.
² Base salary for all developer roles.
³ Base salary for all engineer roles.

Figure 3. Blockchain Inventor Salaries, (Daniel, 2019).

The highest-paid incomes are located in New York and San Francisco, according to the data presented. When the bulk of blockchain jobs begin, this is discovered to be comparable. According to the World

Economic Forum, blockchain will store 10% of global GDP in the future age. By eliminating middlemen, it has the potential to save the industry billions of dollars. It might also be used to improve supply chains and track down the origins of tainted foods (Daniel, 2019). Ibn Khaldun's Al-Mal (Wealth of Economic Empowerment) should be implemented and applied for its supply, demand, and high salary in order to support blockchain development internationally (Rusdi and Widiastuti, 2020). In this regard, the government and businesses should invest more in blockchain development in order to build appropriate blockchain talent and ensure scalability, privacy, and security, while also being able to offer high pay comparable to those offered by IBM, Facebook, Amazon, and Standard Chartered Bank (Daniel, 2019). Consequently, to overcome the existing blockchain issues, it is critical to boost blockchain investment in order to fulfil its economic facilities using Ibn Khaldun's notions.

Law enforcement institution

In this regard, Ibn Khaldun reinterprets the organization's law enforcement as a model of growth. On the other hand, he does not advocate for the establishment of open law enforcement organisations; instead, he emphasises the importance of looking for social order in five ways: the ruler, the law, and the principles of fairness (Ali, 2020; Chapra 2008). Furthermore, Ibn Khaldun is said to have understood the significance of moral ethics as a fundamental method for achieving justice. These five values can all be thought of as modules of good authority that a state recognises. The aforementioned signs of effective governance can be linked to the three parts of Ibn Khaldun's thesis (administration, law, and justice) (Mohammad 2010). Another three dimensions in this regard are economic and social progress, social welfare, and civilization's rise and collapse. Three of these are the pillars of an active state that protects human rights and promotes economic growth. However, putting the legislation in place for blockchain poses significant hurdles (Mohammad 2010). According to a survey of hundreds of executives and entrepreneurs performed by the Chamber of Digital Commerce Canada and the Blockchain Research Institute, the most significant barrier for blockchain innovators is the lack of capital. Regulators now favour incumbents over innovators (Negara, Hidyanto et al., 2021). In this sense, Blockchain has sparked major debates among regulators over consumer and market protection, but the inflexibility with which regulators in the world's main economies have advanced blockchain has hampered innovation and progress (Yeung, 2019).

Despite the study's amazing success, regulatory constraints for blockchain entrepreneurs are a reality that must be recognised throughout large economies. The effect would be a continuous "company drain" from Canada and other countries to more friendly jurisdictions (Kakavand, Kost De Sevres et al., 2017). Thus, the first large jurisdiction to properly integrate this new technology and establish a regulatory framework that encourages innovation while safeguarding customers will reap the benefits in terms of jobs and economic progress (Massarotto, 2019). Besides, the majority of countries do not yet have a blockchain law, and some countries' legal intuition to encourage blockchain technology is very poor. As a result, without law and justice, the state would be unable to adequately address blockchain concerns (Pashkov and Soloviov, 2019). Therefore, Ibn Khaldun's idea of law enforcement intuitions must be incorporated and developed within the blockchain technology to ensure the rights of customers, privacy, and the safety of financial institutions (Laabdi, 2021).

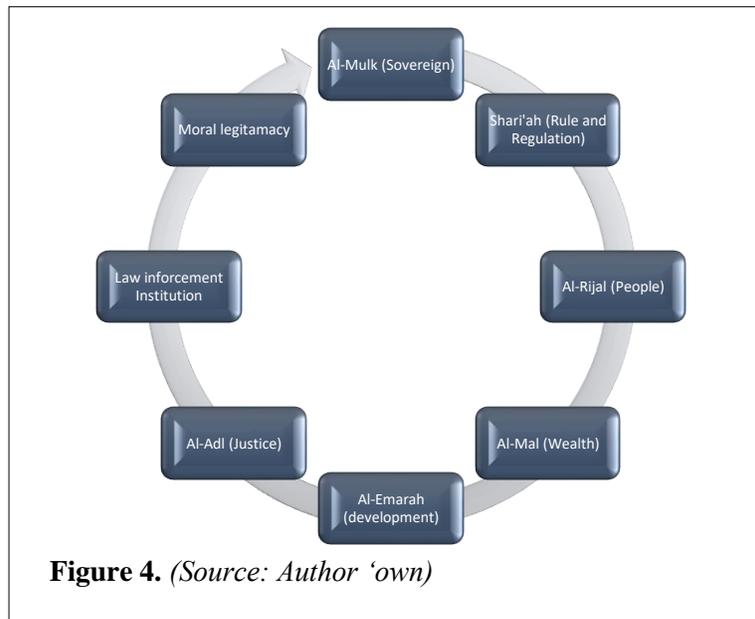
Moral legitimacy

Ibn Khaldun emphasises the moral importance of any powerful advancement. Ibn Khaldun is certainly aware of the importance of moral value (Khaldun, 2012). In this regard, he has advised the administration against immoral behaviour, as evidenced by economic collapse indications. He has described the examples of such activities which are immorality, misconduct, insincerity, and deception, as well as fabrication, gambling, deceiving, fraud, stealing, perjury, and usury (Mohammad 2010). In line with this, Ibn Khaldun has further explored that when civilization progresses and a large, urbanised population emerges, immorality becomes an inextricable feature of the urbanised society. This would then cause them to deteriorate. This incident serves as a reminder to both the government and its population of the importance

of defining a moral duty to follow the law (Laabdi, 2021). Henceforth, As a result, money laundering, terrorism financing, arms deals, the dark web, and drug and smuggling transactions are all major issues in blockchain applications (Aitsam and Chantaraskul, 2020). Moral legitimacy should be encouraged among blockchain developers, companies, and consumers in order to break down these obstacles in blockchain. The majority of individuals are unaware of blockchain existence and its use. Blockchain must be widely embraced if it is to be effective. Despite the fact that technology is making history, it isn't enough to entice more consumers. However, the majority of people believe Bitcoin is the only blockchain system that exists. Except for the Bitcoin, no one else is aware of it. As a result, the price of Bitcoin has continued to increase to greater levels. Similarly, Bitcoin has been linked to criminal operations such as black-market trades, money laundering, and other unlawful activity. Members of the public must comprehend the differences between bitcoin, cryptocurrencies, and blockchain before the total implementation can begin (Aitsam and Chantaraskul, 2020). This would help in the removal of recent bad Bitcoin claims, allowing the technology to disappear on its own. In terms of public perception, this would lead to a higher willingness to employ the technology. Accordingly, to overcome the obstacles of the blockchain application, it is important to follow the moral legitimacy and (Al-Mulk) Collective Entity of ibn Khaldun (Abozeid, 2021).

PROPOSED SOLUTIONS

Previous studies have documented that, blockchain technology has facing many challenges as discussed earlier (Monrat, Schelén et al., 2019). This study provides solutions for overcome blockchain challenges in the light of Ibn Khaldun eight wise economic development model such as (Ali, 2020), (Khaldun, 2012): (1) “The power of the autonomous (*Al-Mulk*) does not appear but through the application of the Shari’ah”, and (2) “The Shari’ah cannot be applied except by the sovereign (*Al-Mulk*)”. Likewise, (3) “The sovereign cannot achieve power except through the people (*Al-Rijal*)”, (4) “The people cannot be continued except by wealth (*Al-Mal*)”, (5) “Wealth cannot be industrialized except through development (*Al-Imarah*)”, and (6) Growth cannot be achieved except through justice (*Al-Adl*)”. Ibn Khaldun universalized that (7) “Justice is the standard (*Al-Mizan*) by which Allah will assess mankind”, for which (8) “The sovereign is charged with the accountability of realizing” (Chapra 2008). Below is the circle of the eight Ibn Khaldun’s wise economic development model.



In the *Muqaddimah*, which means "introduction," Ibn Khaldun has emphasised the importance of exploring all of these wise foundations, and has made an effort to explain the various events in history through a reasoned and effective connection, and to uphold scientifically the foundations that lie behind the rise and fall of a ruling dynasty or state (*Dawlah*) or civilization (*Umrān*), (Khaldun, 2012), (Chapra 2008). The entire *Muqaddimah* is an enrichment of this advice, which consists of "eight smart principles (*kalimat hikamiyyah*) of political wisdom, each dovetailed with the other for mutual strength, in such a circular manner that the beginning and finish are indistinguishable," in Ibn Khaldun own words (Ali, 2020). Therefore, this study relooks the following key fundamentals of Ibn Khaldun economic growth model, which can be used to solve current blockchain challenges:

- 1) Ibn Khaldun theory of (*Ar-Riajl*) People and (*Al-Mulk*) Collective Entity can be used to overcome the problem of blockchain's "inefficient technology design."
- 2) The "criminal connection" difficulty of blockchain can be mitigated by using Ibn Khaldun's notion of (*Sharī'ah*) Rules and Regulations and (*Al-Adl*) Justice.
- 3) Ibn Khaldun's idea of (*Al-Emarah*) Development and (*Ar-Riajl*) People can be used to address the blockchain difficulty of "scalability."
- 4) Through Ibn Khaldun's idea of (*Al-Mulk*) Collective Entity and (*Al-Emarah*) Development, the blockchain challenge of "energy expenditure" can be overcome to achieve its highest position.
- 5) Ibn Khaldun concept of (*Sharī'ah*) Rules and Regulations and (*Al-Adl*) Justice can be used to address the blockchain difficulty of "privacy."
- 6) Ibn Khaldun view of (*Sharī'ah*) Rules and Regulations and (*Al-Mulk*) Collective Entity can be used to overcome the blockchain difficulty of "regulation."
- 7) Ibn Khaldun opinion of (*Al-Mulk*) Collective Entity and (*Al-Adl*) Justice can be used to defend blockchain "security."
- 8) Adopting Ibn Khaldun conception of (*Ar-Riajl*) People can overcome the blockchain difficulty of "lack of suitable skill sets."
- 9) Ibn Khaldun idea of (*Al-Emarah*) Development and (*Ar-Riajl*) People can be used to tackle the "slow" difficulty of blockchain.
- 10) Ibn Khaldun thoughts of (*Sharī'ah*) Rules and Regulations and (*Al-Mulk*) Combined Entity can help with the blockchain difficulty of "public's negative awareness."

Recommendations For Future Research Directions

The concept of centralised authorities has been changed by the blockchain. The combination of blockchain and IoT will serve as a springboard for new enterprises and applications. The future research directions of blockchain and IoT are discussed in this section (Atlam, Alenezi et al., 2018). Authorities and local administrative agencies produce regulatory laws to outline lawful ways of functioning with a product or technology inside a country or territory. As previously stated, blockchain is a new technology with no established legal or compliance framework. The following is the research question that must be answered in relation to blockchain legal and compliance issues: What are the global regulatory guidelines that assure the proper use of blockchain in IoT? For all new technology, security remains the most difficult problem to which researchers and organisations devote their attention. Integrating blockchain with IoT can increase security by validating transactions with the approval of the majority of parties, preventing spoofing and theft. IoT devices, on the other hand, have limited processing and storage capacity and so are unable to process large amounts of data (Ren, Wang et al., 2012).

The following are some of the security research questions that need to be addressed: What is the best platform for IoT and blockchain integration? How can IoT devices with limited capabilities be overcome to build a safe IoT system? Finally, we may conclude that integrating blockchain with IoT can provide

numerous benefits that ameliorate many IoT concerns while also posing new challenges that must be handled. More research is needed to investigate the implementation of blockchain with IoT in more depth.

CONCLUSION

Blockchain is a groundbreaking and innovative technology for variations of fields and facilities. Blockchain can be used for banking, digital identity, power and sustainability, government and the community, healthcare, sciences, international commerce and merchandises, food safety, notary, fundraising, Marine insurance, law, media and production, real estate sports and exports supply chain, Social Impact, energy market, intellectual property, and Crypto banking are some of the applications of blockchain technology (Mohamed and Al-Jaroodi, 2019). By allowing people to create safe digital relationships, blockchain is making the unthinkable possible. As a result of the blockchain introduction, data is now recorded, released, and secured in a different way (Monrat, Schelén et al., 2019). Therefore, blockchain is being used by various smart and advanced firms to improve their business procedures and eventually become the business leaders of their respective companies, thanks to its tremendous potential (Gunasekara, Sridarran et al., 2021). On the other side, some problems have hampered blockchain capabilities, including inefficient technology design, the criminal relationship, scalability, energy consumption, privacy, regulation, security, a lack of adequate skill sets, the fact that blockchain is slow, and public perception. These are the obstacles to Blockchain advancement, and it is therefore impossible to extract blockchain technology from them (Gupta, Sinha et al., 2020). In order to fully gain the benefits of blockchain, the study has presented eight intelligent Ibn Khaldun economic strategies (*kalimat hikamiyyah*) in order to completely gain the benefits of blockchain. These are People (*Ar-Rijal*), Wealth (*Al-Mal*), Development (*Al-Emarah*), Justice (*Al-Adl*), Law enforcement institutions (Law Establishments), and Moral legitimacy are the collective entities (*Al-Mulk*), rules and regulations (*Shari'ah*), people (*Ar-Rijal*), wealth (*Al-Mal*), development (*Al-Emarah*), justice (*Al-Adl*), law enforcement institutions (Law establishment) (Khaldun, 2012), (Chapra 2008). If the suggestions have presented by this study are implemented, blockchain will undoubtedly reach its pinnacle of popularity on a huge scale. Hence, in order for the technology to progress, the blockchain challenges must be resolved.

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