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Waqf in the 21st Century: The Implementation of Blockchain and Smart Contract Technology

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ABSTRACT

Waqf in its role as Islamic charitable institution has considerable role to sustainable economy, since the initiation of waqf itself started from Muslim for the benefit for all people. Despite its important roles and promising potential, the waqf institution is facing problems which will potentially deprive itself of its full potential. One of the main problems faced by waqf and other charitable institutions is the problem of proper administration of its assets, especially when the contribution to the charitable institution came from various sources. Considering the importance of technology to the life of the 21st century, the same technology may be applied to the enhancement of Islamic charitable institutions such as waqf, in the area of supervise and utilization of waqf assets. This paper employs qualitative methods through literature review to identify the possibility and suitability of technology implementation into waqf institutions. This approach is necessary to explore the potential suitability and the extent of Blockchain and Smart Contracts technology are capable of in improving and enhancing waqf institutions. The possibility of these technologies to be applied to become panacea to the problems that are commonly faced by waqf institutions such as asset administration, transparency, accountability, and governance. The implementation of such technology that offers complete transparency is considered effective against transaction costs and to create efficiency in charitable work of waqf institutions. It is expected that the technology implementation may provide ample room for waqf institutions to evolve into modern Islamic charitable institutions which can answer and adapt to the challenge of the 21st century.

Keywords: Waqf, Blockchain, Smart Contracts, Waqf Institution, Governance.

JEL Classification: A13, O30, Z10

INTRODUCTION

In the modern era, waqf institutions had been diminished and decapitated so badly that, these institutions are left to rot in the 20th century, when the western countries started to invade Muslim countries to expand their influence and their ideology. Thus, the history of waqf institution now swept away under the carpet of modern history, until some initiatives made by some people in the 21st century to reinvigorate waqf institution utilizing the technology and good management of the western-based endowment institution to put waqf back as one of central institution in the Islamic economics.

One of key important factors on pushing waqf into different level is through technological improvement of the waqf institution. The development of Information Technology nowadays promotes even faster movement of data from one point to another. The development of the technology also encourages the efficiency, accountability, disclosure and transparency on almost all aspects in the daily life. The existing technology may push waqf institution to improve more on their performance, because waqf institution essentially is a public institution, where it has to be responsible not only on how it manages, maintain and improve the assets received from the donor, but also its disbursement of the benefits of waqf assets, whether based on the stipulated agreement or based on their own discretion.

There are many waqf institution that spreads among Islamic countries or Muslim-dominated population countries around the world. Technology in the information sharing and data transfer has made the connection between one to the other is possible within a very short period of time. With good infrastructure and human resources, it is possible that the waqf institutions around the world may share important data, technology, management, key performance index and many more. In this sense, waqf institutions all around the world are helping to each other, to achieve the ultimate goal of Islam, *maqasid* as sharia. With the technology of database, block chain, smart contracts and many other technologies, it is expected that the waqf institution may be comparable with the third sector institution such as endowments, foundations, and many successful charitable institutions that focus on the development of the community. With good infrastructure in technology, waqf institution may have a good and reliable data that can be shared among another waqf institutions around the world, thus they may share strategies, managements information, assets, and all related information for the sake of development of Muslim community all around the world.

Waqf institution in the modern world face many problems that makes it very difficult to compete with the western-based charitable institution in giving positive impact into the society. These problems mainly come from the internal incapability of the management of waqf itself. The problems are: inability of technology utilization, inefficiency of managing waqf assets, disclosure of waqf assets performance, and lack of important data to analyze the performance of the institution, and lastly, the problems of fraud, dishonesty and concealment of the key performance of the institution. With the aforementioned problems above, it might become impossible for the waqf institution to move forward and give its full benefits for the sake of the ummah, and Muslim community will always be left behind by the western communities, because they are steps ahead helped by technology to make better results, with least possible resources, and the most efficient methodology.

In this paper, will be discussed of the concept of how the Islamic endowment and/or foundations or commonly known as waqf institution may also be benefitted from this new technology, and perhaps will propose as the solutions that mingles in the management of waqf institution, mainly in the governance and transparency of the management of the

waqf institution and its assets surrendered by the donor, and we will also highlight the possibilities of inserting the waqf deed in the form of “smart contracts” which also the part of the blockchain technology.

It may be argued that it is still not clear whether the blockchain technology will bring, but the idea on integrating technology for future improvements seems way too good to be ignored in the interconnectivity and integrated world such as today. In addition, there also the dispute, debate or disagreement between sharia scholars regarding this technological improvement that will be discussed in this paper, and this will need future research and improvement for the sake of waqf institutions revival that leads to the improvement of the ummah welfare.

The discussion related to the improvement of waqf institutions through technology still given very small attention compared to the western charitable institution that now has started the discussion on the concept of introducing blockchain technology in their charitable activities. The UK government through their science office has now started the discussion also on the same technology that said to offer the extreme transparency over the activities and transactions in the blockchain, to ensure the accountability, governance and disclosure of the institution itself. The issue of trust is central in the charitable institution, both conventional and Islamic, so waqf institution at the mean time is encouraged to start the discussion of the technological improvement in their own institution for future developments. With the reinvigoration of waqf institution as Islamic third sector institution, the gap in the society that the government cannot provide will be filled in, by providing public goods or private goods that available at cheaper price for the sake of the improvement of the society at large, including those who are not moslem. The problem of providing public goods because of lack of funding from the government may be handled by waqf, and promoting better life standards for moslem in achieving the *maqasid* as sharia.

LITERATURE REVIEW

Waqf as Islamic Philanthropy

Waqf is a voluntary act of charity that comes under the general terms of charitable spending. This condition of perpetuity has led over the years to a considerable accumulation of societal wealth to the extent that waqf has become an important sector dedicated to the social and economic improvement of Moslem society. Waqf institution can be traced back to the era of prophet Muhammad SAW and the companions, where the golden age of Islam prevailed in the 6th and 7th century. Waqf reached its peak days in the ottoman era, where most of the waqf institutions play important role on funding, pooling and channeling resources to the community at large for many purposes, including business and public-related infrastructure, such as schools, mosque, roads and many others. At that time, the role of waqf institution so central in economy so that, most of the business relies on the waqf institution for providing for capital for their business expansion, so, in this position, waqf institution plays its role as financial institution that nowadays replaced by banks. Capital injection by waqf institution based on benevolent loan, where no interest imposed on the capital injection for the entrepreneur.

Today, the development of waqf institution is somehow decapitated and overshadowed by the performance of the third sector institution of the western world, because of many factors that the waqf institution cannot handle and improve and progress as the technology moves forward. There are many things that required to be improved, but the main thing is that, waqf institution cannot utilize the full potential of technology that available in the computerized world, including data, efficient system and early warning

system for detecting fraud, promote transparency and will increase the confidence of the institution to invite more people to contribute into waqf, and will resulted into even more people benefitted from the waqf institution as Islamic third sector institution.

In the western world, the foundations, endowments funds, and many charitable institutions are now begin discussing the possibilities of using the technology that called "blockchain" and its derivatives, such as cryptocurrency [for the public it is famous by the name of bitcoin, created by an anonymous (computer/ hacking expert) naming himself as Satoshi Nakamoto], smart contracts, and Internet of Things (IoT). The one that already put forward the discussion is the UK based charity institution, Charity Aid Foundations (CAF) that discussed heavily in their paper on how the development of the blockchain technology will revolutionize the way of charity on both the giver and the institution that involved in the charitable activities. The government, on the other hand, also put attention on this technology, because of the feature offered by this technology, i.e transparency, governance, security and many features that blockchain technology may offer.

Blockchain Technology

Blockchain technology is defined as distributed ledger, where the persons involved in the chain responsible for the maintenance of the block itself. The chain consists of multiple computers connected to each other in the network that record each and every transaction occurred in the system (Davies, 2015). Bitcoin, and many others cryptocurrency rely heavily on the blockchain technology to operate, where every single transaction will be recorded and kept in each computer in the blockchain. Blockchain system, as explained by Davies (2015) act as public ledger that records ownership at any given time, and this owned by all the users in the system. Blockchain consists of multiple blocks that represent the data that exist in the computers connected to the systems, and recorded who owns what and what belongs to whom, and transaction or change of ownership between the users in the system. Whenever a successful cryptographic process in the system, this will create a new block that will contain the new information and will be added into the chain of information or "block" that already exists, creating a long, intertwining line of information that stretched from the beginning of the blockchain, up until another "block" of information is added into the chain.

The application of blockchain, as mentioned by Davies (2015), still limited to the usage of the cryptocurrency such as the buy and sell of bitcoin and other cryptocurrencies. But this usage of the blockchain will develop in the future as the technology that will revolutionize and give an extreme transparency and disclosure in a certain degree and level. Aside from the investment, transactions, or even speculative manner, there are other usage of the cryptocurrencies such as bitcoins. Davies (2015) stated that the existence of the cryptocurrency may revolutionize the way of charity giving using the blockchain-based cryptocurrency, to reduce the transaction costs and to eliminate the third party that would hinder the willingness to donate because it will take longer process and not efficient enough. Another argument stated that with the elimination of the third party (commonly the government, banks, central banks) the flow of funds is easier to channel, especially in the area of the corrupt or defunct government so that the funds received in the right recipients at the right time, thus increase the outreach of the charity institution itself.

The maintenance of the blockchain is the responsible of the users that involved in the system, including the safety of the chain from malfunctioning and cyber-attack from outside of the system. One of the key features of the blockchain that makes it seems unbelievably difficult to breach is the existence of the long, intertwining, interconnected chain of blocks existed in the system. Cryptographic calculation that generates the new

block makes it depending on the block that precedes it, and the block before it, and before it, until the first block, and this feature is to ensure the safety of the blockchain. The logic is that you created walls over walls, over and over again. If anyone attempt to duplicate one block, then they must replicate all the blocks that precedes it, and that process would be extremely difficult, let alone almost impossible to do. The blockchain technology has a lot of things to offer, but the application of it still limited into the usage of cryptocurrency such as bitcoins and others, but the expanding possibilities of the usage is still unexplored, and it is expected that this technology would give positive impact on the public sector institution such as charities, endowments, and foundations that manages public trusts to serve the public purposes, to maximize the impact of the charity and to reach the outreached that initially are more eligible to receive the benefits of the charity.

The presence of Internet of Things (IoT) is believed to bring in the transformation in the daily life, as they will be equipped with the sensors that collects data from the condition of itself and the surrounding, providing forecast for possibility of failure and repairing request (Morgan, 2014). The European union had started initiative that they would become the example in the application of the IoT, and they already put key strategic goals in making the realization of IoT in the Europe (Pan European Networks 2016).

The connectivity of the devices using IoT will provide a very big opportunity for the efficiency and forecasting purposes, because the data collected by the connected devices would serve as the resource for creating of forecast on almost anything, from the possibilities of the disaster, air pollution index, water quality, and many others, as long as the internet connectivity maintained between devices, so to make it short, these devices now becoming smart devices that can analyze themselves and provide efficiency to the user.

Smart Contracts

Smart contracts, is often called self-executing contracts, blockchain contracts, or digital contracts are a computer programs that act as an agreement where the terms in this program can be set with the ability of self-execution or self-enforcing when the terms and conditions in the contracts is met (Blockchaintechnologies.com, 2016b). This smart contract possible by stretching the implementation of blockchain in the cryptocurrency to another level. The use of public cryptocurrencies has led to the development of the technology that capable of doing complex operations, and the existence of smart contracts will enhance the existing system in the blockchain. Stark (2016) stated that the definition of smart contract now existed is not clearly defined, and most of the people use the term wrongly. The smart contract, he continued, is divided into two parts, the smart contracts as smart contract codes, or smart contracts as smart legal contracts. In the first one, the smart contracts as codes, it is described as series of codes in the blockchain. The smart contract is actually in the form of program that will execute itself when the condition set in the program is fulfilled.

On the other hand, smart legal contract would be more suitable as the replacement of the current legal documentation that existed today. This type of contracts is the smart contracts or programs that use the code to articulate, verify and enforce an agreement between contracting parties involved. Nevertheless, the existence of smart legal contracts in the real life is not yet present, but Stark argue that this kind of smart legal contract will make place in the future when anything from a verbal agreement to an email conversation become a contract law, if the basic elements of the contract can be found.

It is still very premature to determine how the existence of the smart contracts would bring a radical change in our daily live at this present time, but there are still very wide

possibilities that this kind of contract may replacing the old kind of contracts made in the presence of the lawyer that exist and enforced today. The digitalization of things now is pertinent, and the existence of blockchain and its derivatives are the good examples on how this thing happened. Moreover, the existence of this smart contracts perhaps may revolutionize the way people or the government make records of ownerships, pay checks, taxes, and even charity institution would be affected by this smart legal contract, if, in the future this type of smart contract is accepted, recognized, and known by the law

RESEARCH METHOD

Waqf is known to be an effort to empower the economy and welfare of the people. Using a systematic literature review (SLR) method was chosen because of its suitability to answer the research objectives comprehensively in this study. Considering the readiness of this research in the early stages or identification. Therefore, the data used applies the SLR method protocol. The literature that we use is research that leads to the usefulness of blockchain when applied to waqf. The steps to answer the research objectives are identification of research, study selection, quality assessment, and data extraction and synthesis (Qasem et al., 2019; Hanafizadeh et al., 2014; Alhammad et al., 2022).

RESULTS

Future Empowerment and Improvement of Waqf Institution Using Blockchain Technology

Waqf institution all around the moslem countries mostly faced the same challenge that come from the administration, utilization of the waqf assets, and the problem of governance and accountability of it. There are researches conducted by several scholars to analyze the problem in the waqf institution across the jurisdiction, such as the research conducted by Tahir and Hamid (n.d) in the development of waqf properties, the problem of accountability by Assegaf and Sawarjuwono (2013), governance in waqf by; Ihsan and Ayedh (2015), waqf administration by Karim (n.d) in Singapore and multidimensional issues by Puad et al that discuss the challenges in the waqf administration in MAIS Malaysia (2014). Most of these papers talks about the management issues of the waqf institution, and how to create the governance framework to ensure that the transparency and the accountability of waqf institution to be ensured, but how if the technology take over and minimize the involvement of the human to reduce the human psyche and factors that may reduce the efficiency and effectiveness of the performance of the waqf institution.

Waqf institution would play the main role actors in the scheme, because the institution is responsible for managing and maintaining the waqf institution. This waqf institution can be government based, or private based. The second actors would be the donors that gives out their assets to the waqf institution, with the purpose of the benefit goes to his own family, or to the public at large, or to both of them. The third identified actors that may be involved is the Muslim community, whether those who receive the benefits from the waqf institution, or those who acts as the patron to ensure the accountability of it. Waqf, even though working in the Islamic perspective and code of law, still retain its nature as charitable institution that its purpose is for the development of ummah. Trust is the main aspects that makes waqf institution and other charity institution works, because people willing to do charity because of the trust that laid in the institution itself (Davies, 2015; Tyler, 2013; Franko, n.d) that this institution will carry out its duty for the sake of the public. Tyler (2013) argued that the transparency in the charitable institution may lead into the existence of the charity institution itself, and even lead to the

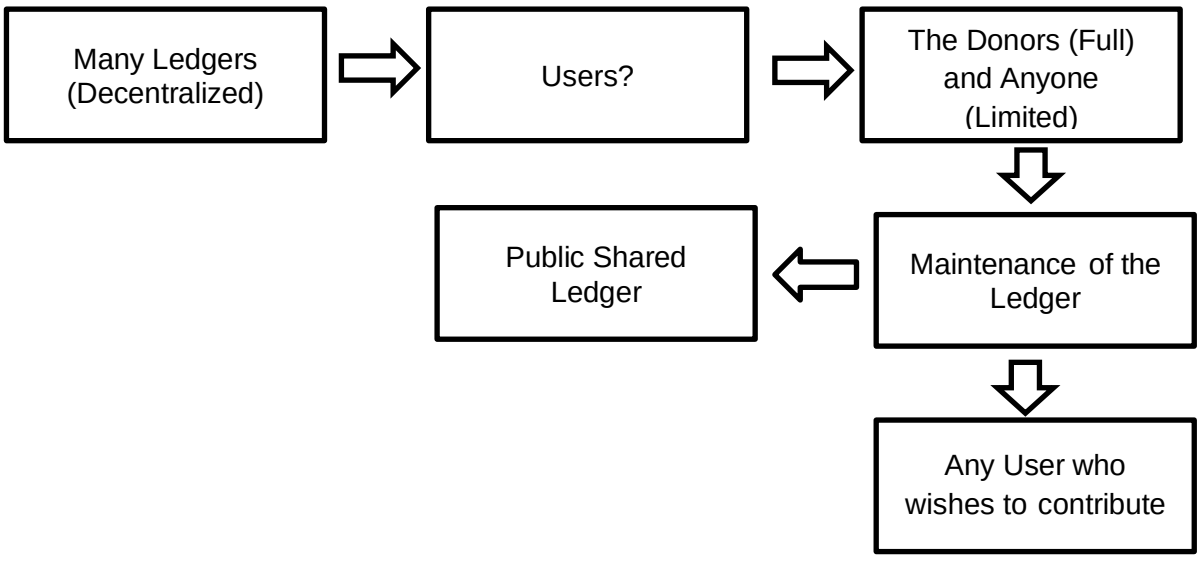
measurement of the effectiveness of the charity institution itself. So, the importance of the transparency and governance in the waqf institution is essential, and may be linked to the blockchain technology, since this technology features a way of transparency up to the extreme level, where all stakeholders involved may become its supervisor and the caretaker of the institution and its assets, and with the extreme transparency of the blockchain, and its efficiency in managing the assets through the concepts of IoT and Smart Contracts.

The existence of blockchain technology, whether like it or not, will surely bring the change in the way of the living in the future, from the way we interact to each other, the extreme transparency, the connectivity through Internet of Things and so many more (Morgan, 2014; Davies, 2015; Atzori, 2017). Even in the radical sense, Atzori (2017) stated that the existence of the blockchain technology and its radical transparency will decentralize the governance on most of the things, that even will relinquish the existence of the state, because, using blockchain as public ledger, all of the connected devices would act as the safe keeper and the patron on every transaction or data movement from one place to another place at any given time. Moreover, because of the decentralized nature of the blockchain, this makes the governance become borderless, stateless and more objectives, because this is runs by sets of codes and algorithms that remove mostly on the involvement of the psyche of the human, so make it more logical and reasonable in making judgement (Atzori, 2017).

Propose Crowdfunding for Waqf via Blockchain

The involvement of the technology in the charity institution as discussed by Davies (2015) that discuss the revolutionize concept of future charity using blockchain and its derivatives may be relevant in the case of waqf institution to revolutionize the way of charity giving in the scope of waqf institution. Davies (2015) stated that there are four possibilities that the blockchain institution may offer and might be suited to the waqf institution improvement such as transparency and openness, reducing of transaction cost, increasing trusts, integrating the digital and physical world. Each of these aspects will be explained thoroughly in the connection with the waqf institution improvement using blockchain technology and its derivatives. Transparency and openness are the feature that the blockchain offers to the users of this technology. Waqf institution may utilize this technology by using the decentralized ledger within the blockchain that the waqf institution is involved inside. The flow of the scheme are as follows (Figure 1):

Figure 1. Transparency and Openess Using Blockchain



The scheme is intended to create many copies of the ledger that can contain a lot of data regarding the donor biodata, assets, and all related information, including the waqf deed that utilize the smart legal contract, a smart contract or programs that previously set or design based on the requirements stipulated by the waqf donor to the waqf manager on behalf of the waqf institution that articulates, enforceable and executable itself automatically, and binding and recognized by law. In this ledger also recorded that the assets ownership has been transferred to the waqf institution trustee on behalf of Allah himself.

After the process of transfer is done, the access of the public to see the performance of the waqf institution and every transaction related to the asset is being recorded and can be accessed via the blockchain by anyone that would like to see the performance of the asset and its conditions. But public do not have the access to make changes in the asset and/or the conditions in the waqf deed as stipulated by the donor of the asset, but they have limited access to assess and oversee the performance of both the waqf institution and the assets itself. This possible also with the Internet of Things (IoT) attached to the waqf assets (if it is a real assets) to know the real-time conditions of the waqf assets. In terms of the maintenance of the blockchain, there are two options available that may be utilized by waqf institution, firstly, they can use permissioned public shard ledger that maintains the block chain, or there are groups of people volunteered to improve the blockchain and its security, or by payment that also goes through cryptocurrency.

In light of the cash waqf, there is possibilities that the cryptocurrency might be possible to become the asset that can be made waqf out of it. The value of the cryptocurrency donated from certain individual or organization may be used as the cash waqf available to utilize, but this concept of cash waqf cryptocurrency might still need further studies, especially in the area of the sharia, whether the scholars accepted the conditions of these cryptocurrencies as the waqf asset or not, or even they totally reject the idea of it.

The movement of one asset, either it is cash or real assets brings costs, even though the transfer is intended for charity purposes. The change of ownership in the asset requires the renew of the title deed and this alone would cost a lot, and there must be paper works to be involved, in order to make the transfer of the ownership is considered legal, let alone the third party involved in the transaction that will cost even more.

With the existence of the blockchain technology, where most of the people can access and see the transaction between one party with another, the need for the third party involvement to endorse the movement of the ownership of the asset (i.e governments, lawyers and related parties) are no longer necessary, because the extreme nature of transparency in the blockchain would allow anyone in the chain to become the patron of the asset movement, and they may be aware if there is any suspicious movement in the chain. The existence of smart legal contract could also become supporting documents that validates the transfer of the asset ownership from the donor to the waqf institution.

With the extreme transparency and openness in every transaction that occurs in the waqf block chain, as well as the data gathered from the IoT devices attached in the asset, it is likely that the issue of trust would likely to go to minimum level, because most of the transaction in the blockchain of the waqf is automated through the existence of the Smart Legal Contract created when the donor transfer the ownership of the assets attached with the waqf deeds in the form of smart legal contracts that records the requirements and conditions of the waqf assets to the waqf institution. Blockchain can reduce the opportunistic behavior of both parties involved due to asymmetric information then the smart contract verifies and is recorded permanently in the application. It is important that in Islamic economic practice, all parties should receive equal information so that no one

party takes advantage of the other. Overall, through blockchain technology organizational structure and practices will be better because transaction fees can be detected faster. The involvement of human influence in the transaction is lowered to the minimum level, and this would reduce the possibility of the fraud and dishonesty, because not much of the human psyche are involved in the transaction, and most of them are being done automatically through the blockchain, to ensure the swiftness and effectiveness of the transfer of ownership as well as the management of the asset itself.

The concept of “colored coins” by Davies (2015) represent the concept integration of the physical and the digital world altogether. The colored coins simply means that the asset that are being charitable or becoming waqf assets are marked with unique marking to distinguish it between the private ownership that exists in the blockchain. This so-called coins or tokens may also in the form of program that allows certain people to utilize the idle or redundant waqf assets to be more productive and the rental payment is payable through the blockchain by cryptocurrency or these assets may be utilized for free of charge. Moreover, this concept may also increase the capacity of sharing economy and ownership, where the idle waqf (supposedly they are connected through IoT) may send signal through the blockchain for their availability to be utilized and accessed based on the rental basis or for free, with the payment also in the form of cryptocurrency, and this kind of program may also disabled the asset or give warning signal that the period of usage of the particular lessee has over, and this may result in the reduce amount of the free-rider in the community.

Furthermore, with the increasing possibility of connected devices of IoT, the devices or public amenities may collect data and do forecasting, to provide early warning system when one public amenities under waqf such as schools, roads, or bridges are in need of repair, so they alert the system in the blockchain to do repair, to maintain the conditions of the asset. Also, there is a possibility that through the use of smart legal contract and IoT, anyone may put conditions in their assets where some part of it may be donated, for example, when the car is not utilized by the owner, then it may be put into the system to be able to “donate” the usage of time of the car itself, when the original owner is not in the position of utilizing it.

Challenges Faced

The obvious challenge that faced in this concept is the current development of the blockchain technology itself. The technology is not yet reached the level as what Davies discuss in the paper, where most of the transaction and all devices are connected and become the hyper logical donator that can contribute to the society. Secondly, the challenge of the human resources that may be able to adapt with this new technology, especially in the developing countries where most of the waqf institution resided. With less capable human resources and lack of research and development in the institution makes it very hard to introduce new concept of technology to help improving waqf institution and its assets. Thirdly, building this kind of infrastructure of blockchain and IoT devices takes time to develop, and improvement must be done over and over again, to ensure the smoothness of the system with minimum hiccup, to ensure the full capacity can be utilized. Lastly, the concept of decentralized governance, different dimension in the ownership, and borderless transparency may displease relevant authorities, especially government where they would prefer the transaction being done under their supervision, not to the others, to ensure they exercise enough control of whatever existed in their jurisdiction.

Regulations to legalize crowdfunding platforms require registration and other regulatory requirements. In general, requirements include accountable administration, including those related to business conduct, governance, and reporting requirements. In fact, the

adoption of blockchain in finance has many unresolved issues such as ensuring the standard of cooperation from the government with academia and industry that is set for its security, integrity, and distribution (Palmer, 2016). Most importantly, in the digital world, there are two operating rules for use in finance, namely the legislative framework and the rules that determine the operation of algorithms coded by software (Kroll et al., 2013).

CONCLUSION

The concept of blockchain technology in improving waqf institution seem promising and futuristic, but the implementation of the blockchain technology still very limited to the usage of cryptocurrency such as bitcoins, and still not even go further at this time now. But the idea and concept on how this technological thing may revolutionize the way people interact with its own kind and surrounding, especially in the way of charitable purposes is very promising.

Waqf institution is still way behind its western counterparts in managing the charitable institution to be more effective, impactful and efficient in their charity work. The introduction of the blockchain technology may revolutionize many things in waqf institution, especially in the area of transparency, accountability and governance of the waqf institution itself, where everyone can be the patron of the waqf institution and its assets. If this so-called futuristic concept come into the picture years later, hopefully waqf institution may be able to have the chance to improve to become even better, to ensure that the waqf would play its role as Islamic charitable institution.

LIMITATION

This study is in the form of concept paper, and the proposal might not be applicable in this present time because of the constraints in many aspects, including the technology itself. It will take a few more years to prepare the technology and its application for good charities such as waqf. Quantitative testing is very much needed in the near future to evaluate the effectiveness of using blockchain that has been running and its suitability if it is carried out on waqf.

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REFERENCES

Alhammad, M., Tan, C., Alsarhani, N., & Zolkepli, I. (2022). What Impacts Backers' Behavior to Fund Reward-Based Crowdfunding Projects? A Systematic Review Study. *Pacific Asia Journal of the Association for Information Systems*, 90-110.

Assegaf, Y., & Sawarjuwono, T. (2013). Ihtisab (Accountability) in Waqf Institution: A Review and Synthesis of Literature. *Issues in Social and Environmental Accounting*.

Atzori, M. (2017). Blockchain Technology and Decentralized Governance: Is the State Still Necessary? *Journal of Governance and Regulation*, 45-62.

Davies, R. (2015). *Giving Unchained: Philanthropy and Blockchain. Giving Thought*. Retrieved from Charities Aid Foundation: https://www.cafonline.org/about-us/publications/2015-publications/giving-unchained-philanthropy-and-the-blockchain

Ekblaw, A., Azaria, A., Halamka, J., & Lippman, A. (2016). A Case Study for Blockchain in Healthcare: “MedRec” Prototype for Electronic Health Records and Medical Research Data. *Proceedings of IEEE Open & Big Data Conference*.

Hanafizadeh, P., Keating, B., & Khedmatgozar, H. (2014). A systematic review of Internet banking adoption. *Telematics and Informatics*, 492-510.

Ihsan, H., & Ayedh, A. (2015). A Proposed Framework of Islamic Governance for Awqaf. *Journal of Islamic Economics Banking and Finance*, 117-132.

Karim, S. (n.d). *Contemporary Waqf Administration and Development in Singapore: Challenges and Prospects.* Singapore: Islamic Religious Council of Singapore (MUIS).

Kroll, J., Davey, I., & Felten, E. (2013). The Economics of Bitcoin Mining, or Bitcoin in the Presence of Adversaries. *Twelfth Workshop on the Economics of Information Security (WEIS 2013).* Washington, DC.

Morgan, J. (2016). *Internet of Things*. Retrieved from Forbes: www.forbes.com/sites/jacobmorgan/2014/05/13

Palmer, D. (2016, October 31). *5 Must-Read Excerpts from the UK Government’s Blockchain Report.* Retrieved from CoinDesk: www.coindesk.com/5-excerpts-uk-governmentblockchain-report/

Pan European Networks. (2014). *Europe’s IoT*. Retrieved from Pan Eurpoean Networks: Government: www.paneuropeannetworks.com

Puad, N., Rafdi, N., & Shahar, W. (2014). Issues and Challenges of Waqf Instruments; A Case Study in MAIS. *Conference on Management and Muamalah 2014*, (pp. 116-127).

Qasem, Y., Abdullah, R., Jusoh, Y., Atan, R., & Asadi, S. (2019). Cloud computing adoption in higher education institutions: A systematic review. *IEEE Access*, 63722-63744.

Stark, J. (2016). *Making Sense of Blockchain Smart Contracts*. Retrieved from CoinDesk: www.coindesk.com/making-sense-smart-contracts/