An Artificial Intelligence and NLP based Islamic FinTech Model Combining Zakat and Qardh-Al-Hasan for Countering the Adverse Impact of COVID 19 on SMEs and Individuals

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Abstract:

**Purpose:** The ongoing Corona virus (COVID 19) pandemic has already impacted almost everyone across the globe. The focus has now shifted from spread of the disease to the economic consequences it will bring to the society. The shortage of production will result into the shortage of supply and consequently will end as loss of jobs and employment for millions of people around the world. Two of the most important section of our society i.e., daily wage laborers and Small and Medium Enterprises (SMEs) will have to bear the major burnt of this crisis. The proposed integrated Artificial Intelligence and NLP based Islamic FinTech Model combining Zakat (Islamic tax) and Qardh-Al-Hasan (benevolent loan) can help the economy to minimize the adverse impact of COVID 19 on individuals and SMEs.

**Design/Methodology/Approach:** The present study explores the possibility of Zakat and Qardh-Al-Hasan as a financing method to fight the adverse impact of Corona virus on poor individuals and SMEs. It provides the solution by proposing an Artificial Intelligence and NLP based Islamic FinTech Model combining Zakat and Qardh-Al-Hasan.

**Findings:** The findings of the study reveals that Islamic finance has immense potential to fight any kind of situation/pandemic. Zakat and Qardh-Al-Hasan, if combined together can prove to be a deadly combination to fight the adverse effect of COVID 19.

**Practical Implications:** To be used as an effective way to support individuals and SMEs in the period during and after the pandemic of COVID 19.

**Originality/value:** There is no study combining Zakat and Qardh Al-Hasan to fight the adverse effect of poor individuals and SMEs. The study will contribute massively to the existing literature and will help the government and civil societies in fighting the economic impact of COVID 19 on individuals and SMEs.

**Keywords:** Artificial Intelligence, COVID 19, Islamic FinTech, Zakat, Qardh-Al-Hasan.

**JEL codes:** G3, G32, G38.

**Paper Type:** Research article.

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1. Introduction

The start of this decade and first quarter of 2020 has seen everything. It started with the fear of U.S.-Iran war to global pandemic in the form of Corona virus (COVID 19) have pushed the global economy into huge contraction. Covid 19 is a new kind of Corona virus which was not found previously in human. The main source of this virus is still unknown but considering the previous experiences it must have transferred to the human from animals. Actually it is a large family of disease that has common symptoms like, normal cold, flu, cough to more severe disease like ‘Severe Acute Respiratory Syndrome’ (SARS). With every passing hour the adverse impact of this global pandemic Corona virus (COVID 19) is increasing manifold. Within just four months after the first case detected in China the economic impact of this crisis is already being compared with the global financial crisis of 2007-08 and great depression of 1930s. Just for the comparison the financial crisis of 2007-08 lasted for more than 3 years (Erken, 2012) where as great depression of 1930s lasted for around a decade (Romer, 1990).

With economies in lock down, closing shops, borders, people being asked to stay indoors and economic activities to a halt the global economy is in shambles and looking less healthy. The stock markets are tumbling, central banks are slashing interest rate, industrial production are almost zero resulting into massive job loss and a financial crisis is around the corner. As the writing is on the wall but the amount of damage to be done by this pandemic will largely depend on the amount of corrective actions the government and employers take today to minimize the damage. The employers, civil societies and government agencies are required to work in coordination to help the affected and minimize the adverse impact of this crisis on individuals in SMEs.

2. Impact of COVID 19 on Poor Individuals

Though the death toll and number of infected people from COVID 19 are mainly from the world’s most developed countries like, U.S., Italy, Spain, Germany, China and UK are increasing every minute. It has severely affected the world’s most impoverished countries despite their best health care systems and other infrastructure facilities. The impact of this crisis is projected to be worse in underdeveloped and developing countries due to lack of adequate testing facilities, lack of accurate data and because of patients might have pre-existing conditions. The ongoing global pandemic will hit hard the poor and daily wage laborers in these countries as it is estimated that 24 million less people will escape poverty due to this pandemic (World Bank, 2020). The World Bank further reports that there are around 900 million people in the underdeveloped countries which are under risk due to this pandemic. Here in this paper we will not talk about the number of death or measures to cure the infected patients. Our focus will be beyond the number of infections and death, we will analyze the economic impact of this pandemic on individuals and
SMEs and how we can use Islamic finance tools, *Zakat* and *Qardh-Al-Hasan*, combined with the technology to fight this virus and minimize the damage on these two important sections of the society.

It is estimated that some regions if we take the extreme scenario the number of people living in poverty could increase by 420-580 million and it is also expected to increase the global poverty to around 0.5 billion which is around 8% of the total world’s population (Sumner, 2020). This situation has arrived first time since 1990 that the global poverty is expected to increase. Oxfam-a Nairobi based charity organization published a report on April 10, 2020 and their findings revealed that this is going to be an economic crisis more severe than the financial crisis of 2008. The global poverty is expected to increase for the first time in 30 years after 1990.

The report further revealed that taking into account the World Bank measure of poverty from being 1.90$ a day or less to a higher poverty line of 5.50$ a day or less, under every scenario there will be a global contraction of income of up to 20% and that will lead into a disaster. The number of people living below poverty line will increase up to 1.2 billion worldwide an increase of 434 million. Under the same calculation if other measure is taken into consideration i.e. the number of people living below poverty line on 5.50$ a day or less. The total global population below poverty line will increase to a whopping 4 billion an increase of 548 million (Oxfem, 2020). Considering the above statistics and scenario, there is very bleak chance that the situation can get any better. In all probability the situation is expected to get worse only. The only way it can be improved is that the rich people and government around the world should come together and join hands to help these deprived section of society. Islamic finance has two of the most beautiful tools, *Qardh-Al-Hasan* and *Zakat*, to help *ummah* by advancing cash in this pandemic situation. If the Islamic finance tools are used effectively with the technology the Muslim countries can save the poor individuals.

3. **Impact of COVID 19 on SMEs**

It is expected that the coronavirus pandemic is going to kill more the small business than human being (Carruthers, 2020). Knowing the importance of Small and Medium Enterprises, it is of increasing importance to analyze the impact of Covid 19 on SMEs and find out the measures to help them in survival. In UK, it is revealed that the most organizations can be categorized as small on the basis of employee number. 95 percent of business have employed less than 10 people and of course when compared to the profit and turnover the data is skewed the other way (Day, 2000). SMEs are the backbone of the economy whether you talk about the economy of a random state or the word economy. Most of the world economy have achieved the high level of development due to the contribution from SMEs, for example, Taiwan, China and Japan have achieved high industrial growth due to the contribution from their dynamic SMEs (Pandya, 2012). SMEs provided the valuable inputs to the society in terms of contribution in GDP, generating employment,
providing goods for the local demand and adjusting the quality of goods and services asper the local demand. The contribution of SME in invaluable to world economy and it is beyond the scope of this research to describe (Robe, 2013).

The SMEs contribute massively to the GDP and employment generation, the contribution to GDP from SME comes around 52-57%, where as it contributes to the 61% of employment in developing countries (Abor, 2010). According to the world bank report in 2020 the SMEs contribute around 40% to the GDP, it contributes around 90% of the total businesses where as it 50% jobs worldwide are coming from the SMEs. SMEs are more important and have more relevance in Islamic countries as there are 53.2 SMEs in Islamic countries as compare to the global average of 25.2 per 1000 population (IDB, 2020).

The SMEs are in urgent need of funds due to the global pandemic COVID 19. There is travel ban all around the world, complete lockdown, no movement of goods and services, industries like, tourism and hotels are in complete disarray. Most of the SMEs are battling for the survival as it has become really difficult for them to bear the operating expenses like, paying salary and rent. It has become the question of survival for them as most of the SMEs are having very small capital and they can sustain for very long if the situation continues for some more time.

4. Zakat as a Financing Tool during COVID 19

Zakat is one of the five pillars of Islam along with the Shahadah, (Belief that Allah is on and there is no one except Allah to worship) Salah, (Muslims are required to worship Allah, five times a day), Sawm (Muslims are required to fast during the month of Ramadan), and Hajj (an annual Islamic pilgrimage to holy city of Makkah). Zakat literally means ‘that which purifies’. All the Muslims who are eligible to pay must pay minimum 2.5% of their wealth every year to the poor, needy, destitute and others. Zakat is a compulsory charity tool is Islamic finance that can be used for various purposes, mainly for eradicating the poverty from Muslim community. Holy Quran has mentioned at least eight application of Zakat, but there is general consensus that the most important application of Zakat can be for the eradication of poverty by paying it to the needy and poor (Hasan, 2010). Zakat is an important part of Islam as Allah has mentioned more than 30 times in Holy Quran about Zakat.

Allah says in Surah Al-Maida, Verse 12. “Allah says, I am with those who prays to Allah, pays Zakat and believe in my messenger. Allah further says in the same Surah that, I will honor and assist them and lend a good loan to Allah and I will erase their sins and take them to the Jannah (paradise) where there are gardens and rivers flowing. If any of you disbelieved, it means he has gone away from the straight path”. (Surah Al-Maida, Verse 12).
5. Scope of Zakat for Helping Poor and Poverty Alleviation during COVID 19 Pandemic

As mentioned earlier there are eight applications of Zakat mentioned in Holy Quran and five of those applications are related to the poverty alleviation. To help the poor is the basic teaching of Islam. Helping the poor people in this difficult time will bring two benefits to the wealthy or rich people as it will purify their wealth and heart from greed as promised by Allah and it will also contribute in the economic growth of the country (Embng, 2013). Keeping all other objectives of paying Zakat, the most important of them is to help the poor and needy to attain the minimum standard of life (Abu Bakar, 2011). Due to the COVID 19, the poor’s and daily wage earners are in urgent need of funds and those people who are eligible to pay Zakat and also the Zakat houses and Zakat collection centers can use this money to help the poor and needy during this difficult time.

6. Zakat as a Financing Tool for SMEs during COVID 19 Pandemic

Distribution of Zakat is a very important and one should be very careful as it cannot be given to every business. It can only be given to those businesses who are eligible for it asper the rules laid down by the sharia. There is various application of Zakat mentioned in Holy Quran and as practiced by the Zakat institutions and rich and wealthy individuals. One of the most widely used application of Zakat is the distribution of Zakat money to the needy people in the form of business capital as a source of Islamic micro financing (Ibrahim, 2014). Zakat can be given to the SME and it has shown positive correlation between the Zakat and business development of SMEs in Malaysia (Sukestri, 2018). However, it is concluded here that while paying Zakat to the SMEs one should be very careful and should check that while paying Zakat the recipient shall not become the Sahib-Al-Nisab (The owner of wealth valuing equal to 52.5 tola silver).

7. Qardh Al-Hasan (QH) as a Financing Tool during COVID 19 Pandemic

Qardh Al-Hasan is the non interest or benevolent loan or non-margin loan practiced since the era of Holy Prophet Muhammad ﷺ. It is one of the most beautiful financing tool available in Islamic finance. Qardh-Al-Hasan is a loan given by the first party to the second party without expectation of any reward. It is served as a bailout fund for a short period of time (Hannanong, 2018). As objective of Islamic finance is the removal of poverty and eradicating the inequality of income. Qardh-Al-Hasan is served as one of the most important tool in Islamic finance. Qardh-Al-Hasan financing is a traditional financing method in Islamic finance and it has its relevance even today in modern world and if applied properly it can help the SMEs sector in fighting this pandemic. Allah has mentioned Qardh-Al-Hasan on six occasions (Q2:245, Q5:12, Q57:11, Q57:18, Q64:17, Q73:20). At one of the occasions Allah says that (Surah Al-Baqarah, verse No. 245).
“Who is it that would loan Allah a goodly loan so He may multiply it for him many times over? And it is Allah who withholds and grants abundance, and to Him you will be returned”.

Explanation: The above verses of Holy Qura’an can be interpreted as- Qardh-Al-Hasan means lending money to the individuals or organization without interest. As Allah has promised that you will be rewarded on the day of judgement. The word ‘Kaseera’ is used everywhere which means ‘more and more’. Of course, Allah is the one who gives more and more and if Allah starts giving the reward, there is no limit to it (Mirakhor, 2007).

8. Scope of Qardh-Al-Hasan (QH) for Helping Poor and Poverty Alleviation during COVID 19 Pandemic

The central objective of Islamic finance is to achieve social justice, eradication of poverty and overall welfare of the society. Islamic finance principles are based on the objective of helping the last man standing in the queue (Munner. 2019). Qardh-Al-Hasan along with the Zakat and Sadaqah are the Islamic finance tools to help the poor and needy. This can prove to be an effective tool in this grave situation of COVID 19. As explained earlier COVID 19 has brought disaster for the poor and Islamic countries and Muslims in the other countries must use Qardh-Al-Hasan to help the needy and poor. It is the duty of the society to ensure that poor including women are empowered (Rabbani, 2020b; Rabbani, 2020d).

The importance of Qardh-Al-Hasan is more than Zakat in the sense that there are many people who are not eligible for Zakat because their wealth is above the prescribed minimum limit for accepting Zakat and these people can easily accept the Qardh-Al-Hasan. The Qardh-Al-Hasan has zero cost of borrowing and individuals who need money can fight this situation of COVID 19 and restore their previous position and can later repay the loan. It is proved that the Qardh-Al-Hasan financing is an effective tool in empowering the economic activities of the poor and needy (Widyanto, 2011). Qardh-Al-Hasan is the tool to reinforce the social integrity, cooperation and harmony. It can be always used to help the needy and power to empower them and help them in times of need (Iqbal, 2015).

9. Scope of Qardh-Al-Hasan (QH) for Financing the SMEs during COVID 19 Pandemic

One the biggest difference between Zakat and QH is that Zakat cannot be accepted by everyone or everyone is not entitled to receive Zakat where as QH can be accepted by anyone who is in need of fund whether rich or poor. It has been observed that the QH loan has completely been ignored by the Islamic banks as financing tool for SMEs. There are various sources of fund which can be used by the government and Islamic banks to provide QH loan to the SMEs. As COVID 19 is a temporary phenomenon and most of the countries have already announced the stimulus package to help their countries in fighting the adversities of COVID 19. The money from these package can be used to finance the SMEs by giving QH loan
(Saquib, 2011). As it will increase the customer satisfaction and customer satisfaction will result into the customer loyalty (Rabbani, 2016). The banks and Islamic financial institutions can use their capital to finance the SMEs in this crisis time by giving QH loan and it will also not affect their liquidity as they are expected to be paid soon. Another source of finance for giving the QH loan could be the charity amount received by the Islamic bank during Murabaha financing. These funds are earmarked and cannot be used for any other purpose, but with the permission from client the banks can use this fund during this pandemic to bail out the SMEs from getting bankrupt (Usmani, 2008).

10. Zakat and Qardh-Al-Hasan Platform

Zakat platform requires that each user of the system must be registered with the Zakat platform. There are three types of users who acts as audience of the Zakat and Qardh-Al-Hasan platform, first type of the users are the people or organization who are willing to support others by offering Qardh-Al-Hasan or by Zakat, as discussed earlier, henceforth, this type of users are called lender in our system. The second type of users are the individuals or small and medium enterprises (SMEs) which are in great need of funding because of some crisis such as due to some kind of natural disaster such as pandemic, flood, war or other similar kind of situation. This type of organizations or individuals usually belong to the category of self-reliant but because of some external forces such as war and natural disasters etc., which are beyond the control of an individual or SMEs. Zakat platform classifies these users as borrowers and henceforth, this research study will use the same term. The other category of the users is those who are less fortunate or underprivileged and are in need of support from others to fulfill basic requirements. The Zakat system classifies this category of users as eligible Zakat receiver and this research will use the same term henceforth. The following Figure 1 illustrates the working of the Zakat platform.

Each user must provide an agreement of Sharia compliance to activate his/her account on Zakat platform. The lenders have to provide the information that the funds which they are going to use for the support have been earned through those sources which are permissible under Sharia law. Similarly, the borrowers and the eligible Zakat receiver also have to provide the sharia compliance agreement stating that the use of the support funds will be used for the activities which are permissible under Sharia law. Borrower and Zakat receiver provide the proof of their needs. These proofs can be in the form of textual information and/or media (audio/video). The Zakat systems use various technologies for processing of this information to support the verification of the needs and classify them into valid or invalid categories. If the system classifies the need into invalid category, it is ignored and will not reviewed by the system again until requested by the Zakat representative. However, if the request is classified as the valid category, it is reviewed by the Zakat platform representative.
The system uses machine learning, natural language process (NLP) and digital image processing techniques for the analysis of the information provided by the borrower or by the Zakat receiver. The text documents are processed using natural language processing techniques to retrieve the important information from the proofs of need document. The retrieved information is used by the Zakat representative to verify the needs and classify them into appropriate category. Zakat platform applies a hybrid approach of natural language process using various techniques in different modules. Hybrid approach uses combination of different techniques used for natural language processing.

Some examples of various techniques used in machine translation application domain of NLP are statistical approaches in which the model is built around the Bayesian probability theorem (Shahnawaz, 2013b), artificial neural network based approach which is one of the most popular approach nowadays as the use of deep learning is increasing (Khan, 2011; Mishra, 2012; Khan, 2019a), rule-based methods (Shahnawaz, 2013a), case-based reasoning approach which considers the previously available data as the case base for processing future incoming information (Shahnawaz, 2015) and many more.
However the textual information received from the borrowers sometimes is not available in proper grammatical structure, therefore, NLP techniques are applied for getting the proper information because for the efficiency of the NLP algorithms the input provided to most of these algorithms must be in proper structure specifically for those algorithms which generates a parse tree for extracting the information from the input documents (Khan, 2018; Shahnawaz, 2011). The proposed system can also be developed for automatic assessment of the images and getting the preliminary information from the images and videos (Bashir, 2017). The researchers are working in the direction of developing a chatbot for the integration on Zakat platform which will be available online for the automatic response of the user queries (Khan, 2020; Khan, 2020b).

However, building a chatbot requires a lot of information as the knowledge base so that it can understand the semantic meaning of the text to respond them by understanding their sentiments (Khan, 2019b; Astya, 2017). The above process of information generation is very similar and can be considered similar to a decision support system as the capability and functionality are almost identical. The Zakat representative examines the needs based on the information generated by the Zakat platform and approved to be published for the Zakat users.

The lender can search from their dashboard any of the published profile of needs and select as the beneficiary to receive the support. The lenders also have access to the verified proof of need information provided by the borrowers. Zakat system recommends the information of possible beneficiaries based on the past supporting history of the lenders and if they have set any interests in the dashboard for the support. If none of the information is available to the lenders, in that case, of the proposed system, the Zakat platform recommends the list of the beneficiaries. These recommendations are based on the type of support selected by the lenders and are generated using artificial intelligence-based recommender system. If the lenders select the Zakat as the type of support then the list of the beneficiaries will contain the needs of eligible Zakat receivers and if the lenders selects the Qardh-Al-Hasan support then the list will contain the information for the borrowers.

The lenders on the Zakat platform can directly transfer the funds to the beneficiaries. In some cases, if the beneficiaries does not have a linked bank account with the proposed platform then the funds are received by the Zakat system and are put into the wallet, the Zakat representatives then makes the arrangement for the transfer of the funds to the intended beneficiary and funds are delivered. The Zakat representative provides the contact information once the beneficiary has been contacted by the Zakat representative to make sure the selected beneficiary by the representative is the intended beneficiary to whom the lender wanted to support. On delivery of the funds, the lender is given the information about the fund transfer with the contact information of the receiver for the confirmation and the funds are removed from the wallet. All the transactions are recorded to maintain the history so that if the borrower wants to repay the Qardh-Al-Hasan, there will be no
discrepancies related to the amount of funds received or repaid. The transaction history of the eligible Zakat receiver is maintained to observe how it has uplifted the status of the Zakat receiver and how much Zakat a user has received, the Zakat receivers are listed in the increasing order of Zakat amount received by a beneficiary.

The Zakat receivers who have received least amount of the Zakat will be on the top of the list. This information helps the lenders to make the decision. In the similar way, the transaction records or history of the borrowers is also maintained, recorded and accessible to the lenders which the lenders can analyze to make decision how much and why they want to support the borrowers and can also agree to terms and conditions of repayment with the borrowers. As discussed earlier, Qardh-Al-Hasan is a type of fund which is considered as one of the highest forms of charity under Sharia law. Therefore, it is up to the lenders to discuss these terms and conditions of repayments. The proposed Zakat system is an Islamic FinTech model which works as the platform to bring all the parties together and ease the way in which these services can be provided. The research studies in (Rabbani, 2020a; Rabbani, 2020c) suggest that Islamic FinTech can provide the solution of many obstacles in efficiently executing the services and obligation of the Sharia law and create innovative pathways to implement some of the most important finance related duties applicable to the Muslim community. Therefore, the proposed Zakat platform can be a revolutionary step in the direction of solving the issues related to transparency, speed of support delivery service and fair distribution of Zakat.

11. Discussion

Based on the presentation above, it can be discussed that Islamic finance have the capability to counter the threats arisen because of crisis situations like COVID-19. Zakat and Qardh-Al-Hasan are two concepts in Sharia law which can be a valuable solution in this kind of situations. Zakat is one of the key pillars of Islamic principles and it is obligatory for every Muslim to pay Zakat. The implementation of these concepts of Islamic Finance with technology using artificial intelligence and natural language processing makes it easier to reach to a wider range of audience as web-based platform can reach the people across the globe.

In this research study, the researchers have presented a novel model for implementing these Islamic finance concepts on web-based platform using artificial intelligence and natural language processing, however, other supporting technologies for building the online version of the platform have not be discussed as those are not in the scope of this research study. The novel ZaQaH platform has three major modules. First module is the information generation module which process the proof of need information provided by the beneficiaries. The information provided in the form of textual and media data as the documents of proofs of need is processed with AI and NLP to generate the key information which helps the ZaQaH representatives in the decision making process for identifying a valid or invalid
need. This module of the ZaQaH platform functions similar to a decision support system.

The second module of the system is the recommender system which helps in generating the potential list of the beneficiaries for the lenders. The proposed Islamic Fintech system ZaQaH, uses natural language processing and artificial intelligence-based recommender system to suggest the list of the envisioned interested parties. Artificial intelligence and NLP also facilitate in the process of verifying the needs of the beneficiaries. The third module is the facilitator module which maintains the record of transactions and provide functionality of communication. As the research studies in (Rabbani, 2020a; Rabbani, 2020c) suggest that Islamic FinTech can provide the solution of many obstacles in efficiently executing the services and obligation of the Sharia law and create innovative pathways to implement some of the most important finance related duties applicable to the Muslim community. Based on the above discussion it can be considered that the proposed system may be a revolutionary step in implementing the Zakat and Qardh-Al-Hasan principles of Sharia law.

12. Conclusion

From all above it can be concluded that it is very early to exactly estimate the exact amount of damage to be done by the global pandemic COVID 19. The views from experts shows the poor individuals and SMEs are going to be worst hit by the COVID 19. Like always, Islamic finance is the complete way of life and it provides an effective tool in terms of Zakat and Qardh-Al-Hasan to not only help these two important sections of society but also minimize the damages on them. Now, it is the responsibility of the government, civil societies and rich individuals to use these Islamic financing tools and provide the benefit to the poor individuals as well as to the SMEs.

The study proposed an Artificial Intelligence and NLP based Islamic FinTech Model combining Zakat and Qardh-Al-Hasan for countering the adverse impact of COVID 19 on SMEs and individuals’ can prove to be a stepping stone in this direction. The model uses the Artificial Intelligence and NLP to make the system more effective and transparent. Islamic finance must be combined with the technology to increase its reach and to achieve the broader objective of social justice and providing quality life to each and every Muslim across the globe. It is further reassured that the QH and Zakat must be used with technology to achieve the objective of Islam and Islamic finance, i.e., to treat every member of Ummah as brothers and sisters and reach to them with right intention in terms of pandemic like COVID 19 and Allah is the best to judge the intention and give the reward.
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