CHAPTER 10

AN ARTIFICIAL INTELLIGENCE-BASED ISLAMIC FINTECH MODEL ON QARDH-AL-HASAN FOR COVID 19 AFFECTED SMEs

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Abstract

The rapid spread of Corona virus 19 (COVID 19) and its associated economic impact has again turned the spotlight on Islamic finance and banking to save the world from its economic consequences. Islamic finance by principle is an ethical finance which intends to help the poor and vulnerable under crisis. It has various financial tools like, *Zakat*, *Sadaqa*, *Awaqaf* and *Qardh-Al-Hasan*, especially designed for this purpose. Among various tools of Islamic finance, *Qardh-Al-Hasan* has emerged as the most viable Islamic finance weapon in the fight against the economic consequences of crises like COVID 19 and financial meltdowns. Against such a backdrop, the present chapter explores the possibility how *Qardh-Al-Hasan* can be used as an Islamic finance tool to help the COVID 19 affected SMEs and individuals. The present study is exploratory in nature as it explores the possibility of *Qardh-Al-Hasan* as the landscape in fighting the economic impact of Covid-19 on small businesses and individuals. The study proposes an Artificial Intelligence-based FinTech model to provide a solution for the affected SMEs and individuals to fight the economic consequences of this pandemic and survive. The findings of the chapter suggest that *Qardh-Al-Hasan* is a beautiful selfless financial service in Islamic finance which must be used in combination with Fintech like Artificial Intelligence to save the poor and affected SMEs from this pandemic.

Keywords: Artificial intelligence, COVID 19, economic effect, FinTech, Islamic finance, SME

1. Introduction

The coronavirus pandemic (COVID 19) continues to take its toll on each section of society. Be it small businesses, large corporates, or private individuals, everybody is being affected and it is almost impossible to measure the economic impact of this pandemic on society. As of 01/07/2020, 3AM GMT there have been more than 10.5 million confirmed cases and more than 500,000 reported deaths around the world. As the countries and the World Health Organisation (WHO) continues to scramble to contain the virus, the economic impact of the pandemic is rising with every second. There is a need for immediate action to be taken to minimise the disruptions on the poor, vulnerable and small business owners. There is a solution available in the form of information technology and Islamic finance. If Islamic finance is combined with technology, the SMEs can be saved (Fink, 1998; Haider et. al., 2020). Information-based technologies are the best bet to bring new corporate strategies and help in the growth of Small and Medium Enterprises (Nieto & Fernandez, 2005). Islamic financial services combined with technology can bring more stability and sustainability (Cihak & Hesse, 2010; Pappas et. al., 2017).

The economic impact of COVID-19 in just 4 months is higher than the global financial crisis, which lasted for about 3 years, indicating that it will have a very long-lasting effect on the world economy, and it may take years to recover from this pandemic. The biggest demand the SMEs would have from the government is to delay the EMI payments on their loan and wave off the interest and not to declare them as NPA. The banks should give them more time and treat them as a normal customer. In this case, the role of Islamic finance becomes extremely important as for this reason, Islamic finance treats interest as a haram commodity and one of the financing methods known as *Qardh-Al-Hasan* (benevolent loan) can be applied to help these SMEs recover from this pandemic. *Qardh-Al-Hasan* is an interest-free loan which is extended by the lender to the borrower and therefore is not contaminated in any way by *riba*.

Sources of fund as QH for SMEs: There are various sources of funds to be advanced by governments, Islamic banks and other charitable institutions as QH to the needy SMEs. The most important source of funding could be the 'charitable fund' held by these institutions as these funds are non-Zakat funds and can be advanced as QH. Usmani (2008) further states that in the case of noncompliance of a Murabaha contract, the client pays a specific amount to the bank as charity. However, the bank must guarantee that it will not use this fund as income from operations and will not use it for any other purpose than charity. After approval from the sharia board the same fund can be used by the bank to advance a QH loan to the SME for fighting this pandemic.

Other sources of funds: Islamic banks and IFI can use the reserve capital of these institutions to finance the urgent need of SMEs. As this is a temporary phenomenon and loans needed by the SMEs are in very small quantity, it will not affect their liquidity. (Saqib 2011) supports this idea for the application of this method and states that it can be applied for giving QH loans to the farmers in need.

Most importantly, the governments in Islamic countries have already announced various economic stimulus packages to negate the adverse effect of this global pandemic. For example, Saudi Arabia has announced \$32 Billion as a stimulus package while Bahrain and UAE have announced packages worth \$4.2 Billion and \$70 Billion respectively. In summary, as of now the governments of GCC countries alone have announced stimulus packages worth more than \$120 Billion (FCCIB 2020). As specified by the respective government departments, these packages will be used for different purposes to support the different sections of the economy based on their need. Therefore, particular sums of money must be allocated by the governments from these stimulus packages to support the SMEs by advancing QH loans either directly or through the Islamic Banks and IFIs. This can prove to be a vital source of finance to support the COVID-19 affected SMEs. It will also bring many benefits to the governments, as the governments could well have the expectation of receiving the principal amount in future. It will not be considered as pure charity like pay and forget.

The core principle of Islamic finance lies in achieving the objective of social justice, inclusion, removal of income inequality and fair and equitable mobilisation and distribution of resources (Rabbani & Khan, 2020b). The key characteristics of Qardh-Al-Hasan as a financing tool for the removal of poverty and financial inclusion are summarised as follows-

1. The primary objective of the Qarh-Al-Hasan is to help poor and affected people to get on their feet and restore their previous position in the least expensive and the most dignified way (Demirguc et.al., 2018). The proposed model can help achieve this objective by linking these people with technology and achieving the objective of inclusion.
2. Qardh-Al-Hasan is the benevolent loan with no expectation of any return and principal repayment also depends on the financial condition of the borrower. The lender will forego the demand to repay the principal amount if despite the best efforts the borrower is not able to pay (Zauro et. al., 2016).
3. The intention of the lender is purely benevolent in the case of a Qardh-Al-Hasan loan as being a Muslim, the belief is that Allah the Almighty is the best to give reward. If not now, then Allah will give the reward on the day of judgement.

4. With the use of Qardh-Al-Hasan, the harmony and cooperation between the rich and poor can be enhanced which in turn would help in the creation of a more caring, cooperative, empathetic and collaborative society.
5. With situations like COVID-19 and the Financial crisis, QH loans can be used more effectively to create job opportunities for the poor leading to the eradication of poverty from them.
6. Finally, the proposed Artificial intelligence based FinTech model can serve as a tool for poverty alleviation and increasing social and financial inclusion. By extending credit to the poor and affected due to the pandemic, they can be brought to the formal financial sector as they will get access to other financial services. Also they will be better integrated and included in society.

The present study is divided into two parts. The first part looks at the possible economic impact of the virus on small businesses and how *Qardh-Al-Hasan*, an Islamic finance tool combined with Artificial Intelligence-based financial technology can help to fight and restore the SMEs. The second part proposes an Islamic FinTech on *Qardh-Al-Hasan* based on Artificial Intelligence and NLP dedicated to Small and Medium Enterprises (SMEs).

2. Literature Review

Small and Medium Enterprises (SMEs) are the backbone of any economic system. This segment needs to be carefully handled because the people associated with it do not have multiple sources of income like corporates. Also, SMEs are important in terms of contribution to the GDP, job creation and the economic development of a country (Ayyagari et.al., 2003; Rabbani & Khan, 2020b). Taking care of the needs of small and medium enterprises is essential to boost the economic development of both developed and developing countries. It not only contributes massively to the GDP of the country and job creation, but it also plays a dominant role in the overall wellbeing of the people (Sa'ad & Pitchay, 2020). SMEs represent about 90% of the total businesses and 50% of the total workforce worldwide and it contributes to around 40% of the global GDP (WorldBank, 2020). These numbers could be much higher if informal sector SMEs are also included. In Islamic countries, SMEs have even greater importance and contribute more heavily towards GDP and job creation.

In Islamic countries, there are 53.2 SMEs per 1000 population in comparison to the global average of 25.2 SMEs per 1000 population (IDB, 2020). The SMEs sector is in urgent need of finance due to the great economic downturn; the local and global demand has almost become zero due to the sharp decline in disposable income, travel restrictions, lockdowns in most countries and the halt in the supply chains due to global restrictions. Small and medium

enterprises are playing a dominant role in the development of every economy irrespective of the stage of development. Whether it is a developing or a developed economy, the contribution of SMEs cannot be overlooked. When it comes to developing economies, the role of SMEs increases manifold in the creation of jobs and contribution to the GDP. Therefore the SMEs segment is rightly regarded as the engine of growth in these countries (Man et. al., 2002). The history of economic development is replete with evidence suggesting that the overall development along with the equal distribution of wealth with social justice can only be achieved with a good contribution from SMEs (Abdullah & Owolabi, 2015). However, due to the economic impact of COVID-19, SMEs are struggling for survival. They need to be saved by at least helping them meet necessary expenses like salaries, wages, rent, electricity bills and other expenses. One way for SMEs to survive would be to cut their expenses by laying off the employees. However, it will only worsen the situation as many eminent economists have already warned that there might be over 25 million job losses due to this pandemic (UN, 2020).

Governments all around the world acknowledge the importance of SMEs for the development of their respective countries and for that matter many countries have already announced stimulus packages to bail them out of this situation. If the present situation is not handled properly, it will be a long road to recovery and will result in large scale bankruptcies and massive unemployment. Governments have their own limitations and every government does not have the luxury of reserve funds like USA, Saudi Arabia, Kuwait or Bahrain. Social organisations and NGOs must come forward along with governments to fight this pandemic and help this important section of our economic society to recover and gain lost ground. *Qardh-Al-Hasan* is one such tool in Islamic finance which has the potential to empower the needy SME sector and help them in this pandemic (Selim & Hassan, 2020). Islamic finance is not just a financial system, rather it works on the religious beliefs of honesty, integrity and ethics. Religious beliefs and Islamic work ethics do affect the success or failure of SMEs (Uygur, 2009).

Theories of *Qard Al-Hasan*: The word *Qard Al-Hasan* is an Arabic word which is a combination of two words- *Qard* and *Hasan* which literally mean ‘loan’ and ‘beautiful’ respectively. It is the financing arrangement where one party gives his fungible property to another party to receive the same fungible property back without any addition. It is also defined as the Islamic loan without expectation of any interest from the borrower. *Qardh-Al-Hasan* financing is a traditional financing method in Islamic finance, and it has its relevance even today in the modern world and if applied properly it can help the SME sector in fighting

this pandemic. Allah mentioned *Qardh-Al-Hasan* on six occasions in the holy Quran (Q2:245, Q5:12, Q57:11, Q57:18, Q64:17, Q73:20). On one of the occasions, Allah says that (*Surah Al-Baqarah*, verse No. 245) *Qardh-Al-Hasan* is a beautiful tool in Islamic finance that can be included in monetary policy to eradicate poverty and help the poor (Mishkin, 2009; Selim & Hassan, 2020).

“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”.

If we try and interpret all these verses from the Quran and Hadith, it can be described as the QH means lending money to another person/organisation without interest or an increase in the value. It is promised by Allah that you will get the reward credited to your account in multiple of the amount lent on the day of judgment. On every occasion, the word “Kaseera” is used, which means ‘many’ in English. When Allah says many there is no limit to his “Rahmah”.

As narrated by Abu Huraira, the beloved Prophet Muhammad ﷺ has said. (Sahih Bukhari, Hadith No. 579)

“Whoever takes the money of the people with the intention of repaying it, Allah will repay it on his behalf, and whoever takes it in order to destroy it, then Allah will destroy him.”

Explanation: The intentions are very important in Islam. If you lend or borrow money with the right kind of intentions, Allah will give you the reward. Don’t expect everything in this world, there is a world after this world and that is more important. Allah is the best to judge what is good for you and he will of course do the best for you.

QH, as practised by the Holy Prophet Muhammad ﷺ, is the informal loan given by the lender to the borrower who is in need of money for charitable purposes. The borrower should not use it as a source of profit otherwise it will violate the basic purpose of QH i.e. to help each other.

(Mohammad Taqi Usmani, 2008) states that the lender can only have the claim on the amount lent or the principal without expectation of any profit from it (Cihak & Hesse, 2010).

Recovery of QH Loan: *Qardh-Al-Hasan* is a gratuitous loan advanced to the person in need for a specified period of time. After the expiry of the period the borrower has to return the amount to the lender the face value of the loan (*asl-al-qardh*). In other words, as per the principles of sharia the lender should not accept any excess amount as it can result in *riba*. However, an excess amount can be given by the borrower as *Hiba* (gift). There can be a

serious problem in the recovery of Qardh-Al-Hasan loans, when the borrower is not able to repay the loan on the due date the lender cannot reschedule the loan repayment. It is to be mentioned here that if the lender reschedules the QH loan without an increase in the principal amount it is not unacceptable to the injunction of sharia (Zafar et. al.,2015). The sharia advises the creditor to ease up the payment terms and due date until the debtor is in a comfortable position to repay the loan. If the debtor is still unable to repay the loan, then the amount of loan is considered as charity. Now, the concern is that dishonest SME owners can use it to their own benefit and avoid repaying QH loans as they know that they are not legally bound to repay the principal amount of loan. In this case, the guidelines by the Holy Prophet should be used for the recovery of a QH loan. Abu-Huraira (Sahih-Al-Bukhari No. 580) narrates:

The holy Prophet once looked at the Mountain of Uhud and said that, If the whole of mountain turns into gold, I would not keep even a single Dinar for more than 3 days except the amount, I have to repay my debt.

Following the above Hadith, if the SME doesn't repay the debt intentionally, it is subjected to harsh punishment. However, those SMEs who are actually not in a position to repay must be duly taken care of, as it is the duty of the Islamic state to safeguard the interest of the poor and needy. People need to be educated more on the need to repay their loan as soon as possible as the Prophet once said-

“Best among the people is one who pays his loan in a handsome manner”

In Summary, with Covid-19 being a pandemic with varied negative consequences, relaxation must be given to the borrowers as per the rules laid down by the sharia. In addition, QH loans should be classified into long-term and medium-term loans and the due dates should be fixed accordingly. It is recommended that the maximum duration for a loan should be from 6 years to nine years. The short-term and medium-term loans should be provided to the SMEs which have small capital requirements whereas long term loans should be provided to the SMEs with large capital needs after due verification.

3. Proposed System and Methodology

Artificial Intelligence has been the conversation piece among computer scientists and non-IT people since the early stage of computer inventions. The history of Artificial Intelligence as an academic discipline can be traced back to 1955. Although not a very successful academic discipline back then, inventors have been trying since (Russell & Norvig, 2003). The overwhelming results of those efforts have been seen in the last couple of

decades. As computing power has increased, the intelligence capability of computing machines has also increased. A machine is considered intelligent if it can learn from the experience and from its environment and improve the likelihood of achieving its objectives or completing its tasks successfully (Russell & Norvig, 2003; Poole et. al., 1998). At the present time, the use of artificial intelligence can be found in a variety of tasks such as the automated translation of one spoken language text to another spoken language text (Khan & Mishra, 2011; Shahnawaz, 2019), understanding the sentiments and opinions of internet users through their social media posts and reviews posted on different e-commerce websites or on micro-blogging platforms (Shahnawaz & Mishra, 2017), automated conversation responsive bots for customer services (Khan & Rabbani, 2020), Blockchain (Rabbani, 2020a), Fintech, self-driving cars, improving machine translation outputs (Shahnawaz & Mishra, 2013, Khan et. al., 2018) and many more. AI machines use a variety of algorithms to successfully complete their tasks or achieve their objectives. These algorithms are developed using a variety of approaches such as case-based reasoning, artificial neural network, statistical approaches, rule-based approaches and many more techniques (Shahnawaz & Mishra, 2015).

The proposed Qard Al-Hasan Lending (QAL) model (see figure 1) uses artificial intelligence and its subfield machine learning and natural language processing to develop a Fintech model for bringing together a small and medium enterprise (SME) (borrower) which is going through bad financial times because of the external factors arisen after a natural disaster such as flood or a pandemic like COVID-19 or riots etc. and a person or investor who is willing to help (lender). The proposed model is compliant with Islamic principles and follows sharia law in its implementation. As discussed earlier, *Qardh-Al-Hasan* is a way of helping needy people or small businesses (borrowers of the funds) in which the lender does not need any guarantee or contract or benefit from the borrowers. However, as per Sharia law, it is mandatory that both the borrowers and the lenders shall follow Islamic principles, the borrower shall utilise the borrowed funds as per sharia law and the lenders shall also ensure that those funds are earned through permissible means as per Islamic principles.

Figure 1. Qard AlHasan Lending Model

The QAL Islamic Fintech model uses natural language processing and a machine learning-based recommender system for recommending the interested profiles to the borrowers and lenders. These recommendations are generated with the help of a machine learning and natural language processing-based automated recommendation system. Natural language processing (NLP) is the subfield of computer science which is used to process the natural language (such as English) text. Some of the application areas of natural language processing are machine translation (Khan & Usman, 2019), sentiment analysis (Shahnawaz & Astya, 2017), conversational chatbots (Khan & Rabbani, 2020), etc. The most popular recommender systems are the ones used in recommending music and videos on websites such as YouTube, Netflix or on the recommender services on e-commerce websites such as Amazon, recommendation service or content recommendation services on social media platforms such as Facebook, etc.

The QAL Islamic Fintech model uses a recommender system for recommending the profiles and projects of the potential parties who need each other. The recommender system analyses the interest areas provided by the lenders and the verified proof of needs submitted by the borrowers. On analysis, the system generates a ranked list of recommendations. These recommendations are ranked based on similarity indexes. The higher the similarity index, the

higher the rank of the recommendation. Ranks of the recommendations are calculated automatically by using machine learning and natural language processing based on various factors such as the interests of the lenders and borrowers, the features and types of project and the amount of funds, etc. The rank is not a static number and is calculated separately for each user. For example, a lender may rank higher in one borrower's list and lower on another borrower's list because of the type of project, interests and the amount of funds and a few other contributing factors. The same analogy applies to the borrowers. A borrower might appear on the top of the recommendation list for one lender and on the bottom of the recommendation list for another lender based on the similarities between the two profiles. Apart from these lists, users can also search and browse to find suitable profiles to connect with. The recommender system generates separate lists for the borrowers and the lenders and each user can access these recommendations for their further actions. The lenders use these profiles to select the borrowers which match with their interests while borrowers use these recommendations to see the potential lenders and may communicate with them to provide more details if the lenders need to be satisfied before providing any funds.

One of the most important conditions to use QAL model is to agree to the Sharia rules and principles. The users can register with the platform only if they agree to utilise the services as per Islamic principles. When a borrower user raises a request for the need of funds, the user will have to provide proof why he/she requires funds. In addition, the user will have to mention specifically if the funds raised will be utilised as per sharia principles. All the submitted proof will be verified to make sure that everything is as per Islamic principles. Once the request is approved by the QAL platform, it is made visible to other users who are willing to help (lenders). Lenders can set their preferences for the type of help they are interested in such as helping a business that has been badly hit because of the crisis such as COVID-19 or because of communal riots or natural disasters such as floods etc. Borrowers also have the option to create their own interest fields which are verified by the QAL system if they are legitimate and conform to Sharia law. The proposed system uses natural language processing and machine learning in understanding the semantic behind the interests of the lenders and recommends the profiles and lists of the needs accordingly. Once the lender is satisfied with the claims made by the borrower, he/she can agree to transfer the funds. However, the lenders also have to declare that the funds have been earned through means which are permissible as per sharia law. The QAL records the transactions and saves it for future use. It can be used as an authentic reference for verifying details such as the date of repayment.

The QAL platform has three primary modules that are needed; the verification module, the recommender system and the transaction & communication manager. The functions of these modules are described below:

Need verification Module: This module is responsible for verifying the borrower's needs and provides the result in one of three categories; valid, invalid and incomplete. The Need verification module uses the sharia-compliant agreement, proof of need submitted by the borrower and the borrower's profile as input to the system. It collects and processes all the input to provide a decision on the need. The sharia-compliant agreement is verified if the user has agreed to all the terms and conditions and is willing to comply as per the Islamic financial principles. If there are any discrepancies and the user does not agree with all the rules mentioned in the agreement, his/her application is rejected without any further processing. The borrower's profile is updated after a decision on each of the requests. Every invalid request made by the borrower decreases the credibility of the borrower. The credibility score is displayed as an integral part of the borrower's profile and is used as an important criterion for funding by the lender. The textual proofs submitted by the borrower are processed using AI and NLP. Key phrases recognition and descriptive analysis are done using machine learning and NLP techniques. The system categorises the need request into valid, invalid or incomplete categories. If the system identifies any request which contains business activities that are not sharia-compliant it automatically categorises the request as invalid and it is not processed further. However, the valid requests are reviewed by the QAL agent to make a final decision about the borrower's need or if further information is required the need requests are categorised as incomplete.

Recommender System: Recommender systems are a type of information filtering system. They are commonly used in commercial applications for recommending the items that a user might like. QAL system uses a recommender system module to recommend the list of the relevant lenders to the borrowers and to recommend the list of the relevant borrowers and their projects/needs to the lenders. These recommendations are generated based on the preferences for needs/projects set by the lenders primarily. This module analyses the projects/needs liked by the lenders or related browsing history on the QAL platform. Key phrases and other patterns recognised by the need verification module are also used by the recommender system to generate the list of the possible recommendations. The recommender system module also uses the information recorded by the transaction & communication manager for generating the recommendation list. The generated list of recommendations is organised based on the similarity of the interests and credibility of the borrower. If two or more items

in the list have the same similarity index, then the profile/item that has a high credibility score is ranked higher. The recommender system module is also used to recommend the list of lenders to the borrower as well.

Transaction & Communication Manager: The Transaction & communication manager module manages and records all the transactions and communications on the QAL platform. When a borrower is interested or willing to collaborate with a lender, he can directly send a request for collaboration to the lender. The lender can accept or reject the request. The rejected collaboration requests decrease the rank in the recommendation lists for each other (the lender and the borrower). On successful collaboration between the lender and the borrower, this module records this as a transaction and generates a unique code for the collaboration. All the information of any further communication and/or financial transactions are linked to this unique code. The lender and the borrower can set up the terms and conditions of the collaborations and store them using the collaboration code. These terms and conditions are useful for resolving any future conflict between the collaborating parties and also serve as reminders in case any time-based conditions have been agreed between them. For example, if the lender agrees that he/she will provide the funds on a specific date, then the lender will be notified by the transaction & communication manager. This also applies to the borrowers as well. For example, if the borrower has agreed to return a specific amount from *Qardh-al-Hasan* on a specific date then this module will send a reminder to the borrower in advance. However, these can be configured based on user preferences. Thus, the QAL records the transactions and saves them for future use such as knowing when the borrower is going to pay. In this way, it can be used as an authentic reference.

4. Results and Discussion

Due to Covid-19, unemployment rates are increasing very rapidly across the globe. This is primarily because businesses are shutting down or at least scaling down their operations. Small and medium enterprises, which are the largest employer, have been hit the hardest. As most of these SMEs run with limited funds and rely on regular cashflows, these businesses are affected the most by the pandemic and subsequent lockdown. SMEs are confronted with the problem of crippled cash flows and a shortage of credit and manpower. Many of these organisations are in urgent need of funds for their survival and to restore their operations back to normality. However in most cases, the normal loan processing takes time and on top of it, many SMEs are not in a condition that they can be given a loan by the financial institutions. Therefore, the proposed *Qard Al-Hasan* model is a silver lining for these dying SMEs.

The proposed model does not add any additional financial burden on the organisation and helps them to raise an interest free loan. Another advantage of the *Qard Al-Hasan* is that there is no fixed monthly payment unlike a normal loan. In a normal loan system, the borrower has to pay monthly instalments (mostly) along with interest which is an additional burden on the borrower. Many borrowers, individuals or business enterprises are not able to bear this burden which ultimately ruins them. To overcome this kind of situation, the *Qardh-Al-Hasan* model will prove to be very useful as it will help the crisis hit organisations to raise funds without interest and without putting any additional regular burden on the organisation. The QAL model brings together needy borrowers and lenders who are willing to help without any strings attached. The proposed artificial intelligence, machine learning and natural language processing based Islamic FinTech model will prove to be a landmark for social and sustainable finance in fighting the adverse effects of a crisis like COVID-19 on small and medium businesses.

5. Conclusion and Future Work

Fintech solutions have become an inseparable part of our lives. There has been an increment of 70% in usage of the FinTech apps during the COVID-19 crisis. The impact of this sort of crisis would be seen for a longer period. Small and medium scale enterprises and poor individuals are the most affected mainly because of the type of business processes and cash flows which almost freeze in these kind of circumstances. However, Islamic finance has many noble and practical solutions to combat crises like COVID-19. *Qardh-Al-Hasan* is one such beautiful concept in Islamic finance. Despite the huge potential of *Qardh-Al-Hasan* to help the poor and vulnerable sections of society, it has remained under used when compared to the other financing methods in Islamic finance. There are many individuals and SMEs affected by COVID 19 who are either not eligible to receive Zakat or they don't want to receive Zakat due to other reasons. *Qardh-Al-Hasan* can solve the problems of such individuals and SMEs without laying any additional financial burden on them (Hassan & Ashraf, 2010). This *Qardh-Al-Hasan* can be given by Islamic banks, rich individuals, governments and private organisations. To make *Qardh-Al-Hasan* a success in the present scenario of social distancing, we have proposed an AI based Fintech model which can prove to be a revolutionary solution for resolving the financial crisis of SMEs and poor individuals. Researchers are working in the direction to further improve the proposed system and also to include the poor and needy people as borrowers who are the primary victims of any crisis arising out of natural disasters, pandemics, riots or wars. The future work will be in the direction of extending the model by inclusion of Zakat along with *Qardh-Al-Hasan* to support and uplift the victims of the crisis more effectively.

References

- Abdullah, M. A., & Owolabi, Y. M. B. (2015). *Small and medium enterprises in Muslim countries*. IIUM Press.
- Ayyagari, M., Demirgüç-Kunt, A., & Beck, T. (2003). *Small and medium enterprises across the globe: a new database*. The World Bank.
- Čihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, 38(2-3), 95–113.
- Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. The World Bank.
- FCCIB (2020). Gulf countries pledge over \$120bn stimulus to combat corona fallout. <https://www.fccib.net/news/n/news/gulf-countries-pledge-over-120bn-stimulus-to-combat-corona-fallout.html>. Accessed on 05/04/2020.
- Fink, D. (1998). Guidelines for the successful adoption of information technology in small and medium enterprises. *International Journal of Information Management*, 18(4), 243–253.
- Haider, M., Khan, S., Rabbani, M. R., & Thallasinos, Y.E. (2020). 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. *International Journal of Economics and Business Administration*, 8(2), 348–361.
- Hassan, M. K., & Ashraf, A. (2010). An integrated poverty alleviation model combining zakat, awqaf and micro-finance. In *Seventh International Conference–The Tawhidic Epistemology: Zakat and Waqf Economy*, Bangi, Malaysia (pp. 261-281).
- Islamic Development Bank (2020). President of the Islamic Development Bank Group: Covid-19 and Micro, Small and Medium Enterprises, Saving the Global Economy from the Pandemic: Available at; <https://www.isdb.org/news/president-of-the-islamic-development-bank-group-covid-19-and-micro-small-and-medium-enterprises-saving-the-global-economy-from-the-pandemic>. Accessed on 4 April, 2020.
- Khan, S. and Rabbani, M.R., (2020a), Artificial Intelligence and NLP based Chatbot as Islamic Banking and Finance Expert, *International Journal of Information Retrieval Research (IJIRR)*, *Special Issue On: Optimization and Convergence of Machine Learning Algorithms for Leveraging IoT, Block chain and Artificial Intelligence*.
- Khan, S. N., & Usman, I. (2019). A model for English to Urdu and Hindi machine translation system using translation rules and artificial neural network. *The International Arab Journal of Information Technology*, 16(1), 125–131.
- Khan, S., & Mishra, R. B. (2011). Translation rules and ANN based model for English to Urdu machine translation. *INFOCOMP*, 10(3), 36–47.
- Khan, S., Mir, U., Shreem, S. S., & Alamri, S. (2018). Translation Divergence Patterns Handling in English to Urdu Machine Translation. *International Journal on Artificial Intelligence Tools*, 27(05).
- Man, T. W., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, 17(2), 123–142.
- Mishkin, F. S. (2009). Is monetary policy effective during financial crises? *American Economic Review*, 99(2), 573–77.
- Nieto, M. J., & Fernández, Z. (2005). The role of information technology in corporate strategy of small and medium enterprises. *Journal of International Entrepreneurship*, 3(4), 251–262.
- Pappas, V., Ongena, S., Izzeldin, M., & Fuertes, A. M. (2017). A survival analysis of Islamic and conventional banks. *Journal of Financial Services Research*, 51(2), 221–256.

- Poole, D., Mackworth, A., & Goebel, R. (1998). *Computational Intelligence: A Logical Approach*. New York: Oxford University Press. ISBN 978-0-19-510270-3.
- Rabbani, M. R. (2020a). The competitive structure and strategic positioning of commercial banks in Saudi Arabia. *International Journal on Emerging Technologies*, 11(3), 43–46.
- Rabbani, M. R., & Khan, S. (2020b). FinTech, Blockchain and Islamic Finance: An Extensive Literature Review. *International Journal of Economics and Business Administration*, 8(2).
- Russell, S. J., & Norvig, P. (2003). *Artificial Intelligence: A Modern Approach (2nd ed.)*, Upper Saddle River, New Jersey: Prentice Hall, ISBN 0-13-790395-2.
- Sa'ad, A. A., & Pitchay, A. B. A. (2020). Financing SMEs Through the Islamic Qard al-Hasan: A Proposal of Islamic FinTech Interest-Free Lending for Government Initiatives. In *Impact of Financial Technology (FinTech) on Islamic Finance and Financial Stability* (pp. 54-64). IGI Global.
- Selim, M., & Hassan, M. K. (2020). Qard-al-Hasan-based monetary policy and the role of the central bank as the lender of last resort. *Journal of Islamic Accounting and Business Research*.
- Shahnawaz, K. & Astya, P. (2017). Sentiment analysis: Approaches and open issues. *2017 International Conference on Computing, Communication and Automation (ICCCA)*, Greater Noida, 2017, pp. 154–158. doi: 10.1109/ICCA.2017.8229791.
- Shahnawaz, K. & Mishra, R. B. (2013). Rule-based approach for handling of case markers in English to Urdu/Hindi translation. *International Journal of Knowledge Engineering and Soft Data Paradigms*, 4(2), 138–165., Inderscience Publishers, doi: 10.1504/ijkesdp.2013.058128
- Shahnawaz K., & Mishra, R. B. (2015). An English to Urdu translation model based on CBR, ANN and translation rules. *International Journal of Advanced Intelligence Paradigms*, 7(1), 1–23.
- Shahnawaz, M. R. (2011). ANN and rule-based model for English to Urdu-Hindi machine translation system. In *Proceedings of National Conference on Artificial Intelligence and agents: Theory & Application (AIAIATA 2011)* (pp. 115-121).
- UN(2020). Coronavirus pandemic: UN report claims nearly 25 million jobs could be lost worldwide: Available at; <https://www.msn.com/en-in/money/news/about-25-million-jobs-could-be-lost-worldwide-due-to-coronavirus-warns-un/ar-BB11oX20>; Accessed on 4 April, 2020.
- Usmani, M. T. (2008). *An Introduction to Islamic Financial System*, Maktaba Maariful Qurān, Karachi, pp. 10-221.
- Uygur, S. (2009). The Islamic work ethic and the emergence of Turkish SME owner-managers. *Journal of Business Ethics*, 88(1), 211–225.
- Worldbank (2020). Small and Medium Enterprises Finance. Available at; <https://www.worldbank.org/en/topic/smefinance>; Accessed on 4 April, 2020.
- Zafar, M. A., Khan, K., Roberts, K. W., & Zafar, A. M. (2015). Local agricultural financing and Islamic banks: is Qard-al-Hassan a possible solution? *Journal of Islamic Accounting and Business Research*.
- Zauro, N. A., Saad, R. A. J., & Sawandi, N. (2016). The moderating effects of financial inclusion on Qardhul Hassan financing acceptance in Nigeria: a proposed framework. *International Journal of Economics and Financial Issues*, 6(7S).