

Big Data, Islamic Finance, and Sustainable Development Goals

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ABSTRACT. The adoption of the 2030 sustainable development goals (SDGs) by the UN member nations is of great importance. These goals seek to ensure that no single individual is left behind, and everyone is carried along. Key to achieving these goals is to ensure the availability of data and skills necessary for interpreting such data. Paucity of data is a major issue faced by several developing countries towards achieving the sustainable developing goals. Non-traditional data sources can augment and compliment the traditional data sources in planning and monitoring the implementation of the SDGs. This paper has sought to look and capture the application of big data in sustainable development goals and its impact on the Islamic finance industry.

KEYWORDS: Big data, Islamic finance, Sustainable development, Data analytics.

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KAUJIE CLASSIFICATION: H52, H57, I43

1. Introduction

Jack Reardon's lead paper on platform capitalism (Reardon, 2020) is very interesting. Reardon is a very knowledgeable scholar in the field of economics with several publications and years of teaching experience. He believes in the need for a reform of mainstream economics and the way it is taught. He thinks that students are now being taught to solve today's problems with yesterday's solutions.

The discussion paper started by giving a definition of platform capitalism in which Reardon highlighted to the ambiguity in literature regarding whether "if a platform is a firm, or if a platform is an arrangement used by a firm to achieve its objectives" (p. 61). This assertion is important as the term platform is used by almost everyone nowadays and in different context.

Reardon states that platform capitalism is not a new system, but a part of capitalism as it emanated from it. Yet, several differences between platform capitalism and traditional markets exist. The author showed that unlike the traditional markets which are of different sizes, platforms are intrinsically huge, monopolistic, and powerful. Data, according to him, is of high importance to platforms in their quest for more dominance, power, and growth (pp. 61-62).

Reardon believes that platform capitalism has not only brought back capitalism from death after the 2007-2009 recession, but it has also given it impetus and strength and this could act as a constraint towards achieving sustainability and addressing the menace of that capitalism. The author sees big data, platforms, and the internet of things (IoT) as three sides of the same coin (p. 62).

The author proffered some solutions on addressing the issue of platforms. One of those solutions is to regulate platforms (p. 63). This has been gaining momentum ever since the 2016 US election in which Data Analytica used the data of millions of Americans to generate personalized advertisement in order to induce them to vote for a certain candidate. Facebook has been at the receiving end of most of the criticism as many people believe that the company did not do much in curbing the spread of fake news.

2. Big Data and Big Data Analytics

2.1 Big Data

The advent of the internet, emergence of social networking sites, sensor networks, healthcare applications, and many other companies has led to the generation of drastic amount of data which are both structured and unstructured (Jain, Gyanchandani, & Khare, 2016, p. 1). The enormous data that is generated by these various sites and at an astronomical speed is termed as big data. Big data could be defined as "a new generation of technologies and architectures designed to economically extract value from very large volumes of a wide variety of data by enabling high-velocity capture, discovery, and analysis" (Furht & Villanustre, 2016, p. 5). Hence, big data can have the following characteristics: high volume, high velocity, and high variety.

Volume: There is huge amount of data that has been created over the years. According to Jacobson (2013, para. 1), 90% of the data in the world today has been created in the last two years and that 2.5 quintillion bytes of data is created every day. Companies can gain a lot of insights from this generated data. Companies gather data from different sources such as social media, mobile networks, digital videos, and downloads.

Variety: There are different types of data and this data can be structured or unstructured in the form of audio, texts, and other forms.

Velocity: A minimal delay could be costly. Therefore, real-time data is required.

2.2 Big Data Analytics

Big data analytics refers to the use of analytics techniques to understand and make use of the information retrieved from various sites and sources and in different sizes from gigabytes to zettabytes ("What is big data analytics?", n.d., para. 1). Analysis of data allows companies to make timely and informed decisions about their business activities. The development of data analytics represents an opportunity for businesses which can now take advantage of these huge data to improve on their service delivery.

For example, Amazon keeps track of customer purchase history and offers them suggestions tailored to their needs. Marketing and advertisement companies use consumers' web history to send targeted advertisements.

2.3 Big Data from an Islamic Perspective

Data analytics is neutral from an Islamic perspective as it is regarded as a means to an end. This categorization falls under the realm of the permitted and allowed from an Islamic perspective. A famous *fiqh* maxim holds that “*al-wasā'il laha aḥkām almaqāsid*” (the ways and means take on the same ruling as the actual objectives). So, the ruling of data analytics and how data set are processed and used will determine its Sharī'ah ruling. For example, if this data is used for a social cause such as combating climate change, addressing poverty in the world, and spreading awareness among the population, then this will be regarded as public benefit (*maṣlahah*). On the other, if data is mined and obtained illegally by transgressing upon the privacy of people without their consent or knowledge, for personal gain, then this clearly goes against the teachings of Islam. A clear example of this is the proliferation of sextortion and cyber bullying in India. Images and videos of women in compromising situations are taken and circulated on the internet. Therefore, we need to balance the benefits accrued from the use of big data and the harms that result from its misuse to arrive at a definitive Sharī'ah position.

3. Big Data and Sustainable Development Goals

3.1 Big Data and Poverty

According to the world bank, the percentage of people living in absolute poverty has declined to 10 percent of the total world's population. This puts the number of people living on less than \$1.90 a day at 736 million. The world bank also pointed to the fact that this momentum has decreased over the past few years raising concern about the ability of achieving the goal of ending poverty by 2030 (World Bank, 2018, p. 1, 3). The slow achievement of the fight against poverty can be contributed to several factors and one of the most important factors is the inadequate data on poverty.

Big data can complement the traditional mode of monitoring and collecting data. Generating poverty

maps constitutes the first step towards poverty alleviation. Traditional modes of generating such maps is inefficient as it relies heavily on nationally represented household surveys which are both time consuming and require huge manpower (Pokhriyal, Dong, & Govindaraju, 2015, para. 4). Call Detail Records (CDRs) obtained from mobile phones can be used to generate a more accurate poverty map and the distribution of poverty. A study by Hernandez, Hong, Frias-Martinez, Whitby, and Frias-Martinez (2017) showed that CDR-based research method has the potential to replicate the traditional forms of data collection. The study showed that the CDR method is less costly and provides a more accurate method of predicting urban and total poverty in Guatemala. Pokhriyal et al., (2015) also used CDR to generate a better poverty map in Senegal. International organizations such as the UN can also benefit from CDR to construct a more accurate picture of poverty.

3.2 Big Data and Climate Change Mitigation and Adaptation

Climate change is regarded as one of the pressing issues the world is facing. The UNFCCC (United Nations Framework Convention on Climate Change) defined climate change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (United Nations, 1992, para. 2). Human emission of greenhouse gases (GHGs) is widely believed by the scientific community as the reason why the earth is warming (Henderson, Reinert, Dekhtyar, & Migdal, 2018, p. 1).

The impact of climatic changes is already being felt across different segments. There has been an increase in extreme wave of summer heat in the MENA region. Studies have shown that scarcity of water, another major issue in the region, is likely be exacerbated and increased in the future (Lange, 2019, p. 1). The global heat could also bring extreme drought and increased flooding in Africa. The Horn of Africa has witnessed below average rain fall in the past few years raising concern about food security in the region. Other African countries have witnessed excessive rainfall that has swamped several villages leading to the accumulation of huge losses and

damages to crops and corn yield. Other potential effects of climate change include risk to health, wildlife, and security.

The mitigation of the negative effect of climate change will require concerted efforts from different stakeholders and utilization of modern technology. There must be a paradigm shift in the way businesses and governments conduct their activities. Areas of synergy between the sovereign nations and international organizations such as the UN needs to be strengthened and the 2015 Paris agreement which seeks to keep global warming below 2% is a great step towards achieving that goal.

Although climate science has always used huge datasets to understand how the climate system functions, it has been slow in utilizing information generated by the use of digital devices and services (Faghmous & Kumar, 2014, p. 155). Data scientists have conducted exhaustive data analytics of large data sets in areas of natural disaster, weather forecast, and energy efficiency (Hassani, Huang, & Silva, 2019, p. 1).

The emergence of various platforms has helped address several climate change issues. Companies such as Uber, Airbnb, and other sharing platforms which offer owners the ability to share their idle resources are believed to help reduce emissions. Sharing of assets is likely to reduce resource use, such as water, energy, and energy waste (Gössling & Hall, 2019, p. 84). Uber which is the largest taxi company in the world does not own a single vehicle. Studies have also shown that users of Airbnb platform tend to use less of electricity and water as compared to users of regular hotels (Airbnb, 2018, para. 5).

3.2.1 Role of Islamic Finance in Climate Change Mitigation and Adaptation

Science has shown us that climate change is a result of our actions. The classical conventional view which has always equated wealth and success with material possession, has left a great toll on the environment.

Several Islamic teachings and principles help achieve both climate change mitigation and adaptation strategy. Muslims are obligated to strike a balance and seek moderation in their consumption of goods and avoid the two extremes of extravagance and parsimony. This will likely lead to a reduction in

the unsustainable practices of consumption and production of goods and services which have a negative impact on the environment. Additionally, the Qur'ān (57:7) states that humans are vicegerents and trustees of Allah on earth and that everything belongs to Him alone. The viceregency principle means that humans can enjoy all the beauties of this earth and the natural resources bestowed to them by Allah, but this must be in accordance with the guiding principles set by Allah. Therefore, any deliberate destruction of Earth and natural resources is categorically prohibited.

Islamic finance has in its arsenal tools and instrument that could help address climate issues. The prohibition of interest and excessive leverage can help address several root causes of climate change. Money will not be created out of thin air and investment decisions will be linked to real market activity. Islamic banks can invest in renewable energy which are avenues that require long term capital and are capital intensive. Islamic social finance institutions of *zakāh*, *waqf*, and *ṣadaqah* can be used to help those affected by floods and droughts in different parts of the world.

The current practice of Islamic finance has been far from these ideals. Most of the Islamic screening in capital markets only use negative screening to exclude companies that engage in impermissible activities. Positive screening of companies and industries involved in high carbon emissions and contributing to environmental degradation, is rarely done.

The contribution of Islamic financial institutions to the environmental agenda will likely depend on how the broader goals of *maqāṣid al-Sharī'ah* are implemented. Failure to broaden the application of *maqāṣid al-Sharī'ah* to include environmental issues is regarded as one of the reasons for the failure of Islamic banks in adopting ESG (environmental, social and governance) goals. Moving forward, Islamic scholars need to inculcate environmental issues in their decision making (Ahmed, Mohieldin, Verbeek, & Aboulmagd, 2015, p. 8).

3.3 Big Data and Financial Inclusion

Many of the population of low-income countries are excluded from formal financial institutions due to a limited number of branches, automatic teller machines, high costs of servicing small deposits and loans, limited collateral assets and credit information (Morgan & Pontines, 2018, p. 114).

Big data can help make financial services more accessible to the unbanked population. The increase in the number of mobile phone users around the world acts as an impetus towards greater financial inclusion in society. A large number of poor populations have mobile phones which they use to make calls and send text messages. It is reported that 650 million people in India have a mobile phone and about 250 million have access to the internet and use social media and leave a huge digital footprint (Costa, Deb, & Kubzansky, 2015, p. 49).

Platforms such as M-pesa have greatly contributed to financial inclusion in Kenya and other developing countries by providing millions of unbanked rural and poor population access to several financial services.

A Chilean company called Tiixa in 2010 started offering online balance advance services to prepaid mobile subscribers to fund their texts, calls, and downloads when their data runs out. They apply data mining to analyze clients' millions of recharge history and consumption, and segment customers accordingly in an objective and precise manner (Herrera, 2014, para. 3).

Microfinance institutions have tried to address financial inclusion concerns especially with regards to people who are self-excluded from financial institutions for religious reasons. Demirgüç-Kunt, Klapper, Singer, Ansar, & Hess (2018, pp. 40-41) reported that 6% percent of adults without a bank account cited religion as the main reason and that most of them are in Muslim majority countries. Others are considered un-bankable by the conventional institutions due to a lack of proper collateral and policies such as "know you customer".

Big data can augment the work of these microfinance institutions by incorporating digitization and allowing them to make credit decisions based on data. Microfinance institutions can use mobile calls data and browsing history to assess the customers' creditworthiness and risk. So, this data will be used to see if the microfinance customer will be able to repay the loan. The microfinance institution does not use the raw data obtained, but rather takes the behavioral pattern of the customer from such data.

Big data will also provide microfinance institutions with enough information about the customer's

product need. Products offered by the microfinance institution will coincide with the need of the consumer. AliFinance which was established in 2011 to provide loans to vendors on the Taobao and Alibaba platforms, serves as a good example of using big data for microfinance. A vendor must trade on the Alibaba and Taobao platforms for at least three months to qualify for a loan. Alibaba uses the data gathered of the vendor within these 3 months to develop a credit scoring model which taps over 1000 data sets in order to understand the behavior and characteristics of the borrower. Loans are not collateralized or secured, and the parties in the loan agreement do not meet face to face as everything is done on the platform online which helps reduce costs and risk (Shrader, 2013, para. 8).

Small and medium-sized enterprises (SMEs) are also major economic agents that contribute to economic growth and financial inclusion. Up to 45 percent of employment and 33 percent of national income is contributed by the formal SMEs in emerging countries and this number could be higher if the informal sector is included. SMEs are also critical to the economy of western developed countries as they represent 99% of all jobs in the European Union and create 85% percent of new jobs in the region (Elasrag, 2016b, p. 437, 442).

Despite the importance of SMEs in job creation and economic growth, SMEs are facing great challenges in raising financing necessary to invest and create jobs. A joint International Finance Corporation and McKinsey study found that 85 percent of SMEs suffer from credit constraints and 70 percent do not use any external credit at all (Stein, Goland, & Schiff, 2010, p. 3).

SMEs can take advantage of the huge amount of data generated by them to have a better understanding of their business environment. Smart companies can use MNOs (mobile network operators) to predict the exact number of customers they are likely to use and therefore the management can plan on strategies to retain these customers (Sen, Ozturk, & Vayvay, 2016, p. 162).

Platforms such as e-Hub provide farmers in developing economies with access to market to sell their produce and mobilize resources.

4. The *Halāl* Industry and Big Data

The *halāl* industry is an important economic segment that has witnessed great growth over the past few years. It's estimated to be around 2.3 trillion dollars with a growth rate of around 20% (Elasrag, 2016a, p. 4). The industry has grown from the food sector to other important sectors such as tourism, media, clothing, cosmetics, and pharmaceuticals. Growth of this industry has brought to the forefront several key issues and challenges such as the lack of uniformity in *halāl* standards, the absence of any viable international schemes to accredit *halāl* certification bodies, and lack of funding (Elasrag, 2016a, p. 16).

Big data could contribute significantly towards further development of the *halāl* industry. Historically, managers rely on the work of *halāl* inspectors and auditors to ascertain the Shari'ah compatibility of a food establishment to Shari'ah regulations and standards, but the dynamics and often disruptive world of business shows the inefficiency of such regulatory methods as they often rely on historical data and a snap-shot of a firm's position in a point in time. Armed up with enough and up-to-date data, executives can make a better-informed decision on the compliance of any food establishment or *halāl* product. AI (artificial intelligence) and mobile data can be employed by the *halāl* industry to better extend its

growth. Different platforms can also capitalize on the existing funding gap in the *halāl* industry to offer financing to organizations looking to scale-up their activities (Tan, n.d.). Blockchain has the potential of bringing more transparency to the entire process. Using blockchain technology, someone in Qatar can easily trace a meat slaughtered in Australia right from the abattoir all the way to Qatar in real time and at minimal cost.

5. Conclusion

In my opinion, big data and platform are critical and essential to achieving sustainable development goals. A proper regulation of the activities of platforms can address their several demerits. I contend that the prospect of regulating these platforms is difficult due to their huge size and the huge amount of money they spend in lobbying. However, it can be achieved if there is a strong will and determination by the regulators. I also believe that big data can help with the development of the Islamic finance industry. Better utilization of data analytics by Islamic banks would enable them to offer improved personalized products and services that meet the specific needs of customers. Finally, recent innovations in the Islamic finance industry, such as the Islamic Robo-Advisor by Wahed invest, are signs of the promising and bright future ahead for the Islamic finance industry.

References

- Ahmed, H., Mohieldin, M., Verbeek, J., & Aboulmagd, F. (2015). *On the sustainable development goals and the role of Islamic finance* (World Bank Policy Research Working Paper No. WPS7266). Retrieved from: <https://bit.ly/2Qsb6ya>
- Airbnb. (2018, April 19). How the Airbnb Community Supports Environmentally-Friendly Travel Worldwide. Retrieved from: <https://bit.ly/2MFavYC>
- Costa, A., Deb, A., & Kubzansky, M. (2015). Big data, small credit: The digital revolution and its impact on emerging market consumers. *Innovations: Technology, Governance, Globalization*, 10(3/4), 49-80.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). *The global finindex database 2017: Measuring financial inclusion and the fintech revolution*. Washington, DC, USA: World Bank.
- Elasrag, H. (2016a). *Halal industry: Key challenges and opportunities* (MPRA Working Paper No. 69631). Retrieved from: <https://bit.ly/36ajBo3>
- Elasrag, H. (2016b). Islamic finance for SMES. *Journal of Economic and Social Thought*, 3(3), 437-453.
- Faghmous, J.H., & Kumar, V. (2014). A big data guide to understanding climate change: The case for theory-guided data science. *Big Data*, 2(3), 155-163.
- Furht, B., & Villanustre, F. (2016). Introduction to big data. In *Big data technologies and applications* (pp. 3-11). Cham, Switzerland: Springer.
- Gössling, S., & Hall, C.M. (2019). Sharing versus collaborative economy: How to align ICT developments and the SDGs in tourism? *Journal of Sustainable Tourism*, 27(1), 74-96.
- Hassani, H., Huang, X., & Silva, E. (2019). Big data and climate change. *Big Data and Cognitive Computing*, 3(1), 12. Retrieved from: <https://bit.ly/37jDMQw>
- Henderson, R.M., Reinert, S.A., Dekhtyar, P., & Migdal, A. (2018). *Climate Change in 2018: Implications for Business* (Harvard Business School Background Note No. 317-032). Retrieved from: <https://hbs.me/2Q4XauN>

- Hernandez, M., Hong, L., Frias-Martinez, V., Whitby, A., & Frias-Martinez, E.** (2017). *Estimating poverty using cell phone data: Evidence from Guatemala* (World Bank Policy Research Working Paper No. WPS7969). Retrieved from: <https://bit.ly/362A5i8>
- Herrera, M.** (2014, September 14). Leveraging Mobile Phone Data: Tiaxa's Balance Advance [Blog post]. Retrieved from: <https://bit.ly/353tpis>
- What is big data analytics?** (n.d.). Retrieved from: <https://ibm.co/37dgmwj>
- Jacobson, R.** (2013, April 24). 2.5 quintillion bytes of data created every day. How does CPG & Retail manage it? [Blog post]. Retrieved from: <https://ibm.co/352Rcz6>
- Jain, P., Gyanchandani, M., & Khare, N.** (2016). Big data privacy: A technological perspective and review. *Journal of Big Data*, 3:25. Retrieved from: <https://bit.ly/2tS2cCp>
- Lange, M.A.** (2019). Impacts of Climate Change on the Eastern Mediterranean and the Middle East and North Africa Region and the Water-Energy Nexus. *Atmosphere*, 10(8), 455. Retrieved from: <https://bit.ly/2ZDRtaA>
- Morgan, P.J., & Pontines, V.** (2018). Financial stability and financial inclusion: The case of SME lending. *The Singapore Economic Review*, 63(1), 111-124.
- Pokhriyal, N., Dong, W., & Govindaraju, V.** (2015, June 2). Big Data for improved diagnosis of poverty: A case study of Senegal [Blog post]. Retrieved from: <https://brook.gs/2SASjmH>
- Reardon, J.** (2020). Platform Capitalism, Big Data, and Data Ethics. *Journal of King Abdulaziz University: Islamic Economics*, 33(1), 59-69.
- Sen, D., Ozturk, M., & Vayvay, O.** (2016). An overview of big data for growth in SMEs. *Procedia-Social and Behavioral Sciences*, 235, 159-167.
- Shrader, L.** (2013, October 11). Microfinance, E-Commerce, Big Data and China: The Alibaba Story [Blog post]. Retrieved from: <https://bit.ly/2SARwm0>
- Stein, P., Goland, T., & Schiff, R.** (2010). Two trillion and counting: Assessing the credit gap for micro, small, and medium-size enterprises in the developing world. International Finance Corporation and McKinsey & Company report. Retrieved from: <https://bit.ly/2SBzjoo>
- Tan, M.I.I.** (n.d.). Halal and the Fourth Industrial Revolution. Retrieved from: <https://bit.ly/2F4nJdo>
- United Nations.** (1992, May 9). *United Nations Framework Convention on Climate Change*. Retrieved from: <https://bit.ly/36b6gvW>
- World Bank.** (2018). *Poverty and Shared Prosperity 2018: Piecing Together the Poverty Puzzle*. Washington, DC, USA: Author.

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البيانات الضخمة، التمويل الإسلامي، وأهداف التنمية المستدامة

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مدير قسم البحوث، كلية الدراسات الإسلامية، جامعة حمد بن خليفة، الدوحة، قطر

المستخلص. إن اعتماد أهداف التنمية المستدامة لعام ٢٠٣٠م من قبل الدول الأعضاء في الأمم المتحدة يعد من الأهمية بمكان حيث أن هذه الأهداف تسعى إلى ضمان عدم ترك أي أحد خلف الركب، وحمل الجميع. ومن أهم العناصر الرئيسية نحو تحقيق هذه الأهداف هي ضمان توافر البيانات والمهارات اللازمة لتفسير هذه البيانات. وتعد قلة البيانات وندرتها من أبرز المعوقات التي تواجهها عدة بلدان نامية نحو تحقيق الأهداف التنموية المستدامة. يمكن لمصادر البيانات غير التقليدية أن تلعب دور المساهم والمكمل للمصادر التقليدية في تخطيط ورصد تطبيق أهداف التنمية المستدامة. سعت هذه الورقة إلى البحث عن تطبيق البيانات الضخمة في تحقيق أهداف التنمية المستدامة وتأثيرها على صناعه التمويل الإسلامي.

الكلمات الدالة: البيانات الضخمة، التمويل الإسلامي، التنمية المستدامة، تحليل البيانات

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