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Studies and Researches

Role of Digital Economy in Realization of Inclusive Growth

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Abstract

Since the 4th Industrial Revolution (4IR) digital technology has been playing an important role in economic growth leading to a continuous decline in the level of extreme poverty across the globe. While there are opportunities of using the digital revolution to promote inclusive growth, there are risks that technology could further escalate the worsening income distribution, and mitigating such risks will require establishing a sound digital infrastructure and providing digital education to all members of the society. The research adopts descriptive approach to deal with the prospect of digital technology in promoting inclusive growth and to scrutinize the features of digital economy, while it deploys critical approach to discuss the notion of inclusive growth and the ways in which the digital economy may contribute to it. Through the inductive and deductive approaches, the research analyses briefly the Islamic perspectives on digital economy, prior to conclude with the results such as the benefits of economic growth during the past century were mostly in favour of the higher income groups due to the way in which they were distributed among the factors of production and digital economy can potentially contribute to inclusive growth by breaking down some of the constraints in the traditional production process and by offering digital platforms for sharing economies and earning an income. The research proposes to carry out further inclusive innovations in the digital economy for proposing business models that may serve the economically and socially excluded.

Keywords; Inclusive Growth, Digital Economy, Fintech.

دور الاقتصاد الرقمي في تحقيق النمو الشامل

حبيب أحمد

أستاذ كرسي الشارقة في الشريعة والتمويل، كلية إدارة الأعمال بجامعة دورهام - بريطانيا

(سُلم البحث للنشر في 23/1/2020م، واعتمد للنشر في 20/2/2020م)

الملخص:

تؤدي صناعة التكنولوجيا منذ الثورة الرابعة دورًا مهمًا في النمو الاقتصادي والذي يؤدي إلى انخفاض مستمر في مستوى الفقر المدقع حول العالم. وبالرغم من وجود فرص لاستخدام الثورة الرقمية في تحفيز النمو الشامل، إلا أن هناك مخاطر تكتنفها، حيث إن التكنولوجيا قد تؤدي إلى مزيد من سوء توزيع الدخل، ومن هنا يتطلب الأمر تقليل التعرض للمخاطر بإيجاد بنية تحتية رقمية وقوية، وتوفير التعليم الرقمي لكافة أفراد المجتمع. يستخدم البحث المنهج الوصفي في تحديد إمكانات التكنولوجيا في تحفيز النمو الشامل، وبيان خصائص الاقتصاد الرقمي، كما يتبع البحث منهجًا نقديًا في مناقشة فكرة النمو الشامل وطرق تحقيقه من خلال الاقتصاد الرقمي. وباستخدام المنهج الاستقرائي والاستنباطي فإن البحث يحلل باختصار المفاهيم الإسلامية للاقتصاد الرقمي. وقد توصل البحث إلى نتائج منها أن فوائد النمو الاقتصادي في القرن الماضي كانت غالبًا في صالح الفئات ذات الدخل المرتفع بسبب الطريقة التي يتم توزيعها بين عناصر الإنتاج، وإمكانية أن يسهم الاقتصاد الرقمي في النمو الشامل من خلال كسر الحواجز الكائنة في الطريقة التقليدية للإنتاج ومن خلال توفير المنصات الرقمية لإيجاد كيانات اقتصادية مشتركة وكسب الدخل. ويقترح البحث القيام بمزيد من الابتكارات الشاملة في مجال الاقتصاد الرقمي لإيجاد نماذج أعمال تخدم كيانات مستبعدة اقتصاديًا ومجتمعياً. كلمات مفتاحية: النمو الشامل، الاقتصاد الرقمي، التكنولوجيا المالية.

1. Introduction

The world has witnessed remarkable economic growth during the 20th century which continues into the 21st century.⁽¹⁾ A key factor that led to the growth was technological development. With the dawn of 4IR in the latter half of the last century, digital technology has taken a centre stage. The revolution represents a dramatic shift from the past and is characterized by the blending of the digital with the physical and biological domains.⁽²⁾

While the overall global per-capita has risen during the past century and extreme poverty has decreased, the income inequality has also grown. Not only has the income levels of developed economies grown faster than those of many developing economies, within economies the income of the rich has increased at a higher rate compared to that of the poorer households⁽³⁾. The inequality of income has become severe recently with bulk of the benefits of growth going to the wealthier sections of the population.

The dominance of digital technology in the 4IR has the potential to further expand economic growth on the one hand, but also introduces the risk of creating more inequality on the other hand. Given the above, this paper examines the role that digital economy can play in promoting inclusive growth. The paper is organized as follows. The next section presents the features of digital economy followed by a section that discussion the notion of inclusive growth. Section 4 examines ways in which the digital economy can contribute to inclusive growth followed by a section that briefly examines the Islamic perspective on digital economy. The last section concludes the paper.

2. Digital Economy

The digital technological change in the 4IR is exponential and driving the production processes from the physical to the intangible. The digital technological development is affecting the speed, scope and systems and creating unprecedented processing power, storage capacity and access to knowledge. The result is the blurring of the virtual and physical worlds with new business models disrupting industries across the globe⁽⁴⁾.

One of the key elements of a digital economy is the change in the production

(1) IMF (2000) estimates that the world GDP grew about 19-fold between the years 1900 and 2000.

(2) Shwab, K. (2016). The Fourth Industrial Revolution: What it means, how to respond. Retrieved from World Economic Forum: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

(3) IMF. (2000, May). The World Economy In The Twentieth Century: Striking Developments And Policy Lessons". World Economic Outlook.

(4) Shwab, K. (2016). The Fourth Industrial Revolution: What it means, how to respond.

processes. The transformations in the modes of production are changing both the quantity and quality of inputs used in production processes and the composition of resources used in production is changing. The industrial era production processes that were heavily dependent on physical capital and labour have altered in the new digital age. While the need for physical capital has reduced in the production, the role of human and intellectual capital has increased⁽⁵⁾. Furthermore, information has become a key component of contemporary capital in digital firms.

Information related resources and tools include Internet of things (IoT), big data from different sources, artificial intelligence (data analytics) and machine learning, blockchain or distributed ledger technology. Information based digital artefacts and commodities require little physical components to manufacture and are easy to replicate once produced. Unlike traditional enterprises that have fixed and defined physical, spacial and temporal boundaries, information based entities have higher mobility, are more fluid and less structured. As a result, products can be created and marketed in different geographical locations at low costs.

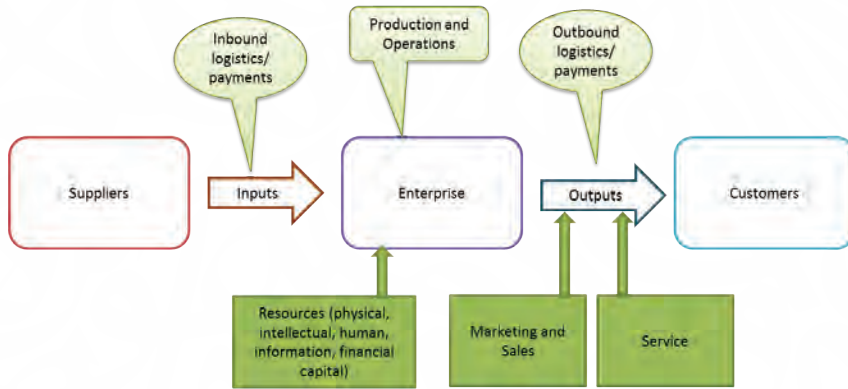
Digital technology is producing new generation of business models. Instead of inventing physical products, digital artefacts, platforms and infrastructure are created through codes and programs. The digital technology has reduced the need to have expensive hardwares to store and analyse data by providing cloud services. The use of Application Programming Interface (APIs) allows applications to interact with each other to produce digital outputs quickly and efficiently.

To understand the ways in which digital technology can affect the supply side, the various aspects of a production process can be examined. The key activities of a value creating firm involve using inputs to produce goods and services and selling these to customers. The production process would entail using different resources (physical, intellectual, human, information, financial capital) that enable the purchase of inputs from suppliers by establishing inbound logistics and selling products that would require outbound logistics of delivery. Increasing sales and customer retention would also need marketing and sales and providing after-sale services. The value creation process and the supply change of a firm are shown in Figure 1. In the 4IR era, the value creation process in terms of both production processes and supply chain is changing

(5) Haskel, J., & Westlake, S. (2018). *Capitalism without Capital: The Rise of the Intangible Economy*. Princeton University Press.

by using digital technology. Enterprises use digital technologies in different segments of the value chain to provide innovative products and services. The potential areas in which a firm can be affected by digital technology are shown in green shades.

Figure 1: The Production Process and Scope of Digitalization

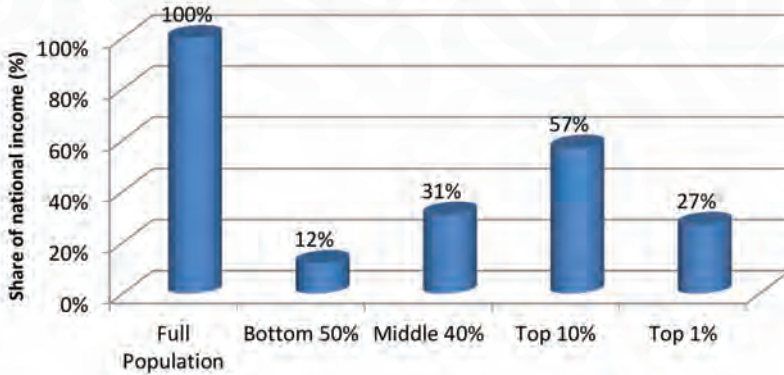


Source: Author's own.

3. Inclusive Growth

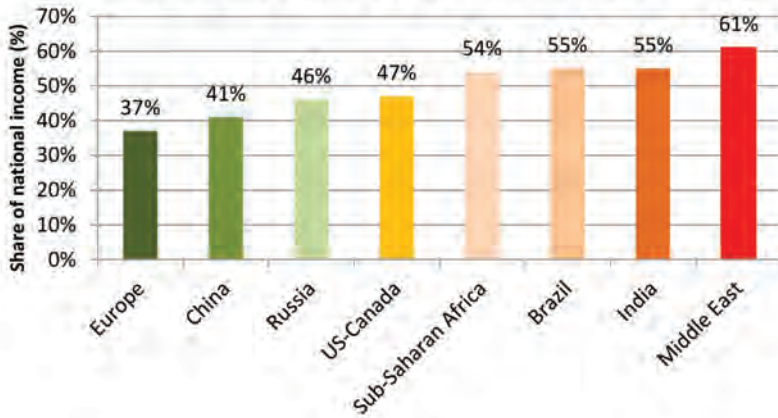
A dilemma that economies face at the macro level is the trade-off between growth and inequality. Although economic growth has reduced extreme poverty in the world, the income inequalities have risen due to disproportionate distribution of the gains of growth. Chart 1 shows the distribution of global growth among different income groups during the period 1980-2016. While the bottom 50% of the global population gained only 12% of growth, the top 10% acquired 57% of the growth during this period. More alarmingly, the top 1% of the population captured 27% of the growth benefits which is more than double of what the bottom 50% of the population got as a whole.

Chart 1: Share of Global growth captured by income groups, 1980-2016



Source: World Inequality Report 2018.

Chart 2: Top 10% income shares across world (2016)



Source: World Inequality Report 2018.

Similarly, Chart 2 shows the income share of top 10% of the population in different regions and countries of the world in 2016. While Europe appears to have the most equitable distribution of income in the sample with 37% of the

income going to the top 10% of the population, the income inequality is the worst in Middle Eastern region with the top 10% taking 61% of the income. In general, the developing world appears to have more unequal distribution of income. The above figures clearly show that in the past the growth has not been inclusive.

World Bank (undated) uses the notion of shared prosperity to identify inclusive growth in which the growth of income and well-being of the bottom 40% of the population in each country is used as a measure of inclusive growth. The ways in which this can be achieved would require understanding the dynamics of production processes that can increase the productivity and income levels of the bottom 40% of the population. A key factor determining the income distribution in an economy depends on the ownership of resources that can be used for productive purposes. While resources used to generate income and wealth include physical, intellectual, human, information, financial capital, they can be broadly classified as capital and labour. There are two ways in which the poorer sections of the population can generate income. First, poor households that do not have capital will earn their income by selling labour. Second, if they own capital they use it with labour to produce some good or service to generate income. Since the capital is expected to be small, the enterprises owned by the poor would be micro or small in size.

The issues that can explain non-inclusive growth relate to the dynamics of the economy and the constraints that poor households face. Documenting historical trends on the returns to labour and capital, Piketty (2014) shows that the rate of return on capital is higher than the rate of growth of in the aggregate income. Since growth in aggregate income is distributed among the factors of production, a higher rate of return on capital implies a relatively lower rate of growth in income for labour. Furthermore, wealthy people who hold capital tend to save a larger part of their income from capital which adds to their capital stock making it grow even more quickly than the economy. These factors lead to concentration of wealth among the higher income groups and increase inequalities of income. Thus, inclusive growth would require a more balanced distribution of growth among the owners of labour and capital.

Poorer households engaging in production face problems that limit their engagement in the economy. A key constraint they face is that they do not have access to resources that can increase their productivity levels. Economic and social inclusion are closely linked. Social exclusion entails lack of

opportunities related to participation in societal activities that adversely affects the quality of life (Part 2017: 35). Social exclusion leads to economic and services exclusion that can include not having access to quality education, health and financial services. Inclusive growth and shared prosperity would require availability of services to all segments of the population to provide them with the opportunities that can enhance their productivities and income levels.

4. Digital Economy for Inclusive growth

The past trend of non-inclusive growth raises a key question on how the digital economy can be shaped to produce a more equitable society. Referring to the 4IR, Professor Klaus Schwab, Founder and Ex. Chairman of WEF observes that “there has never been a time of greater promise, or greater peril”⁽⁶⁾. Thus, while the opportunities of digital technology can be exploited, there is also a need to manage the risks arising from it⁽⁷⁾. The role of digital technology and its impact of growth and income distribution can be studied by examining the business models, production processes and returns to owners of different factors of production. Some of the areas in which a digital economy would be able to contribute to inclusive growth are discussed below.

4.1. Building a Robust and Broad Digital Infrastructure

A prerequisite for the using digital technology for inclusive growth is that all sections of the population should have access to it. This would require, among others, widespread internet connectivity and mobile ownership. Sustainable business environment for an enabling digital economy includes supportive institutions which include telecoms companies, handset manufacturers, and other businesses such as retailers and banks/other financial institutions to help with payment systems. A national digital payment system would facilitate transactions among different parties in the economy. Some transactions such as financial sector related exchanges would also require a proper personnel ID system. Other aspects of the digital infrastructure include regulatory framework related to issues of privacy and security⁽⁸⁾.

(6) Hutt, R. (2016). 9 quotes that sum up the Fourth Industrial Revolution. Retrieved from World Economic Forum: <https://www.weforum.org/agenda/2016/01/9-quotes-that-sum-up-the-fourth-industrial-revolution/>

(7) Mehta, A., Et. al. (2018). How to Build Inclusive Digital Economies. Retrieved from OECD Development Matters: <https://oecd-development-matters.org/2018/03/01/how-to-build-inclusive-digital-economies/>

(8) Berst, J. (2016). Five secrets to building a robust digital infrastructure. Retrieved from smartcitiescouncil.com: <https://smartcitiescouncil.com/article/five-secrets-building-robust-digital-infrastructure>

4.2. Information Capital and Digital Firms

The volume of digital information available on the internet is enormous and increasing exponentially. Deloitte in its report identifies the benefits of internet connectivity consisting of increased information flows, innovation, financial capital access, entrepreneurship and labour enhancement. The study concludes that increasing the internet access for the population has huge potentials of increasing economic and social benefits. These include increasing the long-run productivity in developing countries by 25%, generating of economic activity of USD 2.2 trillion that would result in 72% GDP growth rate and creating more than 140 million new jobs. This can potentially increase the income by USD 600 per person per year and lift 160 million people out of extreme poverty. Internet can also be a tool for unlocking universal education to provide a wealth of education to 640 million additional children⁽⁹⁾.

A key problem in economic transactions is the asymmetric information that makes making informed decisions difficult⁽¹⁰⁾. Since acquiring information is costly, traditional firms fail to gather optimal information which can increase the risks and lower returns. The information-based technologies have the advantage to acquire big data and use artificial intelligence to expand their businesses. Rich personal information can be used to assess the needs of individuals and provide them with the appropriate products and services.

The first movers in the digital economy, however, benefit from increasing returns to scale which can lead to natural monopolies and making it difficult for competitors to enter the market⁽¹¹⁾. Even when smaller enterprises attempt to enter the market, the first movers could potentially buy them off to further increase their dominance in the markets. This is particularly true in collecting huge quantities of information which are then sold at a premium. These tendencies can create inequalities in digital businesses.

Given the above, there is a need to have an oversight of how personal data is acquired and used to not only protect the privacy of individuals, but also the mitigate the excessive powers that large digital firms have in controlling the manipulating information for detrimental outcomes. A sound regulatory regime to protect consumers and data governance polices to regulate access

(9) Deloitte. (2014). Value of Connectivity: Economic and social benefits of expanding internet access. Retrieved from Deloitte: <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/technology-media-telecommunications/deloitte-uk-tmt-value-of-connectivity-tmt.pdf>

(10) Park, Sora (2017), Digital Capital, Palgrave McMillan, London.

(11) Delvin, S. (2017). (In)Equality in the Digital Society. Retrieved from New Economics Foundation, London.: <https://neweconomics.org/uploads/files/Inequality-in-the-Digital-Society-Workshop-Summary-v2.pdf>

and use of information could provide a framework for mitigating the risks and enhancing the benefits of digital technologies.

4.3. Closing the Digital Divide

The consequences of digitization on human capital have couple of important implications with regards to inclusive growth. First, the introduction of digital technology uses artificial intelligence and robotics to automate many tasks that were performed by workers. This will lead to replacing human capital by machines and digital artefacts creating 'digital unemployment'⁽¹²⁾. McKinsey estimates that close to 50% of the current work tasks could be automated by using currently available technologies⁽¹³⁾. If the displaced workers do not adapt to the reality and get training to adopt new knowledge and skills, the digitalization can potentially increase inequalities.

Second, while 4IR brings forth many opportunities, a new form of exclusion can also arise in the form of digital exclusion whereby individuals do not have access to these services such as internet. As in the case of economic exclusion, digital exclusion can be a result of social exclusion that arises due to low income, education and regional and demographic factors. Thus, a key risk that can limit inclusive growth and increase inequality in the 4th IR era is the digital divide.

Those with digital knowledge skill sets will be in high demand in a dynamic and changing economy and would be rewarded with good compensations. If the skilled people needed in digital firms are limited, they would earn disproportionately higher incomes. Increases in incomes of those who have the knowledge and skills that produce the digital technologies and commodities on the one hand and the digital unemployment on the other could potentially exacerbate income inequalities in the short run.

There is a need to come up with policies that can close the digital divide for inclusive growth. This would require improving the quality of human capital by promoting technological education. Interesting, the technological literacy of people can be enhanced by using digital technologies. Once people have the minimum technological skills, the internet can be used to not only increase their digital knowledge but also to look for entrepreneurial opportunities that can enhance their income and wealth. However, at the individual level the

(12) Ibid

(13) Mehta, A., Et. al. (2018), How to Build Inclusive Digital Economies.

amount of information that can be processed is limited. While most of the information available on the internet is free, there are transaction costs to use them. Furthermore, abundance of information consumes too much attention and may go beyond the boundaries of human cognition⁽¹⁴⁾. Not only is the data in raw format, to make it useful would require extracting useful information and knowledge from it. This would require not only the knowledge and skills, but also huge computing capacities that may not be available to individuals. Thus, there may be need for structured training to enhance the skills of 'digital unemployed'. One option of doing this is to use digital technology to disseminate the knowledge in a structured, efficient and effective manner.

4.4. Expand the Sharing Economy

A novel aspect of the digital economy is the rise of platforms that facilitate the sharing economy. While there are variations in concepts and names, a sharing economy entails sharing underutilized assets which can be monetised in ways that can improve efficiency, sustainability and community⁽¹⁵⁾. The assets, that otherwise are used partially, can be shared with others through digital platforms thereby benefiting both the owners and users. By enabling individuals to monetize some of their unused assets, the sharing economy provides opportunities to increase the income levels of those who otherwise would have limited incomes derived from working only.

A feature of the sharing economy is that firms can move away from ownership of assets to buying the services that the assets provide. Using services instead of owning the assets reduces the upfront costs and adds to flexibility in operations⁽¹⁶⁾. However, the digital sharing economy is still evolving and all types of services needed by firms are not available. While the main use of sharing economy has been in the ride-sharing (e.g., Uber) and room-sharing spheres (e.g., Airbnb), there is a potential to expand the model to other productive asset classes such as machineries and transportation. This will provide opportunities to existing small and medium enterprises (SMEs) use their assets optimally on the one hand and help new enterprises to grow without large investments on the other hand.

(14) Park, Sora (2017), Digital Capital.

(15) Rinne, A. (2017). What exactly is the sharing economy? Retrieved from weforum.org: <https://www.weforum.org/agenda/2017/12/when-is-sharing-not-really-sharing/>

(16) Kay, A. (2018). Three Ways to make digital innovation a catalyst for inclusive growth. Retrieved from ey.com: https://www.ey.com/en_gl/digital/three-ways-to-make-digital-innovation-a-catalyst-for-inclusive-g

4.5. Inclusive Innovation for Inclusive Growth

Inclusive growth would need inclusive innovation that can create employment and equal opportunities, provide access to essential services, and empower the poor through education and skill development⁽¹⁷⁾. Inclusive innovations are driven by social entrepreneurs who initiate new enterprises to serve some social purpose. Ian MacMillan defines social entrepreneurship as a ‘process whereby the creation of new business enterprise leads to social wealth enhancement so that both society and the entrepreneur benefit⁽¹⁸⁾’ ⁽¹⁹⁾ defines it as encompassing “the activities and processes undertaken to discover, define, and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner.”

As indicated, a key feature of the digital economy is that the resources used in production are changing. While the role of tangible physical capital in the production process is decreasing the intangible components of capital in the form of intellectual and human capital is increasing. These changes have important implications with regards to inclusive growth. Two types of economic impact of using digital technology can be observed in firms⁽²⁰⁾. The first source of value creation arises in firms that develop, manage and distribute technologies to others. The returns of these firms increase exponentially as the proportion of firms using the technology increases in the economy.

The second type of firms use technology to create value by boosting opportunities, optimizing production processes, reducing costs and transforming supply chains. These firms can be either micro and small enterprises (MSEs) or social enterprises that contribute to inclusive growth by providing services to the poor. One of the key features of this type of transformation is that there is increasing returns to scale in value creation for firms that first introduce technology, but when the proportion of firms using the technology increases in the economy, the relative contribution to value creation decreases⁽²¹⁾.

A key element of social entrepreneurship in the digital era in both types of firms

(17) George, G. et. al. (2012). Innovation for Inclusive Growth: Towards a Theoretical Framework and a Research Agenda. *Journal of Management Studies*, 49(4), 661-683.

(18) Wharton. (2003). Social Entrepreneurs: Playing the Role of Change Agents in Society. Retrieved from Wharton University of Pennsylvania: <http://knowledge.wharton.upenn.edu/article/social-entrepreneurs-playing-the-role-of-change-agents-in-society/>

(19) Zahra, et. al. (2009). A typology of social entrepreneurs: Motives, search process and ethical challenges. *Journal of Business Venturing*, 24, 519-32.

(20) Arbache, J. (2018). Seizing the benefits of the digital economy for development. Retrieved from voxexu.org: <https://voxexu.org/content/seizing-benefits-digital-economy-development>

(21) Ibid

identified above is to use technology to provide goods and services that can promote inclusive growth. As indicated, digital technology has the potential to break spacial, physical and temporal boundaries, products/services can be produced in a more dynamic, faster and efficient manner and information can flow rapidly across borders. The transformation can involve replacing brick-and-mortar facilities with virtual platforms, using smart digital contracts instead of physical contracts and replacing human interaction with digital interaction. The use of certain technologies such as blockchain can deal with the issues of trust and transparency. Use of digital technologies can facilitate providing services to the deprived sections of the population by lowering the costs of access and delivery to the people who cannot be served by traditional technologies.

4.6. Fintechs

Whereas finance to the business sector promotes growth, the distribution of the financing among different firm sizes determines the impact on inequality. In a survey of MSEs from 13 countries, World Bank (2014: 107) finds that the key obstacle to operations identified most frequently (36% of the firms) was limited access to finance. Thus, access to finance is a key impediment to inclusive growth when it comes to MSEs. McKinsey finds that in emerging economies 45% of adults (2 billion individuals) do not have a financial account at a bank/financial institution and 200 million MSEs are un-served or underserved with \$2.2 trillion credit gap. The study concludes that a total of USD 3.7 trillion can be added to developing world GDP in 2025 annually from widespread digital finance(22).

The traditional financial institutions do not provide financing to MSEs due to economic reasons such as high levels of information asymmetry and risks. Furthermore, since the amounts needed by MSEs are small, delivery of financial services to the poor are not cost effective. Remoteness and lack of physical access can also inhibit financial institutions to provide financial services to the poor.

Fintech has the potential to break down traditional financial relationships and 'economics of finance' that inhibit providing finance to the poor. By using digital technology, the costs of delivery of services can be reduced significantly. McKinsey asserts that using digital technologies in finance has the potential of cutting the cost of providing financial services by 80 to 90%. Digital payments

(22) McKinsey&Company. (2016). Digital finance for all: Powering inclusive growth in emerging economies. Retrieved from mckinsey.com: <https://www.mckinsey.com/~media/McKinsey/Featured%20Insights/Employment%20and%20Growth/How%20digital%20finance%20could%20boost%20growth%20in%20emerging%20economies/MGI-Digital-Finance-For-All-Executive-summary-September-2016.ashx>

allow people to transact in small amounts (micro-payments) which can create new business opportunities and enable development of ecommerce and on-demand services. Furthermore, big data can be used to gather information to reduce information asymmetry a key problem in financial contracts. The information collected from big data can be used to develop new credit-scoring models to provide access to broader set of customers. Use of blockchain technology also has the potential for increased transparency and building trust. The infrastructure for promotion of social fintechs would require a national digital-payment infrastructure and a well-disseminated personal ID system. Furthermore, business-friendly regulation for new entrants and financial capital available for innovation can create incentives to establish new fintechs. There is also a need to have an appropriate financial-services regulation that strikes a balance between protecting investors, consumers, stability and growth of fintechs.

5. Islamic Perspectives

The potential Shariah issues that can arise in the digital economy can be viewed at different levels. At the macro level, adoption of ICT infrastructure to produce goods and services has no Shariah issues. Similarly, new digital business enterprises can be structured as companies or cooperatives and there are no Shariah issues as long as the prohibitions are not included in the operations. The areas which may need Shariah overview would be related ownership of new types of capital and contracts used for transactions.

As indicated, digital economies introduce new forms of resources that are intangible and based on intellectual capital (in form of computer programs and codes) and data and information. Since these are new forms of assets, there is a need to resolve their statuses from a Shariah point of view.

The other issue that needs Shariah purview would be smart contracts used in digital businesses. Smart contracts are written in the form of computer program code translating a legal text of a contract into an executable program. The contract states the obligations, benefits and penalties for different events and is automatically executed by computer systems. If blockchain is used for validation, the system monitors the enforcement of contracts. The features of smart contracts include using digital approval/signature, executing the terms with identified triggering events and implementing the terms of the contract instantaneously by computer algorithms. The contracts are efficient with low cost of implementation and not prone to human error (unless there is defect in the code or hacking). While the basic principle of smart contract appears not to contradict Shariah principles, each contract has to be judged individually to

assess its compliance with Shariah.

6. Conclusion

While the world has achieved economic growth during the past century, the fruits of this growth have gone disproportionately to the higher income groups. The resulting inequality of income and wealth can be partly explained by examining how growth benefits are distributed among different factors of production. Digital technology has the potential to break spacial, physical and temporal boundaries and products/services can be produced in a more dynamic, faster and efficient manner. The nature of capital needed to produce goods and services in digital firms is changing from physical to digital that can potentially increasing productivity. While the digital era introduces opportunities for inclusive growth, it also entails risks that can increase the inequalities.

The paper argues that the digital economy can potentially contribute to inclusive growth by breaking down some of the constraints faced in the traditional production processes. Specifically, it outlines some ways which digital firms can promote growth that can benefit all sections of the population. The digital firms have the advantage of not only having the access to a huge pool of personal information, but the means to process it to serve the poor households. The digital platforms also enable sharing economies whereby individuals share their underutilized assets and earn an income. There is a need to have inclusive innovations in the digital economy that have business models to serve the economically and socially excluded. One form of these innovations are fintechs that offer innovative financial products that fulfill people's unmet financial needs. Some of the 'economics of finance' related factors that inhibit traditional financial institutions to provide services to the poor can be resolved by using fintechs.

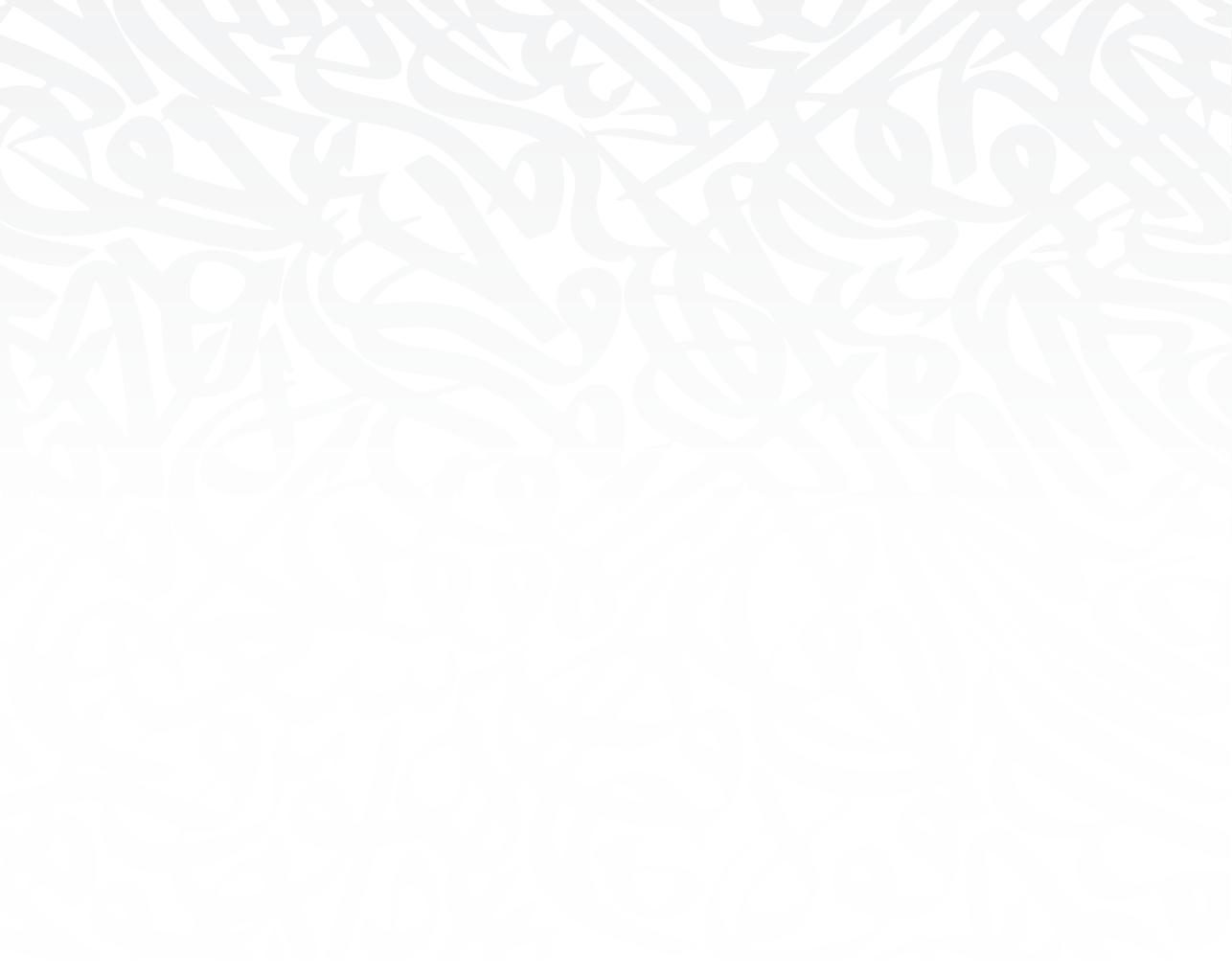
While there are opportunities of using the digital revolution to promote inclusive growth, there are risks that technology could further escalate the worsening income distribution. The key source of this risk is digital unemployment and the digital divide. Using digital economy for the benefit of all sections of the population would require establishing a sound digital infrastructure and providing digital education and skills development to all members of the society. One option of doing the latter is to use digital technology to disseminate the knowledge to all in an efficient and effective manner.

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