

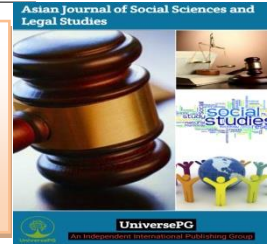


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Fourth Industrial Revolution in Bangladesh: Prospects and Challenges

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ABSTRACT

The stream of globalization is impelling Bangladesh to adopt the technologies of the Fourth Industrial Revolution (FIR). This study examined the opportunities and problems created by the adoption of FIR in Bangladesh. Findings show that the adaptation of FIR can create enormous difficulties for the country with some new opportunities. Sustainable ICT development, increase in productivity, women, and citizen empowerment will bring positive effects. However, social inequality, colossal unemployment, a threat to social security, the domination of MNCs will increase that can harm the economy badly. FIR will also influence the political system. Hence, a comprehensive plan and sound policymaking can help to exploit the opportunity of FIR. Professional development training for human resources, job-based educational system, sensitive labor policies, alternative employment sector with updated technologies, investment in SMEs is expected to tackle the challenges of FIR in Bangladesh. Furthermore, the findings may be used to take the anticipatory role in the future for becoming a beneficiary of the FIR.

Keywords: Industrial revolution, Automation, ICT, Technology, LDC, Challenge, and Policy challenge.

1. INTRODUCTION:

The Fourth Industrial Revolution (FIR) has now become a buzzword, but still, most of the people are not much aware of how this new digital landscape will have a significant impact on their daily life. Technologies like Artificial Intelligence, Robotics, Virtual Reality, Biotechnology, Blockchain, 3D printing, and the Internet of things are taking the place of humans in different sectors (Park, 2018). However, the successful implementation of these modern technologies in a particular country depends on the cultures, norms, value systems, political and economic capacity of the country. Many scholars have predicted that the quality and productivity of industry products are enhanced by the successful transformation of the automation under

the FIR (Ghobakhloo & Fathi, 2019; Zhong *et al.*, 2017). The volumes of works and jobs will have been expanded with the invention and development of various new technologies such as robotics, nanotechnology, and the automation process. However, there are also some risks to automation.

A recent study found that automation will substitute 800 million unskilled workers worldwide by 2030 (World Economic Forum, 2020). To cope with the technologies of the FIR, both developed and developing countries will face serious challenges. The developed nations perhaps face less risk than developing nations because of their advanced technologies and skilled human resources.

But due to lack of skilled human resources, large scale investment, modern infrastructure, unstable political culture, and ineffective public policy, developing countries are lagging in the global market. South Asian developing countries such as India, Pakistan, Nepal, and Sri Lanka are also moving towards FIR. They are trying to adopt innovations of the FIR to upgrade their local industries (Adhikari, 2020; Rashid, 2020). Gradually Bangladesh is emerging as one of the fastest-growing economic power in South Asia with notable progress in many fields.

If Bangladesh can sustain this development rate, it is expected that Bangladesh will leave the Least Developed Country (LDC) category by 2024 (Kim, 2018). Innovations of FIR can be a vital force that can help Bangladesh to achieve its goal. But the journey towards institutionalisation of FIR is a humongous task for the government. The government needs to take appropriate policies to cope with the technological advancement of the FIR. Otherwise, the FIR will be a curse instead of a blessing for us. This study will forecast the political-economic condition under the FIR and will identify the opportunities and problems created by the adoption of FIR in Bangladesh.

2. Study Objective:

The main focus of the paper was –

- To forecast the prospects and challenges created by the adoption of FIR in Bangladesh.

3. Literature Review

Industrial revolutions lead to economic, political, and societal changes over a few centuries by developing and introducing new technologies. These technological changes also represent the three major phases of revolutions. The first industrial revolution refers to mechanical production, which emerged in the United Kingdom in the late 18th century (Frey & Osborne, 2017). At that time, the workplace culture was dominated by men, and women were forced out of production positions (Philbeck & Davis, 2018). Macpherson (1962) stated that this revolution has rapidly increased capacity in production, which leads to urbanisation, the development of local and global market economies, the importance of democratic governments, and an increasing middle income in the

western hemisphere. The second industrial revolution was known as a technological revolution that emerged from the late 19th century to the early 20th century due to natural resources, firm government policy, and abundant labor supply (Frey & Osborne, 2017; Smil, 2005).

Entrepreneurs and businessmen applied technology to manufacturing ends, and the period saw a boom with products that were the direct results with science and engineering themselves (Hughes, 2004). At that time, new technologies were introduced and developed (steamship, telephone, gas turbine, artificial fertiliser, railroads, electric light, and typewriter, etc.) led to mass industrial production, maintaining standardization of products, development of large-scale technological infrastructure, accuracy manufacturing and the emergence of public transportation based on combustion engine (Philbeck & Davis, 2018). Although the Third Industrial Revolution emerged in 1960, it had started in earnest after the Second World War (Frey & Osborne, 2017). This revolution had introduced and developed the personal computer, and the internet led to the democratisation of information, price reduction, and rapid quality improvement, presented as a new era of capitalism; reform the economic structure for a war-torn world, making calculation easier for business and governments (Philbeck & Davis, 2018). Moving on in the work environment of the world is often portrayed as the FIR or 4.0, which is defined by introducing new technologies like genetics, artificial intelligence, wireless technologies advancement, cyber-physical system, cloud computing, internet of thing, nanotechnology, biotechnology, and 3-D printing (Schwab, 2017).

Brynjolfsson and McAfee (2014) mentioned this revolution as the second machine age through their widely famous book and argued that the main distinct from previous industrial revolutions is the current technologies at replacing cognitive labor and human employees altogether. Besides, the FIR refers to the digitisation and automation of work, which will dramatically change working nature, business styles, and cultural phenomenon in the upcoming decades (Arntz, Gregory, & Zierahn, 2016; Brynjolfsson & McAfee, 2014; Ford, 2015; Frey & Osborne, 2017).

This literature also will cover different perspectives like politics, economics, and business, etc. From economics & business perspective, the FIR will bring a radical improvement in the economy and business. However, 800 million unskilled workers over the world will lose their job by 2030 (World Economic Forum, 2020). On the contrary, FIR transforms the existing production system into a better manufacturing process that will add a new dimension to the future industry by developing cyber-physical systems and incorporating advanced technology (Schwab 2017 & Zhou *et al.*, 2016).

Mokyr *et al.* (2015) also have explained that industrial automation can increase efficiency and productivity, which helps to decrease the prices of the goods, and can increase the demand for that commodity, resulting in new labor demand for jobs in those industries. On the other hand, mass unemployment over the next few decades is unlikely to pose a big problem due to the widespread practice of automation processes in industries (Arntz *et al.*, 2016; Autor, 2015; Furman, 2016). The World Bank estimated in 2019 that approximately 57 percent of jobs in OECD countries, 77 percent jobs in China, and 47 percent of jobs in the USA would be at risk due to the increase of automation. The government has to need reforming the existing policies and plans to cope with the technologies of FIR. Zervoudihas conducted a study about FIR in 2019. He argued that as FIR is wholly related to socioeconomic growth, the government will act to minimise the risk of workers being subjected to automation by investing in learning and skills for unskilled labors so that they can respond better to emerging technology and digitisation.

He also further added that governments should support the practical education and training in new technologies, build a strong link between education and the labor market, emphasise STEM (Science, Technology, Engineering, and Mathematics) training of young people to adapt 4.0. Besides, FIR led to a wide gap of income inequality where only 8 percent of the total population of the world earns half of the entire world's income, and the remaining other half income is earned by 92 percent of the world's population (Arntz *et al.*, 2016). Some analysts have said that people from developing countries would feel confused

and challenged structurally over the FIR concept. It has therefore taken time to apply and incorporate the essential elements of FIR and to gain advantage from it (Drath & Horch, 2014; Schläpfer *et al.*, 2015; Gilchrist, 2016; Ludwig *et al.*, 2018; Lasi *et al.*, 2014).

Emerging and developing countries, such as India, Pakistan, Indonesia, Brazil, Malaysia, Nigeria, and Thailand, have tried to adapt the FIR (Bahrin *et al.*, 2016; Iyer, 2018; Ezenwa *et al.*, 2018; Berawi, 2018). Bangladesh is a little far away from the facilities of FIR. Still, it is not hard for the country if it concentrates on infrastructure development and technology integration because of the availability of technological imports and new settings (Gilchrist, 2016; Walcott, 2017). Experts predicted that if the government can increase the support for the integration of FIR, the economic progress of the country will contribute to a more robust economy in South Asia. Islam *et al.* (2018) identified poor infrastructure, availability of cheaper and unskilled labor, expensive installation of new technologies, lack of government support & knowledge as the critical challenges for Bangladesh in this regard. From the above literature, it can be summarised that most of the studies related to the overall impact of FIR in the world, and very few have been discussed on FIR in Bangladesh. Even so, these few studies predict the possible outcome of the FIR on particular sectors, but no comprehensive study was found on this topic.

4. METHODOLOGY:

This study reported findings through a qualitative investigation. Qualitative data was collected to explain complex phenomena on the economic and political impact of FIR in the Bangladesh context. This study employs an explorative case study and a traditional qualitative approach that focuses on FIR. These data collection methods were essential to visualise the myriad information about the impacts of FIR on the political sector to adopt the new economic system of upcoming years. To conduct this paper, primary and secondary data were used. Secondary data was gathered from different journals, books, and international as well as government reports on this particular issue through inductive content analysis. Content analysis is the methodical explanation of the

context by presenting the answer of ‘who’, ‘what’, ‘where’, and ‘how’ questions following the defined rules to avoid any biases (Fraenkel and Wallen, 2008; Islam, 2013).

A multi-dimensional data collection method was used for this study. Here semi-structured interviews and documentation surveys were conducted for collecting data from respondents. The multi-method research protocol is especially useful when approaching topics in which intercultural interaction is obscured by phenomena grounded for a deep understanding of the political-economic impact of FIR.

We had selected three categories of participant’s academicians, experts, and businessmen. These persons have more accurate knowledge to predict the future condition of FIR in Bangladesh. So, we choose purposively 30 participants to get more meaningful information in a limited time. As similar information was coming from the interviews, therefore we stopped taking further interviews after taking 15 interviews. The main themes of the report were identified based on the transcription of all the interviews. A triangulation approach was used for data procedure. The researcher (s) use a triangulation approach to avoid the limitations of a single method, which helps to increase the reliability and validity of data. For analysing data, a thematic approach was employed, which helps to expand the already established horizons of knowledge. For preparing this paper, all sorts of data were managed carefully; ethical issues were considered strictly and followed the ethical guidelines of Miles and Humberman (1995).

5. RESULTS AND DISCUSSION:

Bangladesh is trying to raise awareness among the stakeholders about the FIR concept and encourage entrepreneurs to incorporate new technologies to get benefits from it. However, this transformation process towards FIR will create both positive and negative impacts in different sectors. Experts predicted five crucial sectors that needed to be focused by the government to take adaptation policies while going through this transformation. These sectors are briefly discussed below-

5.1 Governance system in the upcoming decade - FIR will create an opportunity to adopt innovations in political systems. The pattern of vote casting, election time violence, as well as the political manifesto of the political parties, will be changed. Digital platforms will be used for election campaigning, and intelligent voting systems will be introduced. The country will move into a new administrative paradigm called the future digital e-governance system. According to Md. Atique Rahman, Department of International Relations, University of Dhaka (personal communication, January 20, 2020), *“The manifesto of the government will be centralised to digital development, and there will be a paradigm shift of the administrative system from New Public Service to the future e-governance.”*

Democracy will face a lot of challenges in the upcoming decade. The demand of the people will be changed, and political leaders will need new ideologies to tackle the modern social complexities under the FIR. Political polarisation will be so evident in national politics, which will create an extreme environment in the political arena. Due to the domination of capitalists in the political system, anti-government populism will rise, and that will drive the mass population towards movement against capitalist systems. As per an interview with a senior professor of Dhaka University, *“Acute social and economic inequality will force people to raise their voice to fulfill their demand, leading to resurrect socialism in Bangladesh”* (M. Nuruzzaman, personal communication, January 22, 2020).

Automation in the service delivery system will make the public service more available for the citizens and ensure transparency in the working procedure of the government. Massive public sector reform will take place, and maintaining this transformation will be a tremendous challenge for the political leaders. Hence some radical change is brought under the government’s flagship A2I program to make the government sector versatile, efficient, and competitive. For example, 4,554 Union Digital Centers, more than 100 streamlined public services, e-procurement, and smart health cards are moving Bangladesh along the FIR track (World Economic Forum, 2018, Rashid, 2020). According to the prediction of a Professor of political science, *FIR will help citizens to participate in*

governments' policymaking and reduce the communication gap between the government and citizens (N. Parvin, personal communication, January 20, 2020).

5.2 Inequality forced by this new production system

- Under the new production system, through automation and artificial intelligence, the time and cost of production will reduce, and the benefits of industrialists will increase. However, the labor-based production system will alter with capital-based

techniques, causing dehumanisation in the production line (Sun, 2018). In this matter, the president of the Metropolitan Chamber of Commerce and Industry said (Kabir, 2019), "Due to automation, labor market trends will show a gradual shift to jobs that require higher skill levels. New technology does not simply make people redundant; instead, it reduces the labor required for a given level of production." A lot of people will be jobless. Concurrently, income inequality will rise drastically.

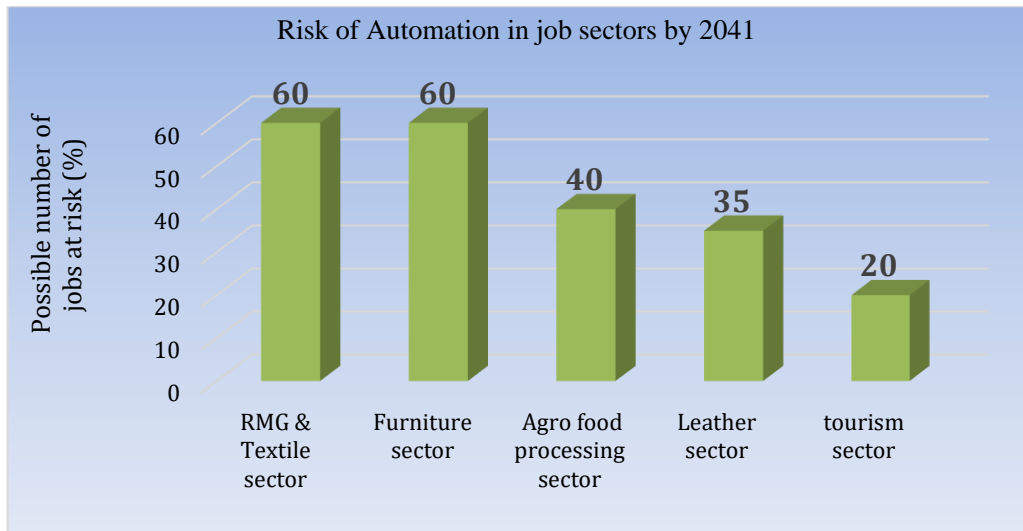


Fig 1: Risk of Automation in job sectors by 2041. Adapted from Finding Emerging Occupations to Tackle the Challenges of Automation in Bangladesh, by a2i, august 2019.

According to the Executive Director of RK group of industries (AJ Chowdhury, personal communication, January 20, 2020), "We witnessed a "Digital Divide" during the Third Industrial Revolution, which is about the epoch of ICT. The privileged people who have sagacity in the digital landscape could take on the new jobs. So if the technology is in the hands of a few wealthy people, then the state of injustice worsens." Most of the respondents reflected the same and supported that statement in their discussion.

As women possess poor knowledge on the technical side, they will face difficulties in the era of FIR (Moktadir, 2018). So, it can be predicted that this revolution will also increase gender discrimination in our country. According to S. Noman (personal communication, January 23, 2020), "Automation will increase gender discrimination, but there is no

effective gender-sensitive policy in our country to upskill the women workforce."

As the FIR created social inequality, the general people possess a negative impression about this, where the industrialists are positive because they are the beneficiaries of the FIR. The government is in a policy dilemma as industrialists are the source of finance, and the mass people are considered as vote banks (Gordon, 1981).

5.3 Security concerns under the Fourth Industrial

revolution- FIR will have a crucial impact on state and private security. The security system of the country will be updated with the introduction of robotics in the security forces. The military force will be equipped with AI soldiers. The efficacy of risky operations will be increased by employing bomb disposing of robots, surveillance, and attack drones. According to an

associate professor of Jagannath University, *“Because of reserving citizens’ information on the public server, the crime rate will be reduced by using digital fabrication that helps the government to identify any criminals easily”* (N. Mahfuz, personal communication, January 25, 2020).

On the contrary, information is said to be the most powerful weapon if they are in the hand of evil people. Misuse of technological Knowledge will create risk for national security. Moreover, we lack technical experts that force us to hire external experts from abroad, which will decrease the control of the state authority over some sectors. In this issue, an AD of NILG (National Institute of Local Government) opined, *“The confidentiality of state policy will be confronted, and the government will lose control in the market because of cryptocurrencies”* (M. Imran, personal communication, January 28, 2020).

Domination of Multinational Companies (MNCs) will also be a key concern for the government. MNCs collect the personal information of the employees & clients by introducing a biometric registration system and NID card information. In this issue, a Professor of Dhaka University opined, *“Technologically developed countries are trying to dominate our economy through MNCs by using our low-cost labor and information”* (S. Ahmed, personal communication, January 22, 2020).

5.4 Education and ICT sector change in future -

The FIR will bring a major challenge for the education sector as Bangladesh promotes education to its students through didactic pedagogy. A Large scale vocational and practical training program is needed to be integrated with the existing education system. A recent study report shows that 60% in low education, 48% in medium, and 19% in higher education jobs will be displaced by automation (Price water house Coopers, 2018). A lecturer of Jagannath University said, *“The education system in Bangladesh is quantitative rather than qualitative. More focus should be given on STEM to conduct MOOC, Life-long Learning, and Blended instruction, optimisation of flipped and online courses, as well as to confer degrees through online. Concurrently, teachers have to focus on flip learning where they teach their students following a*

different method to prepare the future generation ready for combating the challenge of the 4th industrial revolution.” (A. Ehsan, personal communication, January 18, 2020).

To cope with this situation, about 43000 people are given training under the Access to Information (A2I) project (A2I, 2020), and almost four lakhs people get training under the Skills For Employment Investment Program (SEIP) program (Skills for Employment Investment Program, 2020). Moreover, the government has to focus on different issues to lead the FIR, such as personalisation of education (designing for an individual’s changing needs, unique talents, and interests, an engine for rapid growth, lower costs, and greater profits), specialisation of education (advance technological knowledge). About this issue, a lecturer of Independent University, Bangladesh, said, *“To facilitate the FIR, skilled workforce and developed infrastructure are needed which can be ensured by proper educational systems. But our country’s educational system is quite inverse to the job sectors”* (A.Hossain, personal communication, January 18, 2020).

5.5 Global trade structure and future of business in Bangladesh -

The international community acknowledges the FIR positively, and they agree that numerous tech companies will dominate the global market in the upcoming period for their intellectual advancement in the field of international trade. At that time, the demand for software will rise. Former VC of Shahjalal University of Science and Technology opined, *“The FIR will create new business opportunities like a software business. Bangladesh ranked 2nd in exporting software and expected to expand this business.”* (M.U.Ahmed, personal communication, January 15, 2020).

Besides this, our indigenous company will have an opportunity to compete with the MNC. Technical capacity and innovation will help them to establish a strong position in their market (Abdin, 2019). As per a senior professor of philosophy, University of Dhaka, *“FIR will facilitate the SMEs in online business using new digital landscape, and also they will have to face the domination of MNC as they have more capital.”* (F. Uddin, personal communication, January 26, 2020).

However, many countries are using technological assistance instead of unskilled labor in their industries. The demand for labor will decrease, and the capital-oriented countries will adopt a protectionist policy in importing labor. Moreover, it will create an adverse impact in a country like Bangladesh, where foreign currencies by technologically unskilled labor contribute 35% of export earnings (Hasan et al., 2018).

6. CONCLUSION & POLICY IMPLICATION:

The FIR is adding significant dimensions in all spheres of the world. It is expected that the stream of the FIR is going to take the top place in Bangladesh in the upcoming decade. This flow will drop a significant impact on national politics and economics. This study has presented that Bangladesh is a little bit prepared to face the changes and challenges of the revolution. The challenges of FIR for a Graduating LDC like us are lack of talented resources, expertise, and better cloud networking, poor infrastructure, huge unskilled population, lack of legal and proper policy support, etc. Alternatively, FIR will bring some positive implications also, with the increase in productivity, sustainable ICT development, women empowerment, citizen empowerment, etc. The adoption of FIR will create significant complexities in our country. This study has revealed that inequality, gender discrimination, unemployment, cyber-crime, the dominance of MNC over SMEs will increase. The most important thing is that the Political system of our country will be influenced in the next decade by the stream of FIR. To minimise the problems and to get benefits from FIR, the government should take effective policies with defined plans at the current period. Despite revealing these results, this study has some limitations like every other research that created a barrier from getting a neutral, practical, and qualitative outcome. The main drawback of this research is that it was time-consuming, and the verification of the result was difficult. It was a labor-intensive study, and the analysis was complex. On the contrary, the findings of this study couldn't be extended to a broader population with the same degree of certainty. Despite these limitations, this study brought a more-clear picture about the impact of the FIR in Bangladesh.

The policies for accepting FIR in our country require it to be based on proper research, and for this purpose, integration of universities in research activities is emergent. This will help to take the appropriate policy and plan for any dramatic situation. In our country, the government takes jumping systems without any research to serve the interest of their political allies, and as a result, this creates difficulties for us. The government should make policies to transfer knowledge and information to the local industries and to collaborate with educational institutions. To achieve this goal, the private sector should also work along with the government. The private sector should take initiatives to develop and mobilise the skills of human resources according to the demand of the job market of both Bangladesh and other countries. They should also invest in infrastructural development and make a proper strike balance. Finally, it can be concluded that planning should be made in the adjustment or talking period, and the government needs to be anticipatory about the future of the country for becoming a beneficiary of the FIR.

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8. CONFLICTS OF INTEREST:

There is no conflict of interest from the authors' end.

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