

Role of Artificial Intelligence in a Digital Society: Future Prospect of Bangladesh

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Article Detail:	Abstract
<p><i>Keywords— Artificial Intelligence, Digital Society, Digital Bangladesh, Development. ICT.</i></p>	<p>The modern age is the age of digitalization and the Artificial Intelligence (AI) has played a major role on our daily life. AI based technology has the certain ability to remove our burden and labor from several sectors. This is very helpful for every sectors and blessing for human civilization. For Bangladesh perspective the AI has played key role for them to make them a fastest developing country on South Asia. Purpose of this research report is identifying AI adoption opportunities for Bangladesh that can transcend its future prospect towards more prosperity. Bangladesh has recently applied all the technologies to develop their every sector. This has created a good impact on their economic growth and gross GDP. But still have some challenges' they faced to adopt the AI. The Government has initiated different policies and rules to modify the application of AI in Bangladesh. Proper implication of this technology will help Bangladesh to make Nation better. In this relevance, it is quite essential for the government of this country to take some futuristic attempts in order to implement AI across all service sectors.</p>

1. Introduction

Role of artificial intelligence has been indispensable in modern life. Artificial Intelligence (AI) refers to a man-made agent capable of performing tasks as an alternative to human intelligence. It is one of the revolutionary inventions of modern technology. With globalization of technology and services, developing and underdeveloped countries are also gaining by the application of artificial intelligence. Developing countries, likewise Bangladesh, have been able to attain advancement in the social lives of its people by making it easier, by offering benefits in terms of medical care, crime control, education, and means of transportation. Increasing involvement of Artificial intelligence adds extra mileage to the advancement of countries like Bangladesh [1].

	behaviour, demonstrate, learn, advise and explain their users
Implementing human intelligence in a machine	Systems could be created that would be able to think, understand, learn, as well as behave like humans

Bangladesh is considered to be one of the digitally advanced developing nations, due to the government's continuous effort on making **Digital Bangladesh** [2].

It implies a society that is digitally well equipped and well versed in information and communication technology. Digital Bangladesh aims to ensure full accessibility of network services so that virtual activities like sharing and exchanging of information would be possible from every imaginable area of the country. This rapid infusion of technology into the different sectors including agriculture, healthcare, education, transportation, retail, and other

Goals of artificial intelligence adoption	
Creating expert systems	Systems would be able to exhibit intelligent

commercial service areas being initiated by the government has made the researchers predict a prosperous and extraordinary future of the country in fields of Information and Communication Technology (ICT). Significance of doing this study resides in its ability to explore various roles AI can perform in transforming society in a digital society, further taking into account a case study approach, particularly involving Bangladesh as the country context [3].

Based on background information and problem area identification, aim of this study is to explore and explaining prospects of this country in light of AI acceptance and implementation of related technological architecture around all service sectors.

2. Literature Review

2.1 Evolution of artificial intelligence in Bangladesh

With the rapid globalization of information and technology in an international workspace, Bangladesh has introduced and accepted artificial intelligence to digitalize the country. Government of Bangladesh aims on making a complete digitally-driven nation with developed technological and AI facilitated workplaces, in both public and private sectors alike. The establishment of the Union Digital Centre (UDC) by the government, a single-stop access point of information and service delivery took place to decentralize public service delivery and also to reach out to the backward people. At present, Bangladesh boasts of 5838 digital centres serving nearly 422 million citizens. Different portals have been introduced to serve the government and private sectors [4].

National Portal: More than 46000 government organizations use this portal. The portal consists of more than 4 million pieces of information from various government sectors. More than 50 million citizens use this portal for extracting information. This portal alone plays a very important role in absolute digitization of this nation. Due to the extensive productivity of this portal, more than 4000 government offices have gone paperless in terms of document transactions [5].

EkSheba Citizen: This is an integrated digital platform that enables citizens to be able to connect with government organizations. This portal enables single stop availing points under a single identity [6].

EkSheba Sorkar: This is also an integrated digital platform that connects the entire government delivery system. This portal provides access to all the government systems under a single identity and process to the government employees [7].

Today Bangladesh is considered to be an emerging country for Information and Communication Technology outsourcing because of its rapid development in use of mobile phones, availability of internet connection, IT export income, and the maximum utilization of Information and Communication Technology in different official activities and wide acceptance of digital access in government organizations [8].

In the last few years, Bangladesh's ICT market has reached from \$ 25 million to \$ 1 billion [9]. In 2018 Bangladesh entered the space arena by successfully launching the country's first Bangabandhu satellite-1. Recently the government of Bangladesh has been taking initiatives to launch the fifth generation of technology around the country by the year 2024.

3. Role of Artificial Intelligence in different sectors of Bangladesh

AI has been extensively used and has been proved beneficial in different sectors of Bangladesh. Firstly, it has helped humans to overcome the limitations of human reach, for example, space travel. AI also helps to archive millions of data that are produced around the country every day. It has also proved highly beneficial for the medical sector, business sector, educational sectors, financial sectors, lawsuit, and manufacturing sectors on different levels [10].

4. Results and Findings

4.1 Theme 1: Artificial Intelligence can transform economy

It is undeniable that AI has a big impact on balancing the economy. It also accelerates economic growth of nations by offering different benefits on different levels.

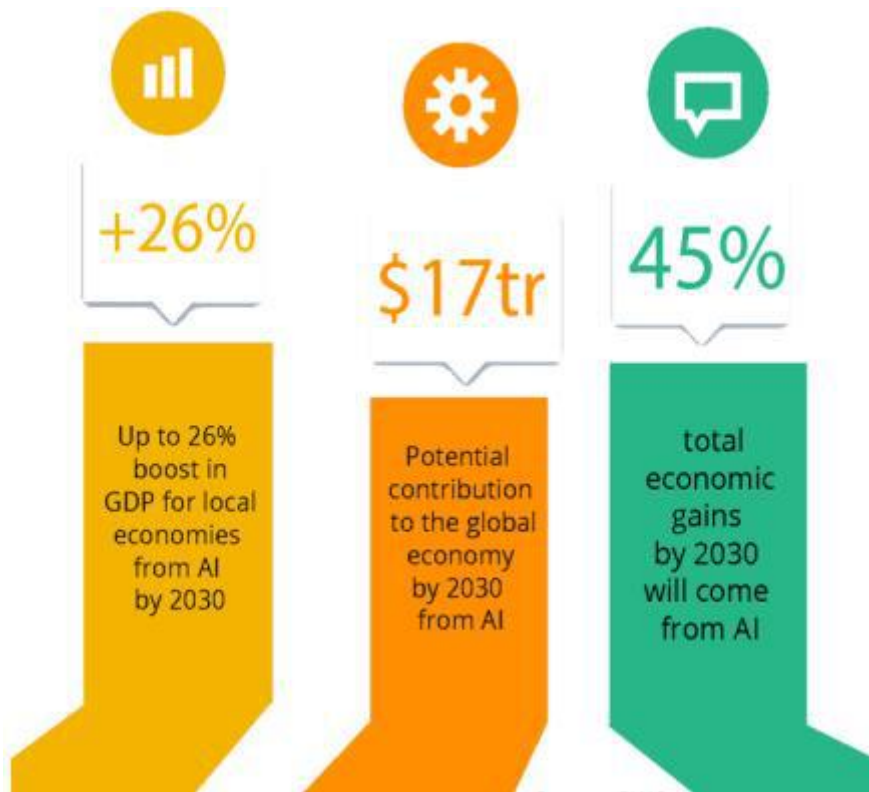


Fig. 1: AI can transform global economy

(Source: [11])

A vast range of offers and technical breakthroughs enables rigorous economic growth and also accelerates the level of productivity of organizations. An organization can gain by automating repetitive tasks by humans. A strategic investment in various applications based on Artificial intelligence of countries enables economic development of the country in the world market. Artificial intelligence enables improved labour productivity [12].

According to studies, different organizations can earn more than 40% of economic growth by 2029 from increasing customer demand and by rapid modification of products [13]. Studies also have predicted that AI will be responsible for increasing the possibility of the customization of products. It is

also responsible for attractiveness and user-friendliness of a product. Countries like America and China expect one of the greatest economic accelerations in upcoming years. For example, it is expected that a great development in the economic field will take place with a boost of 27% of China's GDP by 2029 and America's GDP by 15%. This phenomenon will have an impact on 75% of the global economic field [14].

According to reports from **McKinsey Global Institute**, digitalization will enable rapid advancement in the technological field in upcoming years. Following graph shows a comparative economic growth of different countries.

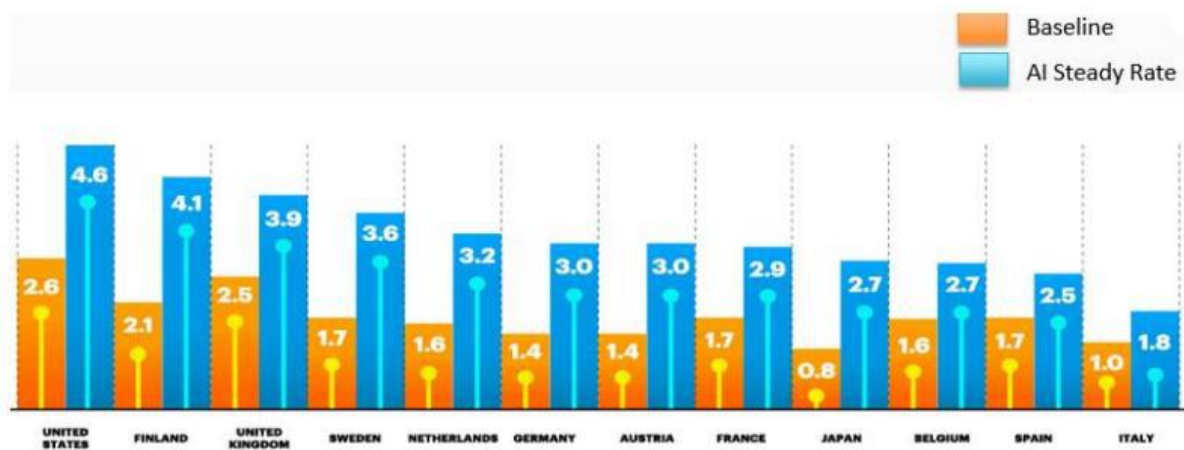


Fig.2: Comparative economic growth
(Source: [15])

4.2 Theme 2: Role of Artificial Intelligence is indispensable in economic transformation of Bangladesh



Fig.3: SDG proposed by UN
(Source: [16])

In the last few years, due to the relentless effort of Bangladesh to secure its position in the international platform in terms of AI, the country has won several accolades. Bangladesh has also gained a worldwide appreciation for its accomplishments in *Millennium Development Goals*, which is a

cluster consisting of eight internationally acclaimed goals developed and established by the United Nations (UN) to eradicate the problems and shortcomings faced by the underprivileged people of the poor nations and making their lives easier and prosperous. Artificial Intelligence has opened a wide

arena for a scope of different developments in Bangladesh. Although the vast possibilities of developments have already been introduced by the application of Artificial Intelligence, yet the future outcome is still to be determined. Due to the possibility of a negative outcome as much as that of a positive outcome, researchers are trying to practice control over the future possibilities of Artificial Intelligence [17].

Bangladesh has proved its advancement in the technological field to the international platform by displaying constant and vigorous growth of GDP and digital revolution. Bangladesh is considered to be a pioneer among the developing countries in terms of its E-services. It is considered to be the 42nd largest economy in the world. Different types of Artificial Intelligence innovations include digital assistance, computer visions, Robotic Process Automation (RPA), Natural Language Processing, and so on. Role of artificial intelligence in the economic growth of Bangladesh is interesting. Bangladesh is considered to be one of the quickest economically developing countries with a GDP growth of 9% [18].

Effective strategies and actions can accelerate the economic growth of Bangladesh by AI for digital transformation in different areas. Bangladesh is an agricultural-based country. Usage of AI in the agricultural sector can be beneficial to the economic growth and social growth of the country.

4.3 Theme 3: Adoption of Artificial Intelligence can put mileage to Fourth Industrial Revolution in Bangladesh

The fourth Industrial Revolution (4IR) refers to a change in the structure of the world economy and industrialization. It is a fusion of different technological innovations like AI, Robotics, genetic engineering, and many other areas to accelerate the rate of economic growth and ensure advanced business techniques. The primary purpose of the fourth Industrial Revolution is to fade away the boundaries of virtual, physical, technological, and biological fields. The same is true in the case of Bangladesh [19].

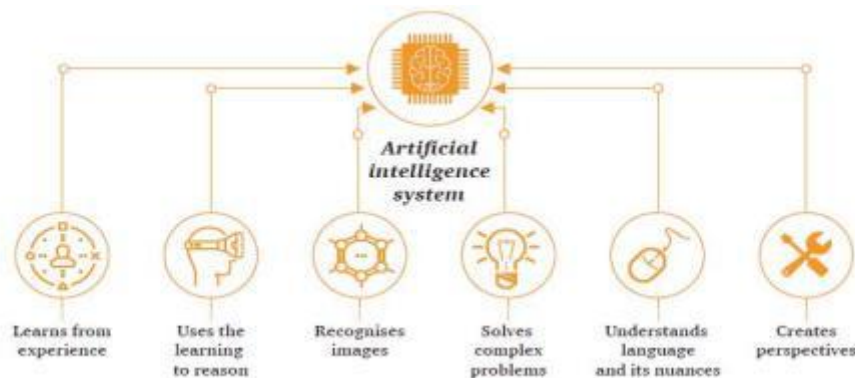


Fig.4: AI system characterising human capabilities

(Source: [20])

It will be possible to predict the production chain and enable faster and individualized decision-making, by implementing new technologies in factories and offices and communicating mediums [21].

The fourth Industrial Revolution is considered as a trail of the third Industrial Revolution and thus, is expected to provide a deep impact on economical and industrial development of Bangladesh [22].

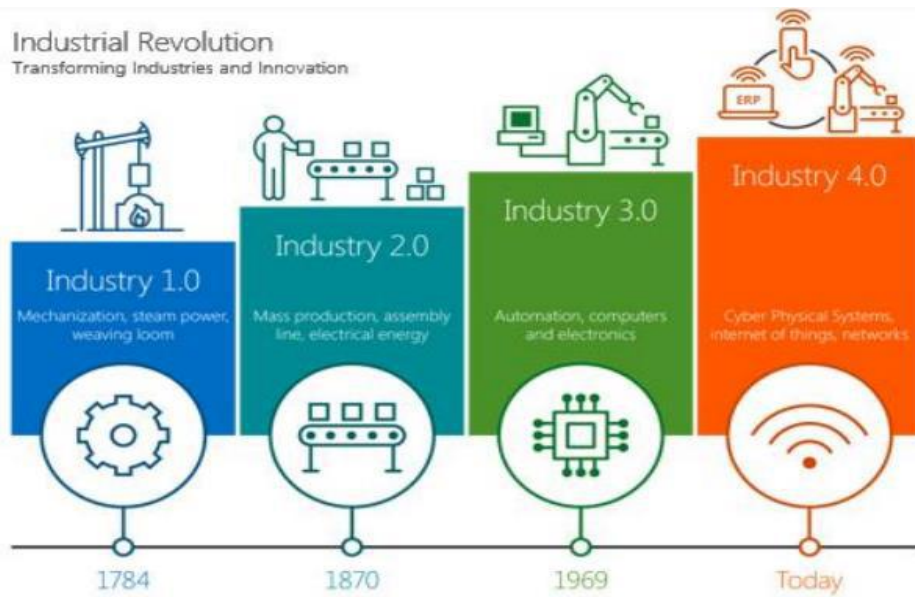


Fig.5: Progressive history of 4IR

(Source: [23])

Like the previous Revolutions, the fourth Industrial Revolution has brought significant effects on every existing industry of Bangladesh. Different technologies like artificial intelligence, robotics have not only caused changes in economic growth of industries but also have changed the ways of human

habit to exchange thoughts and expressions. This results in prone to change not only in industries but also among individuals. The Revolution is even expected to predict and control users' future choices [24].

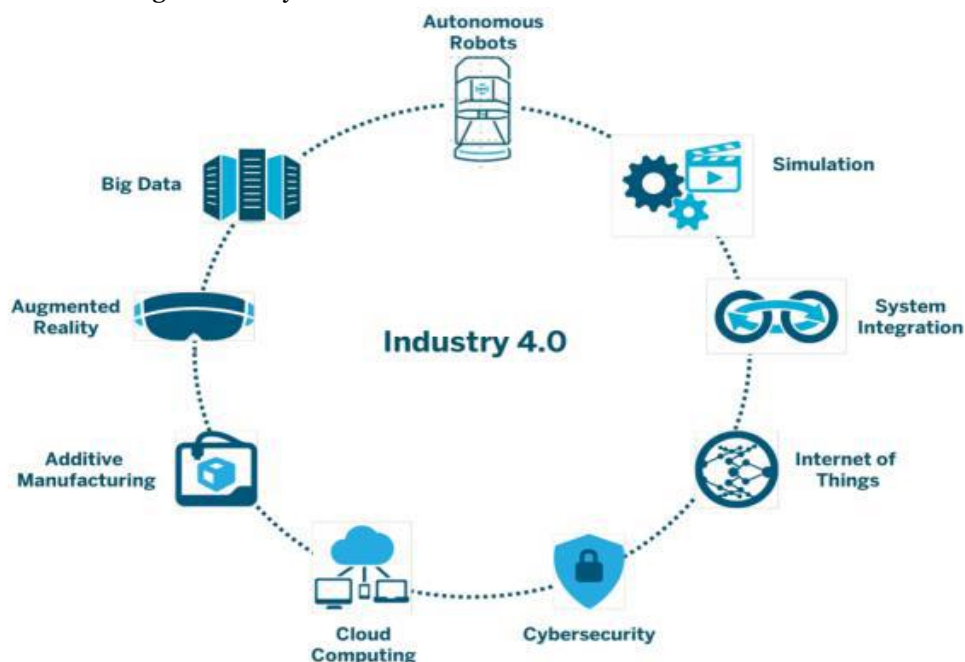


Fig.6: Different dimensions of 4IR

(Source: [25])

4.4 Theme 4: AI adoption can contribute to building prospects of Bangladesh

Extensive adoption of Artificial Intelligence can be responsible for new employment options of the new generations of Bangladesh. Moreover, these new options will enable more educational prospects for the students, which will enable the future generation to be theoretically and practically exposed to different aspects of AI application. Increasing options of employment will accelerate the economic growth of the country as a whole. It solves the problem of unemployment [26].

4.5 Theme 5: AI adoption demands execution of ethical responsibilities by users

Despite its extensive contribution to the development of nations on different levels and fields, there are certain negative impacts of Artificial Intelligence on users. As discussed earlier, to curb the negative impact of the extensive usage of AI, users are expected to have ethical responsibility. One of the most important negative effects of AI on humans is the dependence of humans on Artificial Intelligence to get any sort of work done. Another important aspect is security issues on personal data. With the advancement of technological devices and innovative digital media, human lives have become easier yet another phenomenon has left another issue unsolved; the issue of lack of secured data. Lack of security of personal data is, disables users to be free from being subjected to the theft of personal data [27].

5. Methodology

The present study is a qualitative method of in nature. More specifically, it can be said that the study has conducted through conclusive method. It is a type of study that describes a situation, or phenomenon is used to obtain information that can be used to reach conclusions or make decisions, (Nargundkar, 2008:39). It depends on each secondary data,

significantly existing databases that are reanalyzed to shed light on a special downside than the first one that they were established, and first analysis, or data specifically gathered for the study. For this study role of artificial intelligence in the digital society of Bangladesh, has used the secondary data sets and previous Government data for the development of that study. The data sources are authentic and have reliability on that topic. All these data have been collected from websites, books and different authenticate and selective journals. At the time of taking data and resources, a strict timeline of fewer than 5 years has been maintained. All books and journals have taken followed by application of title and abstract screening method (Nourani, M., et al., 2020:1-8). For more information about Bangladesh and AI the related and authenticate websites and online articles have been taken for proper research and interpreting all data.

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6. Discussion

6.1 Role of AI in Bangladesh Development

In the modern world, people make them more dependent on artificial intelligence (AI) and advanced technology. AI has commendably changed the world by reducing workload from people and connecting everyone with technology. Bangladesh, a third-world country, slowly adopted AI to make national digitalization. However, this started decades ago and now it has become acceptable for their national development [29].



Fig.7: AI initiatives taken by Bangladesh government

(Source: [30])

The Government has also initiated a 5-year plan for AI application in their countries for citizens and the overall development of the country. A strategic plan has to be set for a future vision of the world by ensuring the secure utilization of it to take its impactful advantages. The government of Bangladesh rapidly adopted AI for every sector, which led them to be a developing country in the world. Previously,

Bangladesh considers as the least developed country till March 2018. They have used artificial intelligence for the modernization of public sectors, several industries, agriculture, and farming, and medical or health purposes. Their successful application in this field has taken them to the list of fastest moving countries in Southeast Asia [31].

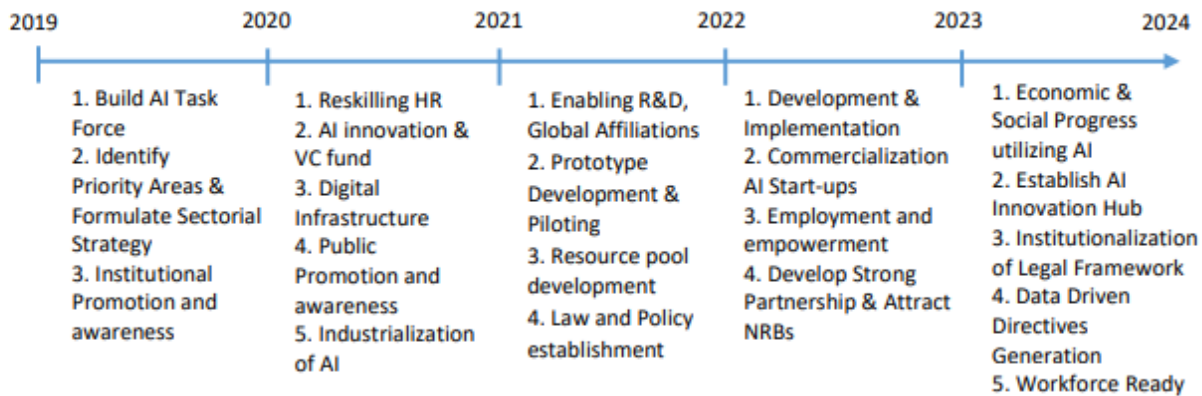


Fig. 8: Progressive adoption and AI Implementation in Bangladesh

Source: [32]

As mentioned before, different sectors of Bangladesh rapidly adopted the technology of AI for their all-over development. This has also impacted on the all-over GDP of the country. Accepting AI as the modern technology and rapid growth of IT industries in Bangladesh has taken quick digital transformation of the country. The strong support of the Bangladesh government and their precise strategies for the

application of AI influenced all several industries and sectors to adopt it immediately. At present, Bangladesh has an 8% GDP growth and is the quickest growing economy in the world. At present, in 2021 Bangladesh holds 37th rank in the world GDP rank. There is a possibility for Bangladesh by 2030 it will be the world's 24th largest economy [33].

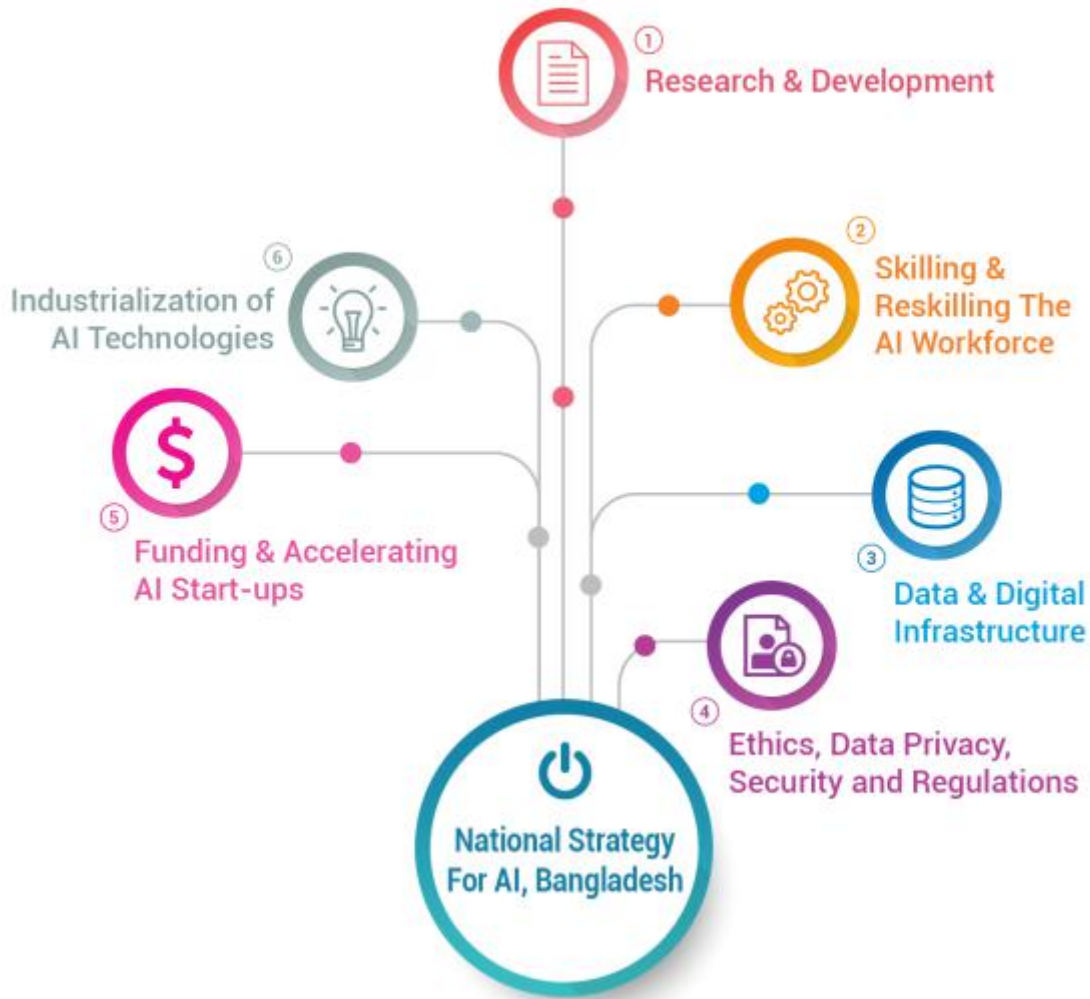


Fig.9: AI strategy development blueprint for Bangladesh

(Source: [34])

6.2 Application of AI for different Public sectors of Bangladesh

The government of Bangladesh has recently started "Eksheba citizen". These are the one-in-all service centers for all kinds of services that are provided by the government. By using this, any citizen of Bangladesh can easily take the facilities of any kind of government scheme by using their own identity. The government has adopted an initiative to find all the services that are provided by the offices of government. 56.5% of the GDP of Bangladesh is

contributed by several industries [35]. For more easy surveillance on the several schemes launched by the government, the officers have used AI. This has also impacted on depleting loads on the administrators for public related services which have been provided by the government. Bangladesh government has created union digital centers for the rural people to take advantage of government schemes easily without reaching the government office. This is only possible for adopting AI in the Government-public sectors of Bangladesh.

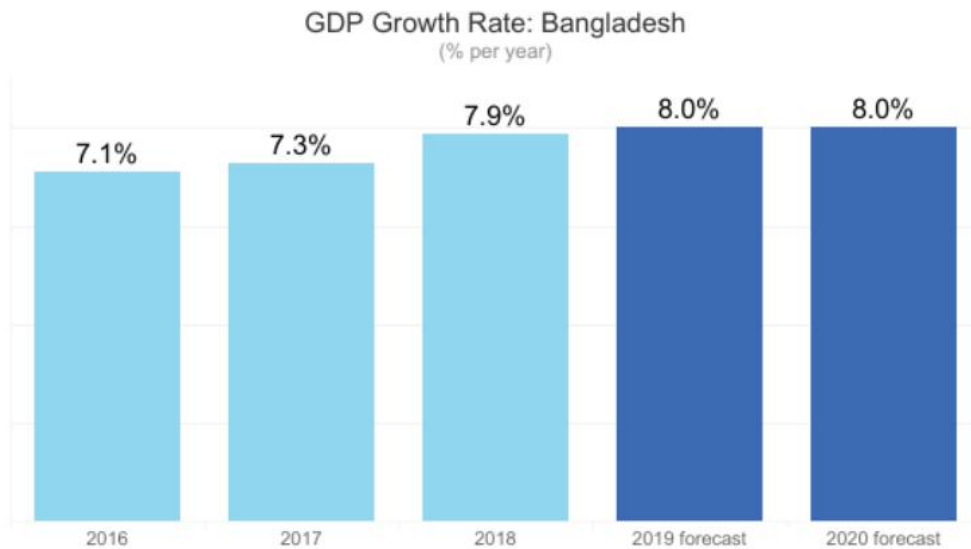


Fig.10: Bangladesh GDP growth rate forecast

Source: [36]

6.3 Several Use of AI in Manufacturing Industries in Bangladesh

The proper use of AI can help any manufacturing sector to grow more quickly than conventional ways [37]. Bangladesh has evolved its manufacturing industries by the utilization of AI technology day by day. The different manufacturing units of Bangladesh are moving closer to AI for their development. This results in a 4th generation revolution in the industries of Bangladesh. By accepting these modern technologies manufacturing sectors of Bangladesh have been able to reduce the raw materials that have been used in those sectors and also able to enhance affectivity and increase chains of supply. This kind of smart manufacturing is the summation of adaptive as well as custom effectiveness. From government data, the manufacturing industries have increased by 13% after using AI technology in their industries [38]. However, this theory does not have proper acceptability. Another government economic report of Bangladesh in 2018 has shown there was a huge contribution to their GDP and that was 29.2% [39].

However, various limitations have created problems for the growth of manufacturing sectors in Bangladesh. Proper demand and supply, skill-related problems, data analysis for production, and more other technological problems should be resolved to make the manufacturing sectors of Bangladesh problem-free. For more advancement, they should use robotic technologies for manufacturing different products in industries [40]. This will be impactful for

every manufacturing sector of Bangladesh. Government must take some relevant policies to more applications in manufacturing industries.

6.4 Bangladesh agriculture and AI

In the agriculture sector, Bangladesh has created an important place in the world. It is known to all that agriculture is also an important factor that the economy of Bangladesh depends on. More than 30% of the people of Bangladesh mainly depend on agriculture to continue their livelihood. By using different government policies Bangladesh has developed its agriculture more and more sustainable. At present, they use AI for agriculture sectors for different purposes. The application of AI helped them to detect the disease of crops, soil condition, and nature as well as physical and chemical characteristics of soil, types of land, irrigation requirements [41]. The Bangladesh government set up 200+ information centers where farmers are helped to farm and suggested better agriculture practices by ex-pats. There were other initiatives by the government of Bangladesh and the Central bank for farmers to make services easy. Recently they have launched a website named **krishi.gov.bd** portal and a helpline number 3331 for supporting the farmers. According to the economic survey report in 2018 of Bangladesh, this has disclosed that the agriculture sector has contributed more than 14% to the total GDP of the Bangladesh economy [42]. For more applications of AI in the agriculture sector, self-regulated robots have been used to farm and harvest

huge amounts of cereal crops from the field. There is also utilization of nano-sensors-based AI technologies for the management of harmful weeds and help to identify the correct amount herbicides should spray to destroy weeds from the agricultural lands. Their government should make some rules to use AI in those sectors properly.

6.5 Use of AI in Transportation of Bangladesh

There were several uses of AI in the transportation system. After the application of AI, Bangladesh has undergone the quickest developing roads, pavements, flyovers. The government has initiated some mega projects that have been targeted to be achieved in the present year. For recent development, the Dhaka Metro Rail and elevated expressway passed by Dhaka has been constructed quickly to make more application of AI in that sector. Though, there are also few limitations that must be checked by the government [43].

6.6 Application of AI in Education Sectors

Bangladesh has created outstanding achievements in the educational and skill development sectors in the last few years. In the education system, application AI has the ability to make several changes. By using this study will be more impactful and application base. With the help of AI visualization and digitalization of education can change the conventional education system [44]. Thus, a student can also benefit from the AI by analyzing their educational performance and will be able to improve them as per requirements. Bangladesh, recently have invested in huge amounts of money for developing the skill of IT industries to make them literate and create a socially informative society [45]. Though, there are also some problems related to the educational application of AI in Bangladesh. The government of Bangladesh should make some long-term plans for the inclusion of AI in the curriculum of tier school education and have to give proper training to students and teachers.

6.7 Application of AI-Based Technology in Finance of Bangladesh

There were also a vast number of applications of AI in the financial sector. Though, the financial sectors are the first sector that adopts AI technologies for their development. Due to more complexity of those

sectors, they accepted AI technology quickly and used it to boost up the services related to customers. Bangladesh has adopted AI technologies for the banking sector for smoother electronic transition with their customers. The government has planned to plant a system on the bank for reducing fraud-related activity. Furthermore, they should use AI-based software for the assessment of risk and personal bank-related issues. Modification of some government policies leads to changes in developing finance sectors [46].

6.8 Health Sector of Bangladesh and application of AI

The health sector has benefited from AI for curing various diseases and research on their medicine. AI application has made surgery easy than before and in many cases, this helped patients from uncertain death. However, in the case of Bangladesh healthcare, there are not too many applications and for that reason, people have to suffer from their disease. It is very important from a Bangladesh perspective to make some impactful strategies to ensure the application of AI in healthcare and medical services. Hence, several challenges have been faced by the Bangladesh health sector and to remove these challenges the government must take effective steps and proper remedy [47].

6.9 Several challenges towards accepting AI in Bangladesh

Though AI has an enormous number of applications and is very helpful for the modern age, it also has some limitations and several challenges for accepting AI. From Bangladesh's perspective, there are also some severe limitations on the application of AI. There is a major risk of unemployment on the application of AI due to the reduction of laborers from several industries [48]. The application of Ai has many benefits in several sectors by reducing load but this may lead to termination of employees in those sectors [49]. By considering the data provided by the World Bank, the excessive use of AI technologies leads to the termination of many employees in India, Bangladesh, and China. Another data has predicted that 800 million jobs will be acquired by robots as well as AI technologies globally, including Bangladesh [50].

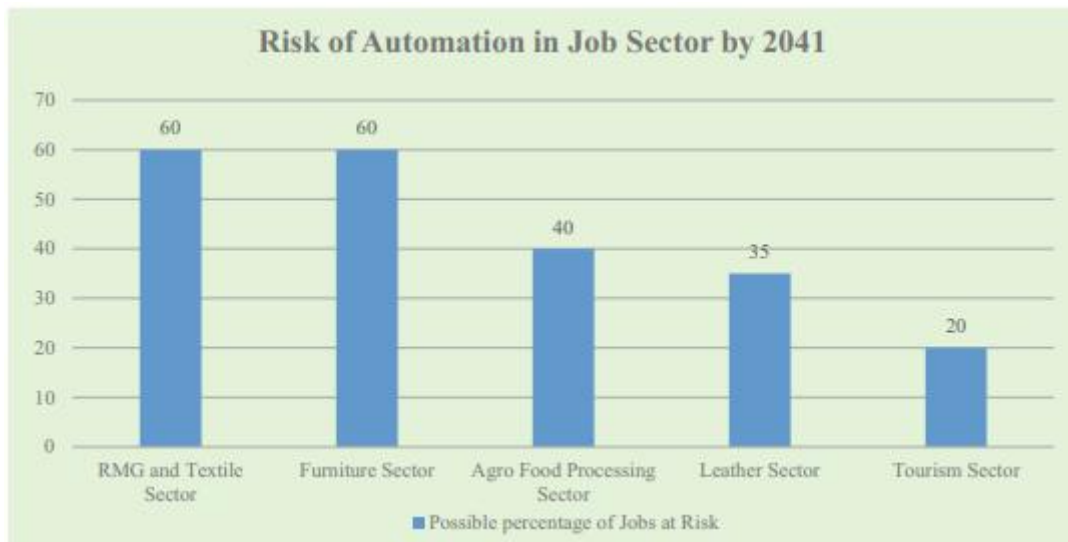


Fig. 11: AI adoption and future of labor market in Bangladesh

(Source: [51])

For AI industries there must be highly skilled and knowledgeable workers needed for any industries to control the AI machinery. There will be a reduction in the demand for less-skilled and moderately skilled workers as they fail to meet requirements. This has created a digital barrier among the people of sensations. The application of AI may change nature and to adopt these changes people have to fulfill the skills of requirements. Privacy-related problems are the most critical problem for the people of Bangladesh and the government should take several initiatives to secure their privacy rights before planning about the application of AI in every sector [52]. However, the shortage of professionals and experts in AI in Bangladesh is also a matter of concern and limitation on taking steps onwards to the acceptance of AI technology. To connect with AI people need to move towards high-speed connectivity like 5G networks. However, the present digital infrastructure of Bangladesh has not supported those types of high-speed connectivity systems. Though, Bangladesh will try to launch a high connectivity network like 5G by 2023 [53].

7. Future prospect and what to do next

Bangladesh can gain a lot from extensive and strategic use of AI, in terms of future prospects. AI has already been effective in different sectors of Bangladesh. The government can incur more profit from AI by applying it in different ways. The administrations of different sectors should recruit and involve more experts to explore new

breakthroughs in technological field with maximum impute from AI [54]. The shortcomings and problems should be taken into account and try to focus on solving the problem related to AI. Necessary government steps should be taken to protect users from unwanted glitches. AI assistance should be proposed to recognized and digitally archive the road map of Bangladesh. An independent AI policy should be proposed. Possibilities of an effective AI based partnership between private and public sectors should be brought into focus so, that both the sectors can be equally profited. Bangladesh should focus into the development in AI based educational system for schools and colleges [55].

8. Conclusion

Use of AI from the workplace arena to daily life has become an inseparable part of human life. AI has not only made life easier but also has affected and accelerated growth in different fields. It not only affects the economic, technological, and social development of a country but also influences individual choices of exchanging and sharing data and information. Artificial intelligence helps in predicting future aspects of a country's economic position in the international market. It also ensures a nation's position in the global technological field.

Bangladesh has proved its worth in the global technological field. Various accolades that have been won by the country prove its achievement in complete digitalization of the country. Bangladesh can acquire a better position in the world economy by

involving more Artificial Intelligence in works and other activities. By implementing better and effective strategies and useful steps on the application of AI into the various systems, Bangladesh can achieve more E- friendly users. Increasing the number of EI applications on different virtual modes increases the number of smart users which improves the country's technological base. The application of AI makes daily lives of people way easier and productive as a whole.

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