



INTERNATIONAL CONFERENCE ON 4TH INDUSTRIAL REVOLUTION AND BEYOND (IC4IR) 2021

To mark the Birth Centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of the Independence of Bangladesh

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University Grants Commission of Bangladesh
Government of the People's Republic of Bangladesh

10-11 DEC 2021
HYBRID MODE
DHAKA, BANGLADESH



President
People's Republic of Bangladesh

Message

25 Agrahayan 1428
10 December 2021

I am delighted to know that the University Grants Commission of Bangladesh is going to organize an International Conference on 4th Industrial Revolution (IC4IR) on 10-11 December 2021 in Dhaka.

To build a poverty and unemployment-free Bangladesh, the presence of necessary skilled manpower is crucial. Bangladesh now has more people of working age than that of dependant one. By 2030, the population aged between 15 and 64 years would rise to 70 percent and then it would start declining. Therefore, an appropriate planning should be formulated to take advantage of this opportunity of demographic dividend. The present government has taken a number of breakthrough initiatives to produce skilled manpower, especially by reforming the country's education system. Moreover, to develop skilled manpower with specialized knowledge to cope with the 4th Industrial Revolution, the government has established Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University, Bangabandhu Sheikh Mujibur Rahman Digital University along with a number of new science and technology universities. The government has continued its effort to build necessary ICT infrastructure at the Union, Upazila, District, Divisional and Central levels, allowing IT services to reach at the doorsteps of the people.

The higher education institutes of the country should follow an Innovative Education Ecosystem (IEE) so that the benefit of the 4IR can be realized. Higher education institutes need to be more focused on innovation and research to accelerate the country's growing economic development. The conference, organized by the University Grants Commission, will be attended by three Nobel laureates and seven eminent scientists and experts from home and abroad. In addition, the conference has two important events titled 'Mujib 100 Idea Contest' and 'Mujib 100 Industry Exhibition' which will help in spreading innovative and creative thinking among the youth. I believe that the discussion and exchange of experiences of eminent scientists from home and abroad at the conference will play an important role in introducing them to innovative sciences.

I wish the International Conference on 4th Industrial Revolution a grand success.

Jai Bangla.

Khoda Hafez, May Bangladesh Live Forever.

Md. Abdul Hamid
Md. Abdul Hamid



Message

Dr. Dipu Moni, M.P
Honourable Minister
Ministry of Education
Government of the People's Republic of Bangladesh

It is a matter of immense pleasure that the University Grants Commission (UGC) of Bangladesh is going to host a two-day long International Conference on 4th Industrial Revolution and Beyond (IC4IR) 2021 on 10-11 December 2021 as part of the celebration of the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of Independence of Bangladesh. On this auspicious occasion, I would like to extend my heartfelt congratulations to the UGC and other relevant stakeholders of it.

We are living in an era where knowledge and skills are inevitable as well as undeniable to keep pace with today's globalized world. Our people will be enriched if they are equipped with the skills of 4IR such as Artificial Intelligence, Robotics, Blockchain, Machine Learning, Quantum Computing, Big Data and other emerging technologies. To achieve the Sustainable Development Goals (SDGs) and implement Vision 2041, there is no alternative to materializing the huge potentials of 4IR in every sector of the country without any delay. These skills can be achieved by developing an innovative entrepreneurial educational ecosystem, which will contribute to building linkages between industry and academia. Implementation of the dream of Digital Bangladesh in almost every sector as well as in the daily lives of the masses of our country over the last thirteen years has created an appropriate platform to kick-off such an international event.

I strongly believe that the IC4IR will encourage university students, teachers, researchers and relevant stakeholders in formulating a realistic plan to achieve the Vision 2041. We do believe that such an international conference will create tremendous momentum in the arena of research and innovation at tertiary level since it will work as an appropriate platform to link academia and researchers both from home and abroad.

Participation of Nobel Laureates and renowned academics from top ranked universities and organizations across the world will add significant values to the conference. It will pave the way for solving local as well as global problems in industrial domain through realistic application of frontier technologies.

I wish the conference a grand success.

Jai Bangla, Jai Bangabandhu
May Bangladesh live forever.

08 December 2021

Dr. Dipu Moni
Dr. Dipu Moni, M.P



Message

Prof. Dr. Kazi Shahidullah
Chairman
University Grants Commission of Bangladesh

It is a matter of great pride for me and the UGC family to host the two day long International Conference on 4th Industrial Revolution and Beyond (IC4IR 2021) to be held on 10-11 December 2021. As the Chairman of the apex statutory body of the country's higher education institutes, I would like to take the privilege to extend my sincere thanks to all, who worked hard to arrange this mega international event.

The UGC is organizing this gala conference as part of the celebrations of the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of Independence of Bangladesh. The IC4IR 2021 is to be conducted in the hybrid mode of both physical presence and virtual platform. The conference aims to unite researchers, academic, entrepreneurs, businesspeople, industrialists and practitioners in diverse domains from home and abroad.

The present government led by Prime Minister Sheikh Hasina has been working tirelessly for the last several years with a view to building Bangladesh as a developed, prosperous and resourceful country by the year 2041. Vision 2041 strives to eradicate extreme poverty and gain the status of the Upper Middle-Income Country (UMIC) by 2030 and the status of the High-Income Country (HIC) by 2041. On the way to translating these dreams into reality, there will be a lot of changes during the forthcoming two decades in the style and working pattern in agriculture, industry, trade and commerce, education, health, transportation and communication sectors. Different technologies of 4IR like artificial intelligence, robotics and automation, Internet of Things (IoT), data analytics and cloud computing, communication and network signals and natural language processing will transform the way we live, work, and relate to one another.

The country will require huge workforce with appropriate skills to deal with these emerging technologies. The higher education institutes will have to play a pivotal role in this regard to produce skilled graduates. The existing collaborative relations among the higher education institutes and the industries have to be strengthened in coming days. This will help the tertiary level education institutes know the needs of industries and redesign their academic curricula in line with their demands.

I strongly believe that the conference will turn into an ideal platform to discuss all the pressing issues relating to impending challenges of 4IR. Hopefully it will also bring out a set of recommendations for the policy makers and higher educationists to confront the challenges. This will ultimately help the country's current pace of economic growth grow faster.

I wish the conference a grand success.

08 December 2021

Prof. Dr. Kazi Shahidullah
Prof. Dr. Kazi Shahidullah

Innovative Education Ecosystem (IEE) is the key to Realize the Dream of 4IR

Now-a-days, a genome sequence can be acquired by using computing power in a few hours at the cost of less than one thousand dollars, while the first human genome project took 10 years at a cost of 2.5 billion dollars to map the human genome sequence. Therefore, to obtain the faster solution of a problem like this, an interaction between computing and genetic engineering is inevitable, enabling the exploration of new avenues of knowledge. Certainly, an integration between these two disciplines, obtained by this interaction, takes them to the new level of knowledge, and can be termed as evolution. Because of the presence of continuous interaction, integration and the evolution between the entities such a method should become dynamic in nature. The combined result of such an approach, resulting in blurring the difference between biology and computation, which is called convergent. Sensors are now widely used to collect data from the physical world (for instance, agriculture, atmosphere, route network, traffic management and many others), facilitating the development of data analytics/prediction models by using machine learning tools. Therefore, prediction of a phenomenon is becoming cheap and accurate, playing an important role in the decision making process. The integration of the physical world with the computer world is rightly delineated with this example. Such an integration opens a new avenue of knowledge, which was out of the scope of this domain before. The above outlines the appearance of a novel civilization, coined by the interaction and integration among physical, computing and biological worlds through a process of continuous evolution or dynamism over time. Such evolution takes place in the cyber-physical space, which is extensively known as Fourth Industrial Revolution (4IR) or Industry 4.0.

Artificial Intelligence, Robotics, Internet of Things (IoT), Cognitive Computing, Cloud Computing, 5G, Quantum Computing, Biotechnology, and Nanotechnology are at the heart of this 4IR. In the other parts of the world, especially in the Scandinavian countries, they are preparing their manpower to take advantage of 4IR. This is the reason, these countries have integrated Artificial Intelligence and Robotics in their education, starting from primary level to higher education with an objective to prepare the cognitive mind of their human resources to lead the 4IR. The charm of this 4IR is that it is expanding faster than from the other three industrial revolutions and empowering human beings equally.

It took 120 years for the first industrial revolution to get out of Europe, which was powered by steam engines, where the production system was mechanized. 1.2 billion People are still out of electricity until now because of the benefit of the second industrial revolution, which was powered by electricity and led to mass production. Half of the world population is still out of internet access because of the third industrial revolution, which is underpinned by the electronics and information and communication technology, known as digital revolution. However, this is not the case with the Fourth Industrial Revolution (4IR) because in this novel civilization, systems are embedded in society as well as in the human body. We are moving towards a time where we can recognize the presence of ambient intelligence, known as pervasive computing because of the presence of Internet of Things, Robotics, Artificial Intelligence, 5G, Blockchain, cognitive computing and nanotechnology. In this era of civilization, skill is important and without this it is difficult for a human being to survive. People will become rich within a short period if they are equipped with 4IR skills. Hence, the exponential economic growth of a country would be observed as long as the presence of people with 4IR skills are available. For example, 5G technologies will completely change the present business model and hence, the business education should be equipped to cope with this new scenario.

The present computer science education requires a serious shaking because it lives in the third industrial revolution. The same is true for the Electronics and Electrical Engineering education, where the concept of smart grid is emerging, which requires the integration of AI thoughts and nanotechnology. The education of medical science should be equipped with the core subjects of 4IR. This is true in other disciplines such as biological sciences, business sciences, social sciences and arts. In addition, all over the world the optimal utilisation of the university resources remains unutilised, because of the absence of an Innovative Educational Ecosystem (IEE), allowing the linking between industry and academia. As mentioned the core of 4IR is the convergence, which in this case consists of taking advantage of industry and academia linkage. Such convergent is really absent, especially in the higher education system of Bangladesh since our universities are yet to set their mind to change the course curriculum to realise the potential of such an innovative educational ecosystem. Hence, it can be argued that our current education system is not equipped with appropriate research, teaching and learning methods and tools, enabling the realization of the huge potential of 4IR. Certainly, university graduates do not possess the skills to live in the era of 4IR with dignity and dynamism.

The hierarchical organization management structure, which is very much centralized, is replaced by decentralized architecture in the era of 4IR. For example, the water supply system of a town is very much centralised and is unable to solve the water crisis for its inhabitants in a sustainable way. This is true for the traffic management system and this is the reason, no cities in the world are able to solve traffic jams.

The implementation of 'Digital Bangladesh' in the last thirteen years by developing huge information and communication technology (ICT) infrastructure all over the country, almost in every sector as well as in everyday life of the people has created an appropriate platform to kick-off 4IR in our country. Indeed, such realization of 'Digital Bangladesh' is considered as the implementation of the dream of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman. The eminent computer scientist of our time Sajeed Wazed, Honourable ICT Affairs Advisor to the Prime Minister is considered the architect of 'Digital Bangladesh'. To implement the vision 2041 of our Honourable Prime Minister Sheikh Hasina, the daughter of the Father of the Nation, where Bangladesh has been envisioned to become a rich country with a per capita income of 15,000 USD as well as empowering the people equally, there is no alternative but to realise the potential of 4IR without delay. The annual financial budget of the government will become 600 billion dollars in 2041 from today's 50 billion dollars. The GDP size of the country will become 2.6 trillion dollars in 2041 from today's 225 billion dollars.

Taking the above view point into account, University Grants Commission (UGC) of Bangladesh is organizing a 2-Day International conference between 10th December and 11th December 2021 in the area of Fourth Industrial Revolution to commemorate the 100th Birth anniversary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman as well as the Golden Jubilee of the country. Such a conference will create a tremendous momentum in the area of research, teaching and learning, especially at higher education level because this will work as an appropriate platform to develop IEE, enabling the realization of 4IR. The presence of Nobel Laureates as well as distinguished scholars from all over the world in various sessions of the conference would play an important role to develop appropriate ways out to realise the potential of 4IR in our country. The outcome of this conference will also help in achieving Vision-2041 by formulating specific recommendations for the implementation of the Fourth Industrial Revolution in every sector of the country.

Professor Dr. Md. Sazzad Hossain

Member
University Grants Commission of Bangladesh (UGC)
Chair, Organizing Committee, IC4IR



EVENT MANAGER: CEMS



Prime Minister
Government of the People's Republic of Bangladesh

Message

25 Agrahayan 1428
10 December 2021

I am pleased to know that the University Grants Commission (UGC) of Bangladesh is going to organize International Conference on the 4th Industrial Revolution and Beyond (IC4IR 2021) on 10-11 December 2021. I extend my sincere thanks to the UGC authority and other stakeholders for taking such an initiative to mark the celebrations of the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of the Independence of Bangladesh.

The participation of three Nobel Laureates and seven world-renowned scientists enriches this event. 'Mujib-100 Idea Contest' and 'Mujib-100 Industry Exhibition' are being organized as part of this event which has already created a lot of enthusiasm among the students, teachers, and scientists of our country.

The country's economy has been consistently achieving high growth for the last thirteen years due to various measures taken by our government in the reality of the 21st century. Development of the agricultural sector, expansion of the service sector, export earnings from the readymade garments sector, and remittances from expatriates have been the major driving forces in achieving the country's socio-economic progress. However, we need to accelerate the current trend of increasing economic growth to transform Bangladesh into a prosperous and wealthy country by 2041. Achieving this goal requires prioritizing investment growth, human resource development, and increased productivity within the framework of an Innovative Technological Ecosystem (ITE).

We are currently going through the fourth industrial revolution, which has brought many challenges to developing and developed countries. Yet, at the same time, it is creating opportunities for the implementation of innovative technological ecosystems. For example, the rapid spread of digitization, robotization, and intelligent automation has a significant impact on the current and future labor market. As a result, on the one hand, labor-dependent employments are shrinking; on the other hand, new employment fields and opportunities are being opened up.

Our government is working to transform our young generation into skilled human resources to meet the challenges of the Fourth Industrial Revolution. Higher education institutions of the country have to play a leading role in producing competent graduates as per the demand of various industrial and commercial institutions. Universities need to take the initiative to create an Innovative Education Ecosystem (IEE) through joint collaborative activities to solve multiple problems of industry and commerce organizations in our own capacity.

Our government has established several new science and technology universities, including Bangabandhu Sheikh Mujibur Rahman Maritime University, Bangabandhu Sheikh Mujibur Rahman Aviation and Aerospace University, and Bangabandhu Sheikh Mujibur Rahman Digital University, to create specialized knowledge and skilled human resources. We want to build our institutions of higher learning as a breeding ground for innovation, research, and development, and the Awami League government is committed to providing the necessary support for this.

I am very much interested in the recommendations and directions that will come out of this conference. I believe that the guidelines and recommendations received will play an essential role in enhancing the skills of our graduates and in formulating forward-looking realistic policies to meet the challenges of the Fourth Industrial Revolution. In addition, by achieving economic growth, the greatest Bengali of all time, Father of the Nation Bangabandhu Sheikh Mujibur Rahman's dream of 'Golden Bangladesh,' will be built by 2041.

I wish this conference a complete success.

Jai Bangla, Jai Bangabandhu
May Bangladesh Live Forever.

Sheikh Hasina
Sheikh Hasina



Message

Mohibul Hassan Chowdhury, M.P
Honourable Deputy Minister
Ministry of Education
Government of the People's Republic of Bangladesh

I am glad to know that the University Grants Commission of Bangladesh (UGC) is going to arrange an International Conference on 4th Industrial Revolution and Beyond (IC4IR) on 10-11 December 2021 in Dhaka. I would like to extend my sincere gratitude to all those who are involved in arranging the conference to mark the celebrations of birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of Independence of Bangladesh.

Skilled manpower plays a vital role to keep the wheels of economy moving forward. To this end, the present government has established numerous technical education and training institutes, including specialized universities, science and technology universities to build skilled human resources in line with the needs of the global labor market. After assuming power in 2009, the government has taken and implemented different initiatives for the quality enhancement of technical education. These initiatives have changed perception of students and parents about technical education. Another outcome of these initiatives is increasing enrolment for technical education from the previous 1 percent to 15 percent today. Our government has set a target to raise it to 30 percent by 2030. I think it has now become a demand of time to take an integrated plan for the development of technical education system.

It has been mentioned in a report of the World Economic Forum that 65 percent of children entering primary school today will ultimately end up working in completely new job types that don't yet exist. It is high time to assess the numbers and types of manpower our job market will require. Our educational institutes would be able to take necessary preparations once the demands of our industries are available. If we fail to cater the needs of our industries, they would seek skilled manpower from abroad. This will remit our currency abroad.

Our higher education institutions need to be more proactive in undertaking joint collaborative activities with the country's industrial and commercial institutions. They have to play a role in solving the industrial problems through research and innovation.

I expect necessary suggestions and recommendations would come out of the discussions of the experts to help our higher education institutes take necessary steps for producing skilled graduates to meet the challenges of 4IR.

I wish the conference a grand success.

Jai Bangla, Jai Bangabandhu

December 2021

Mohibul Hassan Chowdhury
Mohibul Hassan Chowdhury, M.P



Message

Md. Mahub Hossain
Secretary, Secondary and Higher Secondary Division
Ministry of Education

It gives me immense pleasure to note that the University Grants Commission of Bangladesh (UGC) is going to organize an International Conference on 4th Industrial Revolution and Beyond (IC4IR) during 10-11 December 2021 in Dhaka as part of the celebration of the birth centenary of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman and the Golden Jubilee of Independence of Bangladesh.

I strongly believe that the experts from both home and abroad, who are attending the conference, will discuss the necessary steps to be undertaken by the universities of Bangladesh to develop skills of our youths. At the same time, the foreign experts will also be able to know about the different initiatives and future plans of our government in this regard. I would like to congratulate all involved in arranging this event.

The future economic progress of our country largely depends on the producing of skilled manpower through proper education and training. After assuming power in 2009, the present government under the leadership of Honourable Prime Minister Sheikh Hasina has taken a number of breakthrough initiatives to produce skilled manpower through development of the country's education system. Different initiatives like modernization of classrooms with necessary equipment, development of modern research laboratories, supply of modern equipment to the existing laboratories of education institutes, establishment of computer laboratories, library automation, overseas training for teachers and students as well as revision of curricula are going on for the development of teaching-learning environment of our education institutes.

The Fourth Industrial Revolution is currently the most discussed topic in the world. Use of different technologies of 4IR like Internet of Things (IoT), Artificial Intelligence, Robotics, Blockchain etc will cause unimaginable changes in the production system. In near future, machine will outperform human labour force in almost all the manufacturing industries.

At this backdrop we need to take extensive preparations to face the complex challenges that the 4IR is entailed with. In order to take advantage of the opportunities. Our main goal must be to create skilled human resources suitable for handling the potentials and perils of the 4IR. This will require a considerable changes in the education system.

Our youths have tremendous merits and potentials. It would be easier for the government to achieve Vision 2021 and Vision 2041 if we could turn our young population into a skilled human resource through proper interventions.

I wish the Conference a grand success.
May Bangladesh Live Forever

Md. Mahub Hossain
Md. Mahub Hossain