

## Bangladesh and the World: In 2050 and beyond

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### Abstract

*The millennium development goal was set to target goals for developing mainly the developing and less developed countries. After completing the goals, the world leaders are inspired to take a broader vision to take Sustainable Development Goals by 2030. The goals are targeted with 17 visions for the development of all. The development program is an interconnected system of action to bridge the gap in different sectors of the countries with the world.*

*4<sup>th</sup> industrial revolution is an interconnected manufacturing and business process in a cyber-physical environment. The disruptive technologies of the 4th Industrial Revolution are rapidly changing the systems and networks of business and manufacturing. These changes are seen across companies, industries, countries, and society. These technologies can also affect the environmental, economic, and social challenges of the 2030 Agenda for Sustainable Development Goals in values for business, society, and the environment.*

*According to a United Nations report, the current world population is 7.6 billion, expected to reach 8.6 billion by 2030, 9.8 billion by 2050 and 11.2 billion by 2100. Only in Asia will the population be 5.2 billion by 2050, more than half of the world's population. Three billion of them will live in urban areas. Urban areas will be the centres of higher education, innovation, and technological development for economic activities. The quality and efficiency of urban areas will determine the country's long-term competitiveness and socio-economic and environmental stability.*

*Bangladesh has a reasonable GDP growth rate and a globally compatible policy for innovation and technological development, education, health, and the environment. It will meet the demand of the world in 2050 and can contribute to the global economy from Asia with PRC, India, Indonesia, Japan, Republic of Korea, Thailand and Malaysia.*

**Keywords** Industry 4.0 · Industry 5.0 · Society 5.0 · TWIN 2050 and SDG ·

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## 1. Introduction

In evaluating millennium development goals MDG, the data and analysis presented that, with targeted interventions, sound strategies, adequate resources and political will, even the poorest countries can make dramatic and unprecedented progress. The evaluation report also acknowledges uneven achievements and shortfalls in many areas. The work is incomplete and must continue in the new development era.

The new development era is the sustainable Development Goals set in 2015 by the United Nations General Assembly and are intended to be achieved by 2030. SDG is taken under UN Resolution 70/1, as the AGENDA 2030. The Agenda is committed to removing poverty and achieving sustainable development worldwide by 2030. It is a shared global vision toward sustainable development for all. The proposal contained 17 goals with 169 targets.

SDG vision 2030 is an agenda with 17 targets for sustainable development for all. But vision 2050 aims to achieve socio-economic sustainability within a stable earth system.

The United Nations Intergovernmental Panel on Climate Change 2018 Report stated, "Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in society." In recent years, it has become clear that this scenario would require a transformation of our energy system to meet our global emissions targets and a rethinking of how we control the temperature of our homes, travel around our planet, and manufacture our goods.

The achievement of a sustainable development goal mainly depends upon sustainable economic development. There is a clear link between industry 4.0 and society 4.0 with the SDG 2030 and the industry 5.0 and society 5.0 with the TWIN 2050.

## 2. Development Sustainability

Development is measured using the Human Development Index. The United Nations calculate HDI. It measures average life expectancy, level of education and income for each country.

The main challenges to sustainable development, which are global, include poverty and exclusion, unemployment, climate change, conflict and humanitarian aid, building peaceful and inclusive societies, building strong institutions of governance, and supporting the rule of law.

SDG 2030 is a shared global vision toward sustainable development for all. The proposal contained 17 goals with 169 targets. These included ending poverty and hunger, improving health and education, making cities more sustainable, combating climate change, and protecting oceans and forests.

Sustainable development as a political and scientific agenda emerged as a political vision with the Report "Our Common Future" in 1987 by World Commission on Environment and Development 1987. Modern science and technology are essential for ecolizing the economy.

A strong economy implies a high rate of economic growth. It means an expansion in economic output; it will lead to higher average incomes, higher output and higher expenditure—low and stable inflation.

GDP has always been a measure of output, not of welfare. Using current prices, it measures the value of goods and services produced for final consumption, but GDP is not a measure of human welfare. It can be considered some other component of welfare like Social and environmental.

Development is measured by average life expectancy, level of education and income for each country. GDP growth has varied over the world for a long time. Developing countries have had a significant increase in life expectancy and levels of education since 1960. If the GDP growth rate in developing countries can return to the rates of the 1960s and 1970s, we can see a new world in 2050. The total GDP of the developing countries in 2050 will be higher than developed countries.

Global life expectancy at birth in 2016 was 72.0 years (74.2 years for females and 69.8 years for males). Women live longer than men all around the world. The gap in life expectancy between the sexes was 4.3 years in 2000 and had remained almost the same by 2016 (4.4). Global average life expectancy increased by 5.5 years between 2000 and 2016.

World illiteracy and the percentage of populations without schooling have already decreased, from 36% in 1960 to 25% in 2000, and in 2016 it is 14%. A higher education rate is essential for countries to achieve higher economic growth. Education is one of the fundamental factors of development. Education raises people's productivity and creativity and promotes entrepreneurship and technological advances. In addition, it plays a crucial role in securing economic and social progress and improving income distribution. There is a strong relationship between growth and income inequality.

### **3. Industry 4.0 is a Shared Vision of Global Growth**

Industry 4.0 is the digital transformation of manufacturing, production, related industries, and value creation processes for goods and services. Industry 4.0 rapidly transforms manufacturing systems, products, and components' design, production, implementation, operation, and service.

Industry 4.0 is also called the 4th industrial revolution due to the exponential capacity of innovation and unprecedented power of productivity. It is different from the other three industrial revolutions. It enables a new production system, value creation, and real-time optimisation. Industry 4.0 is leading towards a new industrial value chain and fundamental process of transformation and innovation in industrial production.

Industry 4.0 is knowledge-based industrial processes for making manufacturing more innovative and cost-effective using disruptive technologies. Industry 4.0 depends on several innovative technological developments such as information and communication technologies, which are used for digitising information and

integrating systems at all stages of product design, development, manufacturing and service. This integrated system can be adopted inside an organisation or country and cross-organisational in different countries.

Industry 4.0 can solve *some of the world's challenges, such as resource and energy efficiency, urban production, and demographic change*. The interconnected system of manufacturing goods and its services of industry 4.0 enables *resource productivity and efficiency* gains to be delivered across the entire value network. It allows work to be organised to consider demographic change and social factors.

The transformative impact of disruptive technologies on societies and economies increases the demand for technological innovation in emerging markets, which tend to adopt technologies and develop elsewhere. To take advantage of technological innovation and disruption, national and international regulators must consider critical issues like privacy, data security, and competition if the current wave of disruption benefits all.

Reducing poverty and increasing shared prosperity in emerging markets depends on improving the rate at which these emerging markets adopt the new technologies. The exponential capacity of innovation and unprecedented productivity power of the disruptive technologies amplifies opportunities for transformation not only for production, but the interconnection will create economic and social value by enabling users to share knowledge, labour, digital or physical, as the resources.

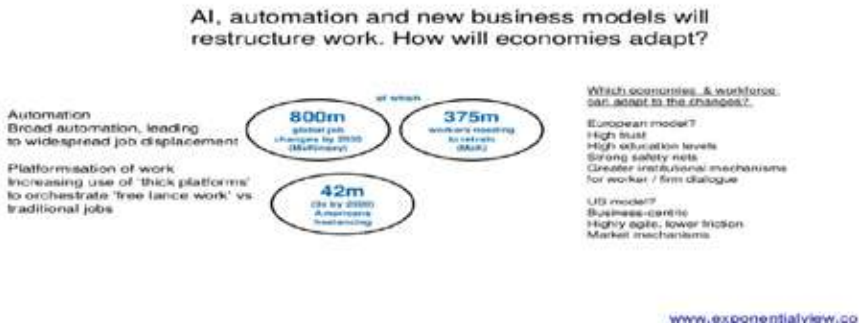
Technological innovations and their adoption as a shared vision can narrow income differences between developing and developed countries by reducing the technology adoption gap. Developing countries can come out from the late arrival of disruptive technologies.

#### **4. Industry 4.0, Disruptive Technology and Employment**

Automation of manufacturing and business services is integral to technological progress and may significantly impact the labour market. The impact of automation can be crucial in countries where unemployment is high and employment is low. Therefore, nations must prepare themselves for the potential risks associated with the impact of digital technologies on the labour market.

Automation in manufacturing and business services is the system of industry 4.0 fuelling the 4<sup>th</sup> industrial revolution by using disruptive digital technologies. It is an interconnected model of higher productivity and growth.

Figure 1: Automation and Jobs



*Source: exponentialview.com*

### Automation in the manufacturing sector

One of the most critical application areas for automation [technology](#) is manufacturing. Through *automatic control*, industries can process and manufacture goods with little human assistance. *In an automated industry*, control systems and data management equipment for processing, design, manufacturing goods and other activities. It can boost output and efficiency by using disruptive digital technologies at a different layer of production.

Automation in manufacturing is used to perform repetitive tasks with little or no human intervention. The manufacturing system uses software and hardware to control processes through computer programming. AI, big data, robotics, and the internet increase manufacturing automation demand. Which is transforming the nature of work very fast. Manufacturing automation destroys jobs for the unskilled workforce and creates jobs for the skilled workforce. The Fourth Industrial Revolution begins a mismatch between available workers and the skills necessary for new jobs.

### Automation in the business service sector

Business automation is a component of digital transformation. It uses data, software, hardware, and the infrastructure that supports operational activities of business automation technologies to upgrade the traditional business processes.

Service automation is adopting disruptive technologies and integrating automation in different layers of business services. It is the process of automating events, processes, tasks and business functions. It increases the workflow and visibility of a business.

At the same time, these disruptive technologies are transforming the nature of work in the business service sector. Technology is doing more tasks than the human workforce. As a result, some jobs are already declined, others are growing, and many more will change.

To meet the challenges of unemployment, new employment opportunities and underemployment, slow diffusion of the technologies can make a company or a country a “late comer” in the 4<sup>th</sup> industrial revolution. Companies and governments should benefit from disruptive digital technologies’ enhanced performance and productivity. The benefits of these technologies will create economic surpluses that will help societies manage workforce transitions.

Entrepreneurship and rapid new business formation will boost productivity and drive job creation. It will increase productivity growth. Investment in new business formation and adoption of disruptive technology is essential; otherwise, the productivity slowdown is risky.

Investment in developing human capital to increase the skill of workforces according to industry 4.0 is a fundamental factor now. The leaders, governments, academic institutions, industry players, and technologists have significant responsibilities for the appropriate policy at the local, regional and global level of transformational operation in the business and manufacturing sector.

## **5. Industry 5.0**

The concept of industry 5.0 is an evaluation of industry 4.0. We are on the doorstep of a new transformation in Industry 5.0. Industry 4.0 is an interconnected manufacturing process under a cyber-physical environment using disruptive technologies, increasing safety and quality, and reducing waste. The new industrial age originates from the unprecedented innovation and production capacity of the technologies 4.0, mainly in the ICT, AI and robotics fields, leading to Cyber-Physical systems and increasingly powerful IoT devices. Industry 5.0 will cooperate more with machines and humans to add value to the goods and meet customers’ requirements. Industry 5.0 will use cobots and Intelligent Software applications. Unlike the robots currently used in the production cycles, Cobots are collaborative robots programmed to interact with humans in a distributed workplace for the same goal. The differentiation and personalisation of products can’t be done without the guidance of the human mind.

Not a long time industry 4.0 was started as an interconnected manufacturing process. The world is not entirely connected with the connected manufacturing process at a higher percentage. The world is threatened by lower average productivity growth because of the lower affordability of modern technologies in developing economies.

Yet, visionaries are already forecasting the next revolution, Industry 5.0. Suppose the current revolution emphasises the transformation of factories into IoT-enabled innovative facilities that utilise cognitive computing and interconnect via cloud servers. Industry 5.0 focuses on returning human hands and minds to the industrial framework with a close and cooperative interaction between man and machine. There will be more upper-skilled workforces for the manufacturing operation and need more affordability for adopting these technologies.

Industry 5.0 is the revolution in which man and machine will find ways to work together to improve the means and efficiency of production. Artificial intelligence will improve the robots' more humanlike capabilities, and the interaction between computers, robots and human workers will ultimately become more meaningful and mutually interactive for the same goal. Industry 5.0 will create more productivity, increase safety and quality and reduce waste. It could ensure a healthier industrial environment by using more electric power than traditional energy.

The vision of industry 5.0 will affect the working world soon by making up new, more specialised and better jobs. Artificial Intelligence and cobots in the sector aim to facilitate employees, not eliminate them. The collaborative dimension of the next revolution will reduce workload by freeing the employees from the most complex duties.

## **6. Society 5.0**

First was the hunting society. Second is the agrarian society. Third, the industrial society and Fourth, the information society. The fifth stage will be an Imagination Society. The combination of diverse people's digital transformation, imagination, and creativity will solve society's problems and create new values.

There is a transition to Society 5.0 and the 4th Industrial Revolution. Both the concepts refer to the transformation of the world towards a new paradigm.

Industry 4.0 can be efficiently used to control and improve vital resources, energy, water, and waste by connecting and automatically exchanging information through an interconnected communication system.

The well-being of our future will be dependent on how we can produce technology that can govern our climate, health, social equity and stability. Technology 4.0 can be used to mitigate and provide a solution for enhancing our way of life by producing sustainable products and services.

In Society 5.0, any product or service will be optimally delivered according to people's needs. Society 5.0 will help overcome significant social challenges such as an ageing population, social polarisation, depopulation, and energy and environment constraints.

"Society 5.0" was presented as a core concept in the 5th Science and Technology Basic Plan, adopted by the Japanese Cabinet in January 2016. It was identified as a growth strategy for Japan. The Japanese government and business community want to seize the golden opportunity to reverse lingering adverse trends. They aim to create a society where they can resolve various social challenges by incorporating the fourth industrial revolution innovations like IoT, big data, artificial intelligence, robot, and the sharing economy into every industry and social life. By doing so, the future society will be one in which new values and services are continuously created, making people's lives more conformable and sustainable. This is Society 5.0, a super-smart society. Japan wants to take the lead to realise this ahead of the world.

The central concept of the proposal is Society 5.0, based on the idea that human society is moving into a fifth stage. They evaluate the last year that the Japanese economy grew gradually and consistently. The international environment is undergoing a dynamic transition. They have entered an uncertain world in which digital technology is bringing significant changes to the economy and the foundations of society itself.

Society 5.0 will bring profound changes to people's lifestyles and industries. Society 5.0 aims to use the potential of the digital transformation not only for economic growth but for the solution of social issues and coexistence with nature. It can also help to achieve the United Nations Sustainable Development Goals SDG. In this context, policymakers, business practitioners, scientists, and intelligent societies are working together to add sustainable value to reinforce the positive aspects of technology's effect on nature.

Japan is facing some challenging problems, but the government and business leaders see the concept of Society 5.0 as being a way to overcome these. Japan might then be able to share its own experience with the rest of the world, given that other countries may encounter similar problems sooner or later. Japan is not the only high-income country facing an ageing population and sluggish demographic growth while struggling to compete in the new digital economy. Many developing countries are also facing the same problem.

In June, the Japanese government is preparing to present its vision for Society 5.0 and the link between Society 5.0 and the SDGs at the G20 Summit in Osaka. EXPO 2025, which will be held in Osaka on the themes of the SDGs and Society 5.0, should offer Japan another opportunity to share its novel vision for the future with the world.

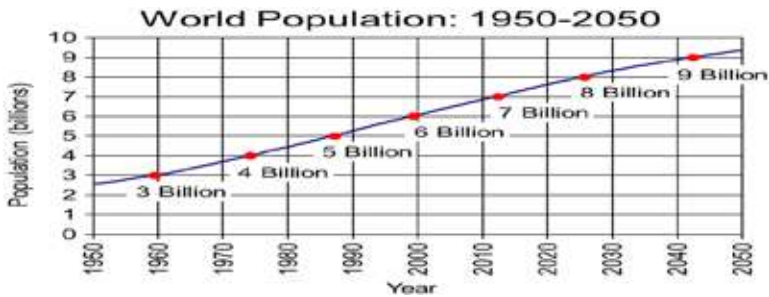
## **7. Industry 4.0 Urbanisation and Environment**

The new evolution of the production and industrial process by disruptive digital technologies under a cyber-physical environment called Industry 4.0 is still moving forward with an unknown potential impact on sustainability and the environment. However, the technologies have the unprecedented capacity for innovation and increased productivity.

According to a United Nations report, the current world population is 7.6 billion, expected to reach 8.6 billion by 2030, 9.8 billion by 2050 and 11.2 billion by 2100. By 2050, 70% of the world population will live in urban areas, with more than half of them concentrated in Asia.



Figure 2: The World Population Growth by 2050



An increasing number of people live in the urban areas of the world. Almost half of the world's population will live in urban areas by 2020 because of the growing contribution of metropolitan regions to developing countries' economies.

The United Nations have projected that the global population in urban areas will reach 66% by 2050. Many studies have described that urbanisation affects CO<sub>2</sub> emissions and heat and the circulation of water, aerosols, and nitrogen in the climate system.

The Paris agreement introduced an ambitious goal of limiting global warming to 1.5°C above the pre-industrial level. A preview model shows that transforming the land sector and deploying measures in agriculture, forestry, wetland, and bio-energy could contribute about 30% or 15 billion tons of carbon dioxide to the global mitigation needed in 2050 to meet the 1.5°C targets. Risks and barriers must be addressed, and incentives will be necessary to scale up mitigation while maximising sustainable development, food security and environmental co-benefits.

Much work has not yet been done regarding the interrelations between industry 4.0 advanced manufacturing and urban development. Industry 4.0 and advanced manufacturing are topics of high international relevance. Urbanisation is a megatrend that will significantly shape societies' economic, political, and social transformation and spatial impacts.

Integrating Industry 4.0 with the sustainable development goals in an eco-innovation platform cannot ensure environmental performance. So, the United Nations Intergovernmental Panel on Climate Change 2018 Report stated, "Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society." In recent years, it has become clear that this scenario would require a transformation of our energy system to meet our global emissions targets and a rethinking of how we control the temperature of our homes, travel around our planet,

and manufacture our goods. Decarbonizing for a zero-emissions world by mid-century would require precise and efficient measures, adopted and implemented rapidly – and we have the technologies to pursue this direction.

This work can contribute to helping stakeholders, practitioners, and governments advance solutions to deal with the outcomes emerging through the massive adoption of disruptive technologies and support the expected positive impacts through policies and financial initiatives.

## **8. ICT 4D**

ICT 4D refers to information and communication technology for development. Industry 4.0 is an interconnected manufacturing and service system that automates service operations and manufacturing under a cyber-physical environment. Big Data is the primary source of automatic decision-making through information and communication technology and devices, requiring less human labour.

Industry 5.0 is also a related business and service sector that manipulate data for decision making and human-robot interface for customer-centric manufacturing of goods and services, where information and communication technology will play a significant role.

Society 5.0 is an integrated approach to empower humans to build a healthy environmental society for all, where manufacturing and waste recycling will occur through interconnected systems that will use digital technologies for the operation. Information and communication technology will play a significant role. It will also collect data for the requisite development priority selection through an interconnected decision-making process.

Industry 4.0, Industry 5.0, and Society 5.0 are interconnected systems of development of the existing system. Development 4.0 is an interrelated and interconnected development program; this is the global vision where faster, reliable connectivity is necessary. For international connectivity, ICT is the primary vehicle. For this reason, ICT 4D refers to Information and Communication Technology for Development.

The United Nations Development Program 2018. Development 4.0: Opportunities and Challenges for Accelerating Progress towards the Sustainable Development Goals in Asia and the Pacific forwarded the following assumption.

“Rapid advances in technology will profoundly affect societies in Asia-Pacific. The Fourth Industrial Revolution—characterised by innovations such as artificial intelligence, automation, and biotechnology—is likely to transform existing production, management, and governance systems. How countries embrace and adapt to the coming technological changes will determine whether they meet the 2030 Agenda for Sustainable Development promise and achieve the Sustainable Development Goals (SDGs).”

## **9. The World in 2050 is a Transformative Way to Achieve SDG**

The World in 2050 (TWI2050) is declared by the International Institute for Applied Systems Analysis (IIASA) and other partners to provide a guideline for science, technology and innovation for the 2030 Agenda. It was presented at The United Nations Science, Technology and Innovation Forums and the United Nations High-level Political Forums.

In 2018, the first report by TWI2050 on Transformations to Achieve the Sustainable Development Goals identified six exemplary transformations needed to achieve the SDGs and long-term sustainability to 2050 and beyond: i) Human Capacity & Demography; ii) Consumption & Production; iii) DE carbonisation & Energy, iv) Food, Biosphere & Water; v) Smart Cities and vi) Digital Revolution.

Development is measured using the Human Development Index. The United Nations calculate HDI. It measures average life expectancy, level of education and income for each country.

There is a strong relation between industry5.0, society 5.0 and the world in 2050.

Industry 5.0 will be more cooperative between machines and human beings to add value to the goods for the customers. It will reduce workload and environmental balance by using disruptive technologies, recycling industrial waste, and renewable and electrical energy.

In Society 5.0, any product or service will be optimally delivered according to people's needs. Society 5.0 will help overcome significant social challenges such as an ageing population, social polarisation, depopulation, and energy and environment constraints.

Sustainable Development Goal is committed to removing poverty and achieving sustainable development worldwide by 2030. It is a shared global vision toward sustainable development for all. TWI2050 is a transformational way to achieve the Sustainable Development Goals and long-term sustainability by 2050.

## **10. Asia in 2050**

By 2050 Asian region will be the highest populated region of the world and become the world's economic centre. The region is not yet sustaining its productivity by affecting a more significant percentage of sustainable development indicators. But the region is improving all the other indicators of sustainability and development. The more the region achieves productivity will impact more sustainable development.

The world in 2050 will be an interconnected world for increasing the socio-economic and environmental value of human development. Sustainable economic development is the key to ensuring sustainable social and ecological values. Sustainable productivity can boost economic development, which will impact social and environmental sustainability factors. Global sustainable productivity will depend upon the sustainable productivity of the regions and the area's

countries. Only an interconnected production system can increase the region's productivity and the world because the 4<sup>th</sup> and the 5<sup>th</sup> industrial revolution depend upon the digital disruption by 2030 and 2050 in different nature of manufacturing and business environment and nature of work. These industrial revolutions are to increase the productivity in business, and manufacturing sectors are the key elements of the new economic world order.

By 2050 the global technology frontier could shift. The rapid adoption of disruptive technologies has considerable ways to grow fast. Asian technology has reached the global cutting edge in electronics, computers, information technology services, communications, drugs, and biotech.

In Asian economies, the capital stock growth per worker during the past two decades has been the fastest, with PRC at 8.6 per cent, India at 8.3 per cent, Vietnam at 9.3 per cent, and Cambodia at 9.5 per cent, among the fastest anywhere.

Other Asian countries, including Indonesia, Malaysia, Thailand, Turkmenistan, Singapore and Taipei, are deepening capital at 5-6 per cent a year, while the Philippines, Pakistan, Bangladesh, Kyrgyz Republic, and Kazakhstan are showing only 2-3 per cent growth in the capital-labour ratio.

The increasing rate of population in Asia will increase the demand for everyday goods and be the highest-selling goods. The consumers will drive the business, and manufacturing decisions will drive the economy because the future industrial revolution is coming for consumer-centric goods and their services.

The Asian region has an excellent adaptive capacity for the new disruptive technologies and the capital-labour ratio for productivity. The countries that do not have a good capital labor ratio need to improve their technology as a means of production. The labour should adjust to the disruptive technologies that have become the productivity enhancer, and some are the factor of production.

## 11. Bangladesh in 2050 and Beyond

For a country, it shows the actual gross domestic products produced by an hour of labour. Growth in labour productivity depends on Savings and Investment, Physical capital, New Technology and Human Capital.

**Labour productivity** is the value that each employed person creates per input unit.

The first determinant of labour productivity is human capital. **Human capital** is accumulated knowledge from the average worker's education, experience, skills, and expertise in an economy. The higher the average level of education in an economy, the higher the human capital and the higher labour productivity.

Government and firms can improve productivity by investing in physical capital, improving the quality of education and training and technological progress.

The second determinant of labour productivity is technological change. **Technological change** combines **invention**, advances in knowledge and **innovation** to produce a new product or service. Technology, mainly disruptive technologies, drive productivity and growth in transforming and developing the economy. The rapid development of the economy at a national, regional and global level changes our way of life and creates environmental pressure. But the technology cannot meet the whole problem and solution of ecological crisis. There need to develop consciousness and proper action.

The urban areas are going to more populated areas. There is a negative relationship between population density and environmental sustainability. But for the economic activities of urban areas, higher education, innovation, and technological development will be the centres of higher education. The quality and efficiency of the urban regions will determine the country's long-term competitiveness and socio-economic and environmental stability.

Only a conscious urban society can increase its quality and efficiency. A conscious urban society can use technology, innovations and cooperation to change the development trend toward a sustainable growth respectful of the environment by reducing desertification, soil exploitation and overbuilding, industrial and food waste pollution, and biodiversity loss where government should have to take support initiatives and investment in health, education, environment, transportation and infrastructure for a conscious urban society.

The environmental impact of economic growth includes the increased consumption of non-renewable resources, higher levels of pollution, global warming and the potential loss of ecological habitats. The economic growth caused by improved technology can enable higher output with less pollution.

Environmental protection itself contributes to economic growth. Somebody makes and sells the air pollution control technologies we put on power plants and motor vehicles. Somebody builds the sewage and water treatment facilities. Somebody is making and selling solar panels, windmills, and a high-capacity battery that will power electric cars. Clean air and water, healthy food and preserved nature benefit human health and result in more economic benefits than the economic cost.

The central role of growth in driving the speed at which poverty declines, economic growth is the most effective way to pull people out of poverty and deliver on their broader objectives for a better life. Sustainable economic growth

can ensure people's standard of living. Even small changes in the growth rate, when sustained and compounded over long periods, make an enormous difference in the standard of living.

GDP per capita is a useful indicator to measure a particular country's standard of living. A healthy climate for growth in GDP per capita and labour productivity includes human capital deepening, physical capital deepening, and technological gains, operating in a market-oriented economy with supportive government policies.

Bangladesh shows only 2-3 per cent growth in the capital-labour ratio. The GDP growth rate is 7.4%.

The Heckscher Ohlin model is called the factor price equalisation theorem. The theorem states that when the output goods' price is equalised between countries as they move to free trade, the price of the factor, capital and labour, will also be equalised between countries. It implies that free trade will equalise the wage of workers and the rent earned on capital throughout the world.

The theorem derives from the model's assumption, the most critical of which is the assumption that the countries share the same production technology and that markets are perfectly competitive.

The capital-labour ratio is at the heart of the 'one-sector regional growth model' (McCombie (1998) *Urb. Studs*, 25): people move from lower real-waged cities-regions to higher ones, the capital-labour ratio is more vital regions decreases and increases in weaker regions. The process stops as soon as the capital-labour ratio is the same in all areas. Then social welfare takes place equally.

The regions have different output abilities for growth total output, total output per worker, and increased per capita income. Low output growth of a region and higher per capita growth indicate labourers' out-migration. The total output growth per labour means growth in productive capacity and the ability to attract capital and labour from other regions. The output per capita indicates changes in economic welfare. A higher wage rate increases social welfare more and can improve environmental solutions.

Globalisation is giving importance to regional economies, including their capacity and competitiveness in the global economy. It will also open up the doors of regional development. Regional competitiveness is relevant in metropolitan and urban areas of different countries.

The quality and efficiency of metropolitan and urban areas will determine the country's long-term competitiveness and socio-economic and environmental stability.

United Nations Population Division (UNPD) released the 2004 revision of population projections for all countries. Bangladesh would reach 218

million by 2050 and finally stabilise at around 260 million in the mid-next century. We must face a new challenge of employment, income, and inequality within the region. We have to turn out our population (male and female) as human capital to face the new challenge of sustainable development goals in 2030, 2050 and beyond.

4<sup>th</sup> industrial revolution is going on over the world through automation and digitalisation in the business and service sector is an interconnected system of production and service. Bangladesh is a country not out of this process.

The capital to labour ratio allows the investors to understand if automation equipment has been deployed to replace labour-intensive tasks. A company may be lowering production costs to remain competitive or improve gross margins where there is an immediate risk of increasing unemployment.

By employing these unemployed labours to develop their production process skills, income per head can be minimised.

Unemployed, unskilled labour related to the disruptive technological production and service process should be employed in sectors requiring less technological adoption, like agriculture, fisheries, forestry, etc., to improve the income of the unemployed labourers.

The ailing industry's integration and cost minimisation can increase productivity and employment through manufacturing automation.

Integration of the present status of technologies of the country's small, medium and large scale industries to stay relevant with the global value chain to add value with the products for local demand of the goods and to include in the worldwide production line. It will increase local and international level employment and income.

The service sector, mainly in the digital service sector in business communication and outsourcing, created a good amount of employment and income contributing to per head income. There is yet a wide possibility in this sector to develop new jobs by expanding the present workforce skill.

Then the overall productivity under a full employment situation can sustain the socio-economic and environmental balance. Full employment is an economic situation in which all available labour resources are used in the most efficient way possible. Full employment embodies the highest amount of skilled and unskilled labour employed within an economy at any given time.

According to a United Nations Development Programme (UNDP) report, the population will reach between 230-250 million in 2050. If the

government fails to protect the rivers from pollution and land-grabbing, these turn into canals and deserts.

Many people will stay in urban areas because economic activities will pollute food waste. The relation between industrialisation and urbanisation will increase industrial and transportation waste pollution. These will generate heat and carbon emissions.

These environmental degradations can affect directly national health. Digitalisation can improve the environmental quality by using less natural energy, quickly recycling the waste, and detecting the level of pollution. The linkage between industrialisation and urbanisation is a demand for globalisation where environmental pollution is more significant than rural areas. Only global initiatives with local partnerships can ensure a sustainable environment for all.

River pollution and land grabbing are now about to be under the control of Bangladesh's government by taking necessary action. But the water flow depends upon the regional cooperation because many rivers of Bangladesh come from India, and these rivers are moving in the region. So regional cooperation is essential for the balance of water flow within the nations for a better environment.

Diversification of agricultural production and process industry with automation requiring less skill can compound the present situation of GNP and environment. An increase in farm production and food is essential to meet the increased requirement of the population by 2050 in Bangladesh.

After all, a human capital development process according to industry 4.0 and 5.0 through a globally consistent education policy and a particular importance on research and development can increase the country's innovation capacity.

A sound health policy and support are significant factors for increasing a nation's productivity. Currently, many diseases are costly to afford for all types of income levels in the country. Moreover, sometimes there are many global health disasters seen where there needs instant support from the government to meet the situation efficiently.

Bangladesh has a reasonable rate of total growth output. If we can positively minimise the employment situation, we will increase production per labour by humans and by adopting disruptive technologies in different layers of our production and service sector. Total growth and total output per labour ultimately increase per capita growth, improve the social welfare of the society by maintaining environmental and cultural values



for future generations, and will be genuinely a sustainable development for Bangladesh by 2050. The country could contribute to the global economy from Asia with PRC, India, Indonesia, Japan, Republic of Korea, Thailand and Malaysia.

We can calculate our future possible GDP growth rate by a simple formula that is,

Future Growth Rate (F) = Present GDP Growth Rate (A) + Expected Increased Growth Rate Per Year (%) + ..... + 2050 (B).

$F=A+B$ .

Analysing the sources of economic growth is analysing the production **function**, turning economic inputs like labour, machinery, and raw materials into outputs like goods and services used by consumers. A microeconomic production function is the inputs and outputs of a firm or an industry. The entire economy's connection from inputs to outputs is called an aggregate production function in macroeconomics.

The production function determines how much output of firm, industry and country should produce under a given price of goods. The combination of inputs is to be used under a given price of capital and labour. It is a mathematical function that relates the maximum amount of output obtained from a given number of inputs.

A straightforward production function from which we can understand the relationship between capital, labour and output.

$Q=K+L$

Where Q denotes the quantity of output, K denotes the amount of capital, and L represents the amount of labour used in production.

This production function describes that; a firm can produce one unit of output for every unit of capital or labour employed. This production function is a constant return to scale. The amount of output will increase proportionally to the amount of inputs. It will help the firm, industry or country for future productivity output to reach the destination.

## **12. Global Good Governance and Sustainable Development**

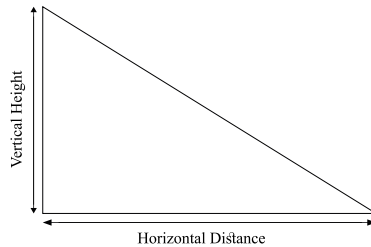
Income inequality, environmental degradation and the social and political situation of the world are gaining the lower global productivity growth, which is a barrier to sustainable development. Only a linear sequence of action cannot achieve economic growth for sustainable development. The local, regional and global governance can achieve sustainable global growth by ensuring the development following the gradient model. It is a simple nonlinear evaluation equation.

The Gradient model increases or decreases the magnitude of a property observed passing from one point to another. In economics, the gradient method

guides the analysis and recommendation of changes to find the global optimum (the most favourable situation or level for growth, reproduction or success) by available data and information for the current point of operation.

Figure 3: Gradient Evaluation

Gradient = Vertical Height/Horizontal Distance



Gradient divides the changes in height by the changes in the horizontal distance, which drag the possible point—differentiation results from gradation in the potentialities for development of various parts. Successful differentiation of a part inhibits the potentiality for similar change elsewhere in the system, reducing inequality.

The countries and areas need the finances and cooperation first, where the requirements are urgent to reduce inequality by increasing jobs and environmental degradation.

### 13. Conclusion

Covid-19 advancing 4IR for its potentiality proved during the pandemic, this quick adoption will grow more in the developed countries and will step up towards industry 5.0. But the low-income and developing countries have not yet completed their adoption of industry 4.0 technologies. For quicker adoption of industry 4.0 in low-income and developing countries, there needs to be financial and technological cooperation between the different nations participating in the GVC for a better world. Our country's human capital development and readiness for adopting industry 4.0 and 5.0 is an important task.

### *References*

- Sustainability 2019, 11 (16), 4371, Concept Paper Industry 5.0—A Human-Centric Solution, Institute for Intelligent Systems Research and Innovation, Deakin University, Waurn Ponds 3216, Australia
- Digital Futures, Final Report, A journey into 2050 Visions and Policy Challenges, European Commission.
- The Digital Revolution and Sustainable Development: Opportunities and Challenges Report prepared by The World in 2050 initiative. International Institute for Applied Systems Analysis (IIASA), Luxemburg, Austria.
- European Commission, The World in 2025 Rising Asia and socio-ecological transition.
- Integrating Digital Economy and Green Economy: Opportunities for Sustainable Development, Carmen Nadia CIOCOIU Academy of Economic Studies, PiataRomana 6, Bucharest, Romania.
- ESRI, Working Paper No. 233 April 2008 ICT Diffusion, Innovation Systems, Globalization and Regional Economic Dynamics: Theory and Empirical Evidence
- Thematic review: Advancing Science, Technology and Innovation for the SDGs 11 Jul 2018 Barbara Rosen Jacobson.
- Digitalisation and sustainable economic and social development, GIZ, GmbH.
- The TWI2050 report calls for urgent action to achieve the SDGs, 16 Jul 2018.
- Society 5.0, Cabinet Office, Government of Japan
- 13th Global Conference on Sustainable Manufacturing - Decoupling Growth from Resource Use Opportunities of Sustainable Manufacturing in Industry 4.0 T. Stock\*, G. Seliger.
- Maintaining competitive conditions in the era of digitalisation. OECD report to G-20 Finance Ministers and Central Bank Governors, July 2018.
- World population is projected to reach 9.8 billion in 2050, and 11.2 billion in 2100, UN Department of Economic and Social Affairs, 21 Jun 2017, New York
- The Past, Present and Future of Economic Development, GLOBAL ECONOMY.
- MaterialEconomics, Industrial Transformation 2050 Pathways to Net-Zero Emissions from EU Heavy Industry. Scenarios for sustainable futures beyond GDP growth 2050. Futures, Volume, August 2019,
- UN News. 9 Mar 2020
- OECD Interim Economic Outlook, March 2020.
- CNBC – Economy, How bad could it get? Economists predict how the Corona Virus could hurt the global economy, 10 Mar 2020.

