**Assignment Title: ICT for Sustainable Development in Bangladesh: Challenges, Opportunities and Future Prospects**

Course code: **MSJ 3261**

Course Title: **ICT for Development**

**Department: Media Studies and Journalism**

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Date of submission: 02.12.2024

**Abstract**

ICT integration is a prerequisite for sustainable development in Bangladesh. Initiatives such as Digital Bangladesh are enhancing governance, education, health care, and economic development in the country. OWING Covid-19, schools have invested in digital infrastructure, with many now effectively using these tools. This article reviews the existing literature and frameworks to scrutinize the role of ICT in sustainable development of Bangladesh. It focuses on the obstacles faced, the opportunities, as well as the prospects ahead, and recommends action to harness ICT for inclusive and sustainable growth.

## Introduction

The last few years have shown a major shift in Bangladesh as it has stepped up efforts to become a middle income country. Owing to the 'Vision 2041' and 'Digital Bangladesh' initiatives, the government is appraising the importance of ICT as a means of addressing some developmental issues and promoting sustainability. The provision of key public services, the encouragement of creativity, and the elimination of the digital gap, are all tasks in which ICT as a tool, is critical to attaining the Sustainable Development Goals (SDGs). However, the commendable advancements which have been made exhibit that the road to achieving sustainable ICT adoption is fraught with; resource deficits, infrastructural challenges and gaps in policies. This paper therefore investigates the links between ICT and sustainable development in Bangladesh considering its capability to transform some of the key sectors while addressing the structural as well as the socio-economic challenges. The main aim is to conduct a comprehensive review of the existing case, determine the impediments to change as well as advocate for the strategy to be taken in the subsequent years.

## Literature Review

There have been numerous extensive studies exploring the relationship between Information and Communication Technology, ICT and sustainable development all over the globe since it is acknowledged to be a game changer in developing economic, social, and environmental objectives. It helps in enhancing the SDG sectors some of which include education, health care, governance, the welfare and even the environment. This section examines to a certain extent the existing literature with regard to the ICT and sustainable development nexus relevant to Bangladesh. According to The United Nations, ICT in particular is important in achieving the SDGs. For example, Heeks (2018) and Mbarika et al. Empirical studies have also reported how ICT enhances economic development through innovation, job creation and the support of small scale businesses on the internet. In regard to the environment, ICT tools have been acknowledged for assisting in real-time climate resource management and drafts of some of the

techniques employed in sustainable development showcasing their importance. Singh and Mishra (2020) in seeking to democratize education have examined the role of ICT in that process as well. Because of online courses, virtual classrooms, and digital libraries, quality education has become available in remote areas with less access, bridging the gaps. The picture is not much different, in this regard, for the healthcare system as telemedicine, electronic health records and m-health applications are being used as Kumar and others demonstrate. While the power of the ICT is well acknowledged , Ken et al. (2015) note that its full potential has not been realized due to several constraints. Alam and Rahman (2022) also point to some infrastructural barriers, particularly low internet accessibility and sub-standard electricity in rural Bangladesh, as some of the barriers to effective use of ICT in the rural areas of Bangladesh. In the same vein, Akter and Haque (2021) point out that gender and socio-economic ICT-related exclusions exist further compounding the fairness problem that such access is supposed to solve. In Bangladesh, the ICT development drive of the government dubbed "Digital Bangladesh" is credited for the growing impact of ICT. Rahman (2023) notes that even policies supporting e-governance and embedding ICT in all facets of education for development have increased service provision and involvement of citizens. However, Hossain et al. (2022) contend that the realization of such initiatives often falls short of expectations due to the resource and policy level challenges particularly in rural and disadvantaged communities. ICT is however still believed to hold promise in areas such as smart cities, AI, and big data analytics. Efforts such as Chowdhury and Ahmed (2023) made during the integration of ICT to urban and environmental management aspects can help increase the effectiveness of sustainability practices. The development of the ICT sector in Bangladesh as well as the global demand for digital services can help in economic diversification and youth empowerment as well.

**ICT and Sustainable Development in Bangladesh**

Bangladesh has witnessed a transforming favor of ICT, several studies noted. Its role in governance has improved as a result of e-governance, financial exclusion has decreased as mobile banking has been implemented, and educational coverage has increased as a result of e-learning expansion. Nonetheless, this problem of digital inequality persists with rural areas being less accessed and utilized than urban areas. Scholars point out challenges such as the lack of digital literacy, availability of cost effective gadgets and infrastructural deficiencies as the factors inhibiting ICT adoption in Bangladesh. Also, cultural contexts and gender imbalance further complicate the issue of the digital divide. There are however, prospects of job creation, innovations, and better service delivery as the ICT industry continues to expand. The provision of such policies by the government, for instance tax incentives to IT firms and development of digital infrastructure have aided this growth. The reviewed literature on ICT development states that an effective ICT environment along with favorable policies and public/private collaborations can help improve the rate of achievement of sustainable development in Bangladesh. In contrast

however, there is focus on the grass root issues as rural and underprivileged people are said to need special focus policies.

**Challenges of ICT for Sustainable Development**

Bangladesh's advancement of ICT in the country as a means of promoting sustainable development encounters a number of challenges.

Digital Divide: Due to the rural-urban disparity of internet availability and ICT literacy level, not all people are able to take advantage of ICT. Generally, urban centers have better networks and resources than rural areas, where infrastructure is much lacking and most people are not aware of the advantages of ICT. Such inequality hampers universal participation in ICT-based development processes.

Infrastructural Gaps: Most of the region particularly the rural and remote area of Bangladesh is deprived of sufficient broadband coverage. Poor coverage of the mobile network and weak internet connectivity affects the deployment of ICT in agriculture, health, and educational activities and millions remain unserved.

Policy Implementation Issues: One of the reasons why Bangladesh is not able to progress as it should be is that all the policies designed for instance ‘Digital Bangladesh’ are never implemented. Red tape and lack of inter-agency cooperation combined with poor accountability undermine such policies.

Socio-economic Inequalities: ICT has growth-potential and because smart devices are expensive, and internet charges are high, these ICT tools remain too costly for the majority of low-income households. Financial constraints need to be overcome, but they are making it impossible for the disadvantaged groups to take advantage of ICT interventions in education, healthcare, even in finance, hence the wider socio-economic disparities.

Cultural and Gender Barriers: In some regions, it is culturally accepted to discriminate against women and other disadvantaged communities from participating in anything ICT related. Third, cultural and educational barriers, as well as the distribution of resources favoring men, keep women in particular disadvantaged when it comes to technologies. This in turn, renders vulnerable sections of society digitally disenfranchised.

**Opportunities for ICT in Sustainable Development**

Economic Growth: This expansion helps improve the economic strength and stability of the nation. The success stories include the ICT sector, which is fast growing contributor to Bangladesh’s GDP, the country becoming an outsourcing hub for Information Technology, and

also the prospects of the country through measures like the ICT Export Roadmap that are aimed at enhancing overseas earnings and growing the Information, Software Development, Data Processing and IT enabled Services sectors locally.

E-Governance: In a bid to enhance service delivery, the National E-Government Portal has also contributed towards efficiency and detection of the various E-service portals. Such access will now allow citizens for example, the service of birth registration, a help center to address issues like tax, availability of taxing places, and registration for land ownership all online with minimal bouncing through corruption, and time drum which ordinarily increases.

Education: With support from the Muktopaath program and ICT labs introduced in the Government-led schools in Bangladesh, technology has transformed education. Equipped with these tools, students and teachers can enjoy digital resources, e-learning opportunities, and global knowledge that is time enhanced to reach them especially in remote locations.

Healthcare: Doctorola and Jeeon gyration telecommunications vision have made it easier even for small villages where other medical solutions are undergoing madness. These technologies address the need by allowing patients to be diagnosed remotely, receive treatment recommendations and health education.

Agriculture: Farmers are notably supported by ICT applications in agriculture, such as weather forecasting apps, pest management tools, and market price updates, as these give them useful insights that are time-sensitive and actionable. With this, their decision making is improved, crop production is increased, and their income is enhanced.

**Future perspective of ICT for Sustainable Development in Bangladesh**

Going forward, one of ICT's advantages is the fact that it can respond to existing and future hurdles while simultaneously creating new possibilities for sustainable growth. The implementation of the following key objectives is crucial in this respect:

Smart Cities: The combination of the Internet of Things (IoT) and AI technologies will make it possible for urban areas to develop into smart cities. Smart cities reduce traffic congestion, energy use and waste, and allow the real-time delivery of goods and services.

Inclusive Development: Economic inequalities can be reduced as ICT will help the disadvantaged sections by increasing their chances for education and health services and economic opportunities. Interventions, such as subsidized internet services or community ICT training programs, can be designed through government and private sectors joint efforts to alleviate the problem of exclusion.

Environmental Sustainability: Moreover, ICT supports innovative environmental protection measures, including air and water quality monitoring, deforestation management, and disaster management modeling. These technologies may help Bangladesh prevent the consequences of climate change and sustain the country's natural environment.

Youth Empowerment: In Bangladesh, there is a sizable youth demographic that can be trained with digital skills to enable them to compete in the global technology economy. Programs such as coding boot camps, ICT vocational skills, and technology incubators can help to create a new generation of innovators and entrepreneurs who will contribute to the growth of the future ICT sector.

**Conclusion**

ICT holds immense potential to accelerate Bangladesh's sustainable development journey. While the progress so far is commendable, addressing the challenges of digital divide, infrastructural deficits, and policy implementation is crucial. By leveraging opportunities in e-governance, education, healthcare, and agriculture, Bangladesh can ensure that ICT serves as a catalyst for inclusive and equitable growth. Strategic investments, capacity building, and cross-sector collaboration will be essential in realizing the transformative power of ICT for sustainable development.

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