

## Role of Cyber Security to Building Smart Bangladesh: A Critical Analysis

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**ABSTRACT :** Today, various countries around the world have embraced new technology in order to become smart countries. New technologies improve the lives of citizens. The adoption of any technology, however, provides additional concerns and challenges. A vulnerable move by an individual or group in a smart country can put the entire country at danger. Since numerous components of a smart nation rely on information and communication technology, cyber-security issues (such as information leakage and harmful cyber-attacks) in this field influence smart country behavior. As a result, in order to respond to the enthusiastic acceptance of global smart technologies, cyber security must evolve in the same direction. The goal of this study is to review relevant literatures on cyber security, smart country, and the available relevant literature smart technology. The current study further focuses on the basic components of a smart country, as well as the Bangladesh government's initiatives to make the country smart. The article also discusses potential cyber security concerns and solutions to them. According to the study, developing adaptable systems with excellent information protection capabilities is critical to preventing significant security catastrophes, which can result in disastrous financial, data, credit, and public trust losses.

**Keywords- :** Bangladesh, smart country, digital technology, cyber security

### I. INTRODUCTION

A "smart country" is one that uses innovation, technology, and data to advance its infrastructure, economy, governance, and people's quality of life (Witanto, Lim, & Atiquzzaman, 2018). It is a development of the idea of a "smart city" in which the concepts are used on a national level. A smart country enhances productivity, sustainability, and service quality across sectors by utilizing digital technology, connectivity, and data-driven decision-making (Lim, Cho, G.-H., Kim, 2021). Strong digital infrastructure, including widespread high-speed internet access, online platforms for public services, and data collection techniques, are characteristics of a smart country (Ijaz, et al., 2016). Additionally, residents would be able to access government services online, paying taxes, applying for permits, and more without physically visiting government offices (Khatoun, Zeadally, 2017). It is critical to keep in mind that creating a highly smart country involves a lot of challenges, including infrastructure investment, data privacy issues, cyber security risks, and ensuring equitable

access to technology for all citizens (Lee, Kim, & Seo, 2019). Furthermore, based on each nation's resources, goals, and technological advancements, the degree of "smartness" differs tremendously (Witanto, Lim, & Atiquzzaman, 2018). To keep pace with the world, the government of Bangladesh want to turn this country into a smart one. An effort called 'Smart Bangladesh', spearheaded by the Bangladeshi government, aims to make Bangladesh a sustainable society with cutting-edge technology is the core issue of the present study.

## II BACKGROUND OF SMART BANGLADESH

At the Digital Bangladesh Day-2022 event held at the Bangabandhu International Conference Center (BICC) in the capital on December 12, 2022, Prime Minister Sheikh Hasina made the first mention of creating a "Smart Bangladesh" during her remarks as the Chief Guest (Jibon, 2023). "We will turn Bangladesh into a developed country in the year 2041, and Bangladesh will go from Digital Bangladesh to Smart Bangladesh," Sheikh Hasina declared (Prothom Alo. 2023). On the website of Aspire to Innovate (a2i), run by the Bangladesh government, we observe four indicators of Smart Bangladesh (Jibon, 2023). The four fundamental pillars of Smart Bangladesh are 1) Smart Citizens, 2) Smart Government, 3) Smart Society, and 4) Smart Economy. In this context, 'smart' refers to the application of advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), deep learning (DL), Block-chain, Big Data, Robotics, Drone technology, 3D printing, Nanotechnology, Quantum computing, and other cutting-edge technologies to improve various national aspects.

### 2.1 Plan for the Smart Bangladesh

'Smart Bangladesh' is built on four pillars. Smart governance, smart citizens, and smart society. There will be no more transition to Smart Bangladesh if we move forward by recognizing these four particular areas in the development of Smart Bangladesh (Prothom Alo, 2023). Smart individuals and a smart government will transform all services and media to digital (Maruf, et al., 2020). Additionally, if a smart economy and smart society can guarantee growth, they will contribute to the development of an inclusive society and a business-friendly environment (BASIS, 2022). 'Smart Bangladesh will be cost-effective, sustainable, knowledge-based, intelligent and innovative (Jibon, 2023). In short, everything will be smart. Such as ensuring smart healthcare, smart transport, smart utilities, urban administration, public safety, agriculture, internet connectivity and disaster management for implementation of smart cities and smart villages (BASIS, 2022). One student, one laptop, one dream initiative has been proposed to ensure online participation of students. Under this, all digital services will be brought under a centrally integrated cloud. The Bangladesh government has already changed the name of the Digital Bangladesh Task Force to 'Smart Bangladesh Task Force' (BASIS, 2022).

### 2.3 Components of Smart Bangladesh

With the four main pillars of the Smart Bangladesh Plan—Smart Citizen, Smart Government, Smart Economy, and Smart Society—that were previously stated by the Honorable Prime Minister.

#### Smart Citizen

"Smart Citizen" typically refers to the concept of using technology, data, and citizen engagement to create more efficient, sustainable, and livable cities (Qamar, & Bawany, 2020). It involves the integration of various technological solutions and data-driven approaches to enhance urban infrastructure, services, and overall quality of life for residents (Secinaro, et al., 2021). Smart Citizen initiatives often involve deploying sensors and IoT (Internet of Things) devices throughout the city to gather data on various parameters such as air quality, noise levels, traffic patterns, waste management, energy consumption, and more (Sengan, et. Al., 2020). This data is then analyzed to gain insights into urban challenges and trends. The involvement of citizens in data collection and decision-making is a fundamental aspect of the Smart Citizen concept (Vitunskaitė, 2019). Citizens can participate by contributing data, sharing feedback, and collaborating with city officials to address issues and prioritize projects (Secinaro, et al., 2021).

### **Smart Government**

Utilizing ICT integration for planning, management, and operations at any level or across layers, smart government creates value for sustainable public production (Chen, Wawrzynski, 2021). To put it another way, in a smart government, information and communication technology-based business processes are what enable the flow of continuous information between the government and the delivery of high-quality services (Sengan, et. Al., 2020). The next phase of e-government is smart governance (Chatfield and Reddick, 2019). Instantaneous information is used by the smart government to prevent crime by raising the level of situational awareness, responding to accidents quickly and effectively, looking into emergencies, and enhancing municipal services (Witanto et al., 2018).

### **Smart Economy**

A "smart economy" refers to an economic system that leverages technological advancements and data-driven strategies to enhance productivity, innovation, and overall efficiency (Chen, 2021). It involves the integration of various technologies such as the Internet of Things (IoT), artificial intelligence (AI), block chain, data analytics, and more to transform traditional industries and business processes (Chatfield, and Reddick, 2019). The concept of a smart economy is closely related to the broader idea of a "smart city," where similar principles are applied to urban development, infrastructure, and services to create efficient, sustainable, and livable environments for residents (Barr, et al., 2021). It's important to note that the realization of a smart economy requires collaboration among governments, businesses, academia, and the general population to create an ecosystem that can fully harness the potential of technology and innovation for economic growth and societal benefit (Chen, 2021).

### **Smart Society**

A "smart society" refers to a concept where advanced technologies and data-driven approaches are integrated into various aspects of daily life to improve efficiency, sustainability, and quality of life for its citizens (Baig, et al., 2017). It encompasses the integration of Internet of Things (IoT) devices, artificial intelligence (AI), data analytics, and other emerging technologies to create interconnected and intelligent systems that enhance various domains, such as urban planning, healthcare, transportation, energy management, and more (Atitallah, et al., 2020). However, it's important to consider potential challenges and concerns associated with a smart society, including data privacy, cyber security, digital divide (inequality in access to technology), and the ethical implications of AI and automation (Al-Saidi, Zaidan, 2020). Balancing technological advancements with societal well-being and inclusivity is crucial for realizing the full potential of a smart society (Al-Dakheel, et al., 2020).

### **Cyber Security**

Cyber security refers to the practice of protecting computer systems, networks, programs, and data from digital attacks, unauthorized access, and other forms of cyber threats (Al-Ghamdi, 2021). With the increasing reliance on technology and the internet, cyber security has become a critical concern for individuals, businesses, governments, and organizations worldwide (Ahmed J., et al., 2021). It encompasses various measures and strategies aimed at safeguarding digital assets and ensuring the confidentiality, integrity, and availability of information (Baig, et al., 2017). This involves securing computer networks and their components, such as routers, firewalls, and intrusion detection systems, to prevent unauthorized access and data breaches (Chen, Wawrzynski, 2021). Protecting sensitive data from unauthorized access, modification, or disclosure. Encryption, access controls, and data classification are commonly used techniques (Qamar, & Bawany, 2020). The field of cyber security is vast and complex, requiring expertise in technology, law, psychology, and other disciplines to effectively address the diverse range of threats (Ahmed J., et al., 2021).

### III OBJECTIVES OF THE STUDY

The main objective of this study is to explore the role of cyber security in materializing the plan of smart Bangladesh.

### IV METHODOLOGY

The paper is prepared based on secondary data, which collected from different sources like books, journals, Newspaper and the internet. Collected information has been analyzed to draw suggestion from the study and make the study informative to the concerned readers. This technique of the critical review will be demonstrated through the role of cyber security to building smart Bangladesh.

### V FINDINGS

The National Cyber security Strategy, NCS, (2018) outlined a total of 11 actions, including raising public awareness, reducing cybercrime, establishing incident response capabilities, protecting critical infrastructure, developing a national cyber security framework, securing government infrastructure, developing cyber security skills and training, and establishing public-private partnerships. These activities were all related to national threats, priorities, and goals, as well as to business growth. The strategy listed various national risks and threats, such as espionage aimed at gathering political intelligence, intellectual property theft from businesses, unauthorized modification, distributed denial of service attacks and disruption during the patching of smart meters, phishing to facilitate credit card fraud, and malware attacks (CCRB, 2018). Responsibility for the design, implementation, monitoring and revision of the strategy has not been formally assigned to any authority, but the process has been and continues to be led by the Ministry of Posts, Telecommunications and Information Technology (MPTIT). A proper revision of 'The National Cyber security Strategy' is urgently required for building smart Bangladesh.

#### 5.1 Cyber Security for Smart Citizen

A digitally literate person that takes advantage of technology in order to engage in a Smart City environment, address local issues and take part in decision-making. When a smart citizen goes online to do his daily life communication, financial transactions, office work etc., he faces fatal problems like Facebook hack, credit card fraud and Gmail hack. Implementation of smart citizens is almost impossible without ensuring security

Cyber security for smart citizens refers to the practices and measures the government and individuals can take to protect them and their personal information in an increasingly connected and digital world. As more devices, services, and processes become "smart" and connected to the internet, the potential for cyber threats and attacks also increases. The government must develop proper security protocol for protecting citizens' data and devices and at the same time a strong monitoring system should be developed by the government. The government also should impart technology education and technology awareness to the citizens so that they can stay informed about the latest cyber threats and security best practices and know about common hacking techniques like social engineering and phishing. By following these practices, the government can significantly reduce the risk cyber-attacks on citizens and enhance their overall cyber security as a smart citizen. It's important to remember that cyber security is an ongoing process, and staying vigilant is key to staying safe in the digital age.

#### 5.2 Cyber Security for Smart Economy

Smart Economy is an economy based on technological innovation, resource efficiency, sustainability, and high social welfare. Smart Economy adopts innovations, new entrepreneurial initiatives, increases productivity and competitiveness, with the overall goal of improving the quality of life of all citizens. A secure smart economy is key to a nation's development. An unsafe financial transaction leads to financial crime and can turn the state into a bottomless basket. Smart transactions are the prerequisite of smart economy but nowadays various digital and online financial transactions are insecure and risky. As we mean by smart economy cashless financial transactions and internet-

based activities, they need a secure cyber space to implement smart economy. Debit and credit card fraud and crimes such as stealing debit and credit card information while shopping online, hacking bank accounts and extorting money. So, cyber security is a critical aspect of building and maintaining a smart economy. To ensure the security and resilience of a smart economy, several cyber security measures need to be considered.

The government must protect the communication channels that connect devices, sensors, and systems. They should implement strong encryption protocols, firewalls, intrusion detection and prevention systems, and regularly update and patch network infrastructure. Implementation of encryption for data at rest and in transit should be ensured. Any type of data access should be limited only to authorized personnel or devices. Implementation of data classification and access control mechanisms to ensure sensitive data is only accessible by those with proper authorization is required. Government should incorporate security considerations at the design phase of all smart economy systems. This includes performing security assessments, threat modeling, and code reviews during the development process. Besides, implementation of continuous monitoring and threat detection mechanisms to identify and respond to emerging threats in real-time. Intrusion detection systems, security information and event management (SIEM) solutions, and behavior analytics can be useful. The government must collaborate with industry peers, other governmental organizations, and cyber security experts to share threat intelligence and best practices. Building a collaborative ecosystem can help anticipate and mitigate potential threats.

A smart economy's success depends on its ability to leverage technology effectively while safeguarding against cyber threats. By implementing a robust cyber security strategy that covers both digital and physical aspects, organizations can help create a secure and resilient environment for their operations within the smart economy.

### **5.3 Cyber Security for Smart Government**

IGI Global defines Smart Governance or smart e-governance as the “use of technology and innovation to facilitate and support enhanced decision-making and planning within governing bodies”. It is often associated with improving the democratic processes and transforming the ways that public services are delivered. Various online devices, internet and various technologies are used to deliver all the services of the government online or through information technology to the doorstep of the people. If there are unsafe devices or cyber space, then deadly incidents like Bangladesh Bank locker fraud, credit card fraud will continue to happen.

So, cyber security for smart countries is crucial to ensure the safety, privacy, and functionality of the various interconnected systems and devices that make up these technology-based environments. For implementing the idea of smart Bangladesh, the government must identify potential threats and vulnerabilities specific to smart country systems, such as IoT devices, communication networks, data centers, and control systems and develop a comprehensive cyber security strategy that encompasses prevention, detection, response, and recovery plans. Furthermore, securing a smart country is an ongoing process that requires collaboration among various stakeholders, including city planners, technology vendors, cyber security experts, and residents. By adopting a holistic approach to cyber security, smart countries can mitigate risks and ensure a safer and more resilient urban environment.

### **5.4 Cyber Security for Smart Society**

The smart society is a global movement that is highlighted in line with digital technology advances. Most studies of the smart society focus on the use of technology to aid human activities, especially in urban areas. Another study referred to the definition of a smart society A smart society successfully harnesses the potential of digital technology and connected devices and the use of digital networks to improve people's lives. In order to move a society forward, all its activities must be done smartly, but in the modern times, cybercrime has become so deadly that teenagers, youth and students are being affected. Pornography, video games and social media scandals have emerged as social ills. If the cyber world cannot be made socially safe at present, the implementation of Smart Bangladesh plan will be uncertain.

According to Action Aid (2020), the most serious impact on women's lives due to online harassment and violence is trauma, depression and anxiety. In their study, they found that 65.07



percent of women suffer from trauma or trauma related psychological disease due to the impact of cyber harassment. Especially girls below 18 years are more victims of harassment. Analyzing these data, we can easily say that women are less digitally literate and aware than men; this uneven digital divide creates opportunities for women to be vulnerable in the digital world in various ways. In addition, the lack of gender perspective in cyber defense strategies often deters women from seeking protection.

So, cyber security is of paramount importance in creating and maintaining a safe and secure smart society. Government should, promote cyber security awareness among citizens, businesses, and government entities and offer training programs and resources to help people understand potential threats and best practices for staying safe online. Moreover, creating a secure smart society requires a multi-faceted approach involving technology, policies, regulations, and active collaboration among various stakeholders. By implementing these strategies, it's possible to mitigate risks and create a safer environment for individuals, businesses, and communities in a connected world.

## VI RECOMMENDATIONS

Since Smart Bangladesh is a technology-based concept and the Internet is its main accessory, the implementation of the concept is unthinkable without safe and beautiful technology. We recommend the following recommendations to implement the Smart Bangladesh vision announced by the Hon'ble Prime Minister:

- a) A special task force can be constituted to investigate the cyber activities of women and children only and submit a monthly or annual report to the task force constituted for Smart Bangladesh.
- b) Internet-based technology is one of the main means of smart and modern economy where sales and purchases, money exchange, payment of various official dues, government payments, tenders and foreign transactions are done. Therefore, for these issues separately under the concerned department, the supervisory authority should be created, which authority directly responsible to the Smart Bangladesh Taskforce.
- c) Establishing a service center under the government in every village to provide all government services at the village level.
- d) Social awareness is essential for building a smart society and lessons on cyber awareness can be incorporated in the curriculum.

## VII CONCLUSION

'Smart Bangladesh: ICT Master plan 2041' has been prepared by examining the best practices of the world's leading countries in information technology, which focuses on artificial intelligence, machine learning, Internet of Things (IoT), robotics, block chain, nanotechnology, 3D printing in the future. Through the use of modern and new technologies such as energy, health, communication, agriculture, education, healthcare, trade, transport, environment, energy and resources, infrastructure, economy, trade, governance, financial transactions, supply chain, security, entrepreneurship, community, etc. The sector will be managed with greater efficiency. 40 mega projects have been proposed in this ICT master plan, one of the objectives of which is to ensure that the contribution of the ICT sector to the national economy is at least 20 percent by 2041. Integrating Digital Bangladesh initiatives with Smart Bangladesh initiatives to adopt fourth Industrial Revolution and Smart Bangladesh friendly plans, policies and strategies

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