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Journey to Smart Bangladesh: Realities and Challenges

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ABSTRACT

Bangladesh, a nation renowned for its resilience and quick growth, has started on a transformational path to become a "Smart Bangladesh." This vision entails utilizing technological advancements to enhance the lives of its citizens, improve governance, and foster sustainable economic growth. To identify the obstacles preventing the realization of a fully smart nation, this study evaluated the current technological landscape, governmental initiatives, and societal integration. Moreover, the study assessed policy gaps, infrastructure constraints, socioeconomic barriers, and citizen engagement. Therefore, the main purpose of the study was to comprehensively measure the trajectory towards a 'Smart Bangladesh.' The study was conducted using a qualitative approach, whereas secondary data were analyzed to reach its findings. The findings of the study revealed the paradigm shift from digital Bangladesh to smart Bangladesh, the development approaches of digital Bangladesh to smart Bangladesh, the diagnoses of transforming digital Bangladesh to smart Bangladesh, and the implications of smart technologies (IoT, AI, blockchain technology, big data analysis, etc.) in transforming digital Bangladesh to smart Bangladesh. Similarly, the study highlighted the challenges behind implementing smart Bangladesh. However, collaboration among the government, private sector, academic community, and civil society is essential for implementing smart Bangladesh. Additionally, it is essential to establish exhaustive policies, laws, and regulations to govern emerging technologies and protect citizen rights. Nevertheless, the findings of the study will provide both theoretical and practical contributions, especially in building the potential of technology to drive sustainable development, uplift communities, and shape a brighter future for all its citizens.

INTRODUCTION

Bangladesh is a rising nation in South Asia (Husain & Tinker, 2020) with a proven track record of expansion and advancement (Ahmed & Akter, 2022), even during periods of significant global unpredictability (World Bank, 2022). With the help of information and communication technology (ICT) and the proactive leadership of the present government, Bangladesh has achieved noteworthy development in every area (Ahmed, 2023a). It is worth mentioning that so far Bangladesh has achieved the Millennium Development Goals (poverty reduction, food security, primary education, mortality ratio, immunization coverage,

and combating communicable diseases) (Ashraf et al., 2019), vision of digital Bangladesh 2021 (M. S. Islam & Grönlund, 2011), turn into lower-middle income country from less development country (2015) (CRI, 2023), first satellite launching ("Bangabandhu-1") (M. Z. Islam, 2018), infrastructure development (Padma Multipurpose Bridge, Bangabandhu Tunnel, Metro Rail, Rooppur Nuclear Power Plant, etc.) (Mirza, 2022), improving GDP (GDP increased from 4% in 1972 to 18% in 2019) (Moyen Uddin, 2015), improving education (country's literacy rate has risen to 74.7%) (Shayery et al., 2022), food security (CRI, 2023), and so on.

Bangladesh is now concentrating on achieving the Sustainable Development Goals (SDGs) (Nasrullah, 2021), the 8th Five-Year Plan (8FYP) (Bangladesh Planning Commission, 2020), the Perspective Plan 2041, the Delta Plan 2100 (Alam, 2019), and the vision of a Smart Bangladesh. As we have already reached the fourth industrial age, the notion of “Smart Bangladesh” is now the talk of the town. On December 12, 2022, Bangladesh's Prime Minister, Sheikh Hasina, made the first official announcement of the idea of a “smart Bangladesh”. The four basic canons—“Smart Citizen”, “Smart Government”, “Smart Society”, and “Smart Economy”—have served as the foundation for the development of this idea (Kabir, 2023).

The ultimate goals of smart Bangladesh are to guarantee that all public services are delivered digitally, including via the use of 5G internet, more than 100% smartphone penetration, more than 100% high-speed internet penetration, and more than cashless transactions (a2i, 2022). Therefore, the principal objective of this study is to assess the present reality and challenges behind implementing Smart Bangladesh. In particular, this study evaluated the paradigm shift from digital Bangladesh to Smart Bangladesh, development approaches of digital Bangladesh to Smart Bangladesh, priority areas for the transition from Digital Bangladesh to Smart Bangladesh, diagnoses of transforming digital Bangladesh to smart Bangladesh, major focus of Smart Bangladesh and challenges behind implementing Smart Bangladesh.

METHODS

This study employs a secondary data analysis approach to explore the reality and challenges of the journey to Smart Bangladesh. In particular, the research aims to demonstrate the present reality and challenges by assessing the current state of smart initiatives, identifying key challenges, and exploring potential solutions for achieving a Smart Bangladesh. Relevant secondary data sources were identified for the analysis. These sources include government reports, academic papers, industry reports, policy documents, and research publications. Data from reputable sources with a focus on Smart Bangladesh, digital transformation, urban development, and related areas was also considered. However, the selected secondary data

sources were collected through an extensive review process.

The data collected encompassed a diverse range of information, including statistics, case studies, best practices, and expert opinions. Data from multiple years was considered to understand the evolution and progress of the journey to Smart Bangladesh. Besides, the collected data were categorized based on relevant themes. This process involved organizing the data into meaningful categories such as paradigm shift, development approaches, priority areas, technology adoption, governance, citizen engagement, policy framework, and sustainability. This categorization facilitated a structured analysis of the data. Thus, the qualitative data analysis involved thematic analysis to identify common patterns, recurring challenges, and emerging trends. The analysis focused on extracting key findings related to the reality and challenges of the journey to Smart Bangladesh. The findings and insights obtained from the secondary data analysis were reported clearly and concisely. The report documented the current reality of Smart Bangladesh, the identified challenges, and potential recommendations to overcome them. Proper citations and references were provided to ensure transparency and credibility.

RESULTS AND DISCUSSION

The Paradigm Shift from Digital Bangladesh to Smart Bangladesh

Digital Bangladesh is a vision of the government of Bangladesh to digitalize and transform the country into a digital and knowledge-based economy. It aims to use information and communication technologies (ICT) to progress governance, provide better access to education and health care, enhance economic opportunities, and improve the excellent quality of life for all citizens (Mahbub, 2022). This initiative was taken by the government of Bangladesh in 2008. Digital Bangladesh aims to transform the country and develop its infrastructure and capabilities into a knowledge-based society by 2021. In particular, the concept primarily focuses on improving the country's digital infrastructure and making government services more accessible to citizens through the use of technology (Mahbub, 2022).

To achieve this, the government of Bangladesh has already implemented various initiatives and

programs to promote digital literacy, digital infrastructure, e-governance, increase and expand access to information through internet connectivity, and encourage the use of ICT in various sectors of

the economy. However, digital Bangladesh also aims to boost the country's economic growth and development by creating new jobs and businesses in the digital sector (Mahbub, 2022).

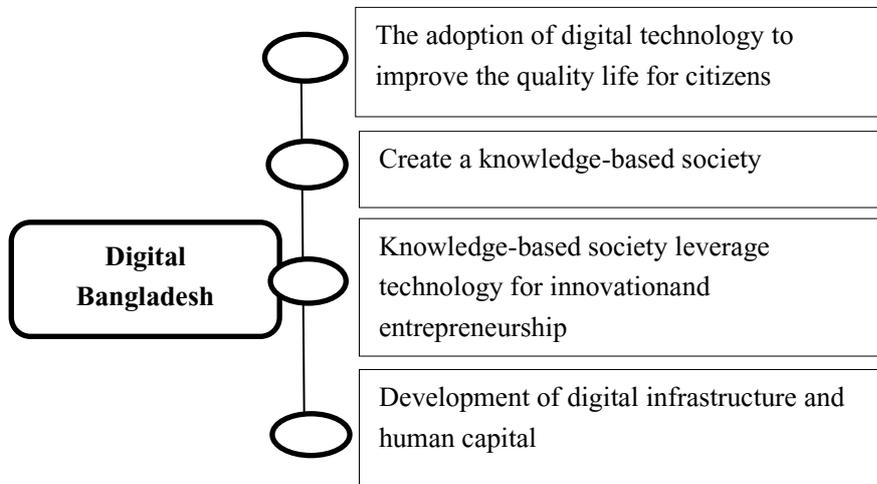


Figure 1. Aims of Digital Bangladesh (developed by authors)

On the other hand, Smart Bangladesh is a broader concept that encompasses the use of technology and innovative approaches to improve the quality of citizens and other smart solutions, such as artificial intelligence, robotics, blockchain technology, the Internet of Things (IoT), and preparing to exploit the potential and challenges of the Fourth Industrial Revolution (4IR) (Palak, 2023).

This vision turns the country into something more digital, smarter, technologically sound, and sustainable, which aims to harness the power of technology to improve the quality of life for all citizens, create new economic opportunities, and drive sustainable development (Ahmed, 2023b). Thereafter, building a smart Bangladesh by 2041 means building a smart citizen, smart economy, smart society, and smart government by 2041 (Mahbub, 2022). Thereafter, building a smart Bangladesh by 2041 means building a smart citizen, smart economy, smart society, and smart government by 2041 (Mahbub, 2022).

In this vein, in line with Vision 2021, the government of Bangladesh announced the vision of Smart Bangladesh on December 12, 2022, which will be achieved by 2041 under the Vision of 2041.

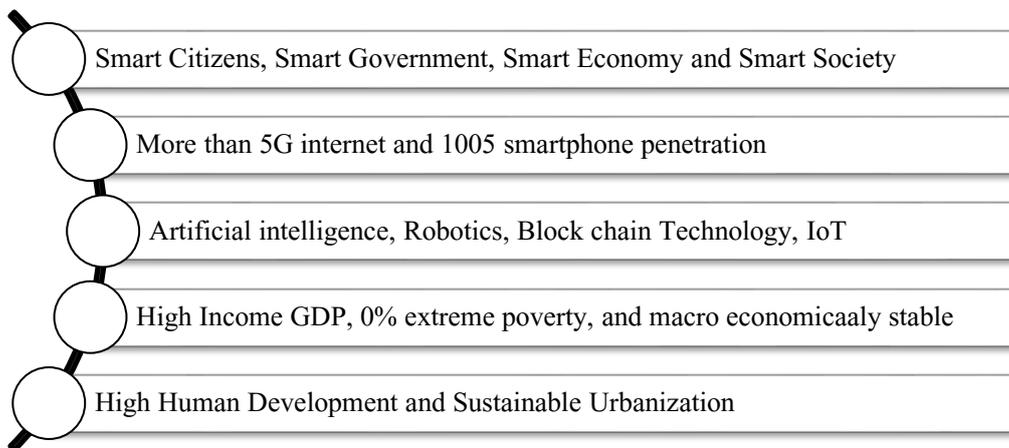


Figure 2. Aims of Smart Bangladesh (developed by authors)

However, the concept of Smart Bangladesh may include the adoption of new technologies and approaches in various sectors, such as

transportation, energy, and agriculture; developing sustainable and livable cities; improving transportation, energy, and water management; and

promoting innovation and entrepreneurship; as well as the development of policies and initiatives that support the use of technology to drive innovation and progress (Mahbub, 2022).

Development Approaches of Digital Bangladesh to Smart Bangladesh

Digital Bangladesh takes a more technology-centric approach to development. Digital

Bangladesh concentrated on improving service delivery using ICTs, capacity development of the whole society towards a knowledge economy, and the diversification of exports towards knowledge products. The vision mainly involves developing the digital infrastructure, improving digital literacy, and increasing the adoption of technology in various sectors (Mahbub, 2022).

Table 1. Development Approaches of Digital Bangladesh to Smart Bangladesh (developed by authors)

Human Resource Development	Encouraging the growth of the ICT industry	Investing in research and development	Promoting internships and apprenticeships	Providing education and training
Digital Government	Implementing electronic voting systems	Promoting open government	Digitizing land registration	Developing online portals and services
Connecting Citizen	Providing access to digital literacy training	Protecting privacy and security	Promoting affordable internet access	Developing and expanding broadband networks
IT Industry Promotion	Developing a skilled workforce	Promoting exports	Fostering research and development	Encouraging foreign investment

On the other hand, smart Bangladesh takes a more holistic approach to development and aims to close the digital gap by developing and implementing sustainable digital solutions to address various development challenges. It focuses on creating smart citizens, a smart government, a smart economy, and a smart society, including all people who enhance the quality of life for citizens

(Chowdhury, 2022). The development of Digital Bangladesh into Smart Bangladesh requires a comprehensive approach that involves the government, private sector, and general public. Here are some key pillars that need to be implemented to attain the vision of Smart Bangladesh.

Table 2. Pillars of Smart Bangladesh (developed by authors)

Smart Citizen	Empower citizens	Education and Skill Development	“Digital First” mindset driving campaign	Widespread digital literacy programs	Access to information.
Smart Government	Use of technology (smart ICT)	Digitalization of Public Services	Smart external collaboration and participation	Smart decision-making	Smart administration
Smart Economy	Infrastructure Development	Innovation and Entrepreneurship	Smart finance and payment system	Transform the business environment	Sustainable employment
Smart Society	Awareness and enhanced citizen engagement	Improve people's well-being	Adoption of digital tolerance	Creating a thriving and inclusive society	Strong ethics and values

Priority Areas for the Transition from Digital Bangladesh to Smart Bangladesh

This vision has been echoed in the “Charter for Change”, the Bangladesh Awami League declared during the ninth parliamentary election of Bangladesh in 2008. The charter emphasizes the need to develop human resources using ICT (in communication and education), which is a key factor in creating an equal society, the 'digital Bangladesh'. The national ICT policy of 2009 also reflects this priority goal of ICT-enabled development. This policy recognizes social justice, universal access, and support for ICT options as some of its key strategic goals. Overall, a key requirement is to ensure the development of an affordable and cost-effective multi-channel access mechanism to connect people and promote digital inclusion for development (A2I, 2017). The implementation of Digital Bangladesh primarily relies on the government's initiatives to build digital infrastructure and promote digital literacy (Ahmed, 2021). However, it also involves private sector participation in developing and providing digital services.

On the other hand, the priority areas for the transition from digital Bangladesh to smart Bangladesh mentioned several specific factors, which include smart governance, smart cities, digital economy, smart agriculture, digital education, digital infrastructure, enhancing citizen services, improving infrastructure efficiency, fostering innovation, promoting sustainable development, digital initiatives, promoting entrepreneurship, digital skills development, developing intelligent transportation systems, and implementing data analytics for decision-making (Roy, 2023). By following this factors-based approach, Bangladesh can effectively prioritize areas for the transition from Digital Bangladesh to Smart Bangladesh, laying the foundation for a technologically advanced and sustainable future.

However, when these sectors are built as smart sectors, the country will automatically transform into Smart Bangladesh. It requires a collaborative effort from various stakeholders, including the government, private sector, and citizens. It involves developing smart solutions that address specific development challenges, such as traffic management, waste management, and energy conservation. So, transforming four key areas as

defined by the present government into smart areas will undoubtedly ensure the achievement of Smart Bangladesh.

Diagnoses of Transforming Digital Bangladesh to Smart Bangladesh

The main benefits of Digital Bangladesh include increased efficiency, transparency, and accountability in governance, as well as improved access to information and services for citizens, increased efficiency and productivity in various sectors, promotion of e-commerce and digital entrepreneurship, and the creation of employment opportunities in the ICT sector. It also has the potential to create a digital economy that can generate employment and increase economic growth (Panel, 2023).

On the other hand, Smart Bangladesh has the potential to improve the quality of life for citizens by addressing specific development challenges, such as traffic congestion, air pollution, and waste management. It can also create smart and sustainable cities, promote renewable energy and waste management, enhance access to quality education and healthcare, promote efficient and transparent governance, and promote innovation and entrepreneurship, which can generate new jobs and spur economic growth (Panel, 2023).

Smart Bangladesh Vision 2041 has four main pillars, the first two of which are Smart Citizen and Smart Government, through which all services and media will be converted to digital. On the other hand, a smart society and smart economy will play a positive role in creating an inclusive society and erecting a business-friendly terrain to ensure smart, profitable growth. In addition to the massive metamorphosis under these four pillars, the technologies of the fourth artificial revolution will play an important part in realizing the vision of Smart Bangladesh (Haque, 2022).

Adopting Smart Technology in Transforming Digital Bangladesh to Smart Bangladesh

Bangladesh has made significant progress in adopting and practicing smart technology in terms of implementing Smart Bangladesh. In this context, some of the smart technologies have been discussed below:

1. Internet of Things (IoT)

IoT is a system of interrelated devices, sensors, and software that allows for the transfer of data over a network. The government of Bangladesh has

already taken steps to integrate IoT into its smart city projects, such as the Dhaka North City Corporation's 'Smart City' project, which aims to use IoT to manage the city's waste and traffic systems (Vongsingthong & Smachat, 2014).

2. Artificial Intelligence (AI)

AI refers to the development of computer systems that can perform tasks that normally require human intelligence, such as visual perception, speech recognition, and decision-making. Bangladesh has already made significant progress in this area, with several AI-based startups emerging in recent years, such as Chaldal, a grocery delivery service that uses AI to optimize its delivery routes (Deowan, 2020).

3. Blockchain Technology

Blockchain is a decentralized ledger that can be used to store and transfer data securely (Upe, 2023). The government of Bangladesh has already started exploring the potential applications of blockchain technology in areas such as financial services and supply chain management (M. A. Islam, 2020).

4. Big Data Analytics

Big data analytics refers to the process of examining large and complex data sets to uncover hidden patterns, correlations, and insights. The government of Bangladesh has already started using big data analytics to improve its public services, such as healthcare and education (Hassan et al., 2021).

Challenges of Implementing Smart Bangladesh

Smart Bangladesh requires a high level of coordination and collaboration among various stakeholders. In particular, high implementation costs and dependence on foreign technology and expertise are considered major barriers to implementing Smart Bangladesh. In addition, Vision Smart Bangladesh requires investment in research and development to create innovative solutions that can address specific development challenges (Panel, 2023). In this vein, the researchers identified several potential challenges behind the implementation of smart Bangladesh.

1. Digital Divide, Disparity, and Inequality

The most concerning issues behind implementing Smart Bangladesh are the digital divide, inequality, and disparity. It is manifested in various ways, such as gender, access to digital

devices, location, income, and marital status (Lester, 2019). For instance, GSMA 2020 data shows gender differences in mobile phone use and internet use, as well as differences in internet access between married and single people. Regional inequalities in digital access and proficiency have been found, with rural households having more access and proficiency (Kormos & Wisdom, 2023), which may create a potential barrier to the implementation of Smart Bangladesh.

2. Lack of Uninterrupted Power Supply

We know well that Bangladesh has made tremendous progress in the last decade in power supply management throughout the country. Each of the distinct parts of the country has been enlightened by the power of electricity, but after the drastic effects of the pandemic, Bangladesh is gradually losing its capacity to provide an uninterrupted power supply. In particular, due to a lack of continuous electrical problems (Akhter & Ahmed, 2022), productivity has fallen, and the Internet hasn't always been available to everyone (Al-Amin, 2022). That may be one of the major challenges to achieving smart Bangladesh.

3. Poor Access to Affordable and Reliable Broadband Internet

We have already discussed that a strong internet connection (like 5G) is the precondition to attaining the vision of Smart Bangladesh. But it is really a matter of sorrow for us that we are still unable to provide 100% strong and reliable internet or broadband internet connectivity which is considered the greatest challenge in the fourth industrial period. While various nations around the world are working on 6G, we are still unable to use 5G technology (Dey, 2022). IT infrastructure and connectivity are well established in the capital and main divisional cities, but rural, haors, chars, and hill districts lag behind (Dijk, 2019). In recent statistics, it has been identified that internet speeds are slow and that 37% of respondents lack access to the internet throughout the country which indicates that we still belong to a poor internet edge (Soomro et al., 2020).

4. High Cost of the Internet and Poor Access to Digital Devices

The high cost of the internet and poor access to digital devices are also considered influential factors behind implementing Smart Bangladesh.

Although Bangladesh has already made significant progress in terms of accessing digital devices, it is not adequate to attain the vision of Smart Bangladesh. In recent statistics, it has been found that in terms of using affordable internet and device access, we still lag behind other South Asian countries, including India, Pakistan, and Nepal (Afrin, 2022). Therefore, we should fix this issue as early as possible.

5. Lack of Skilled Manpower

Although we have made tremendous progress in the field of HDI (Human Development Index), we have not ensured 100% digital literacy for the mass population. At the same time, we know well that skilled manpower is the prime precondition to transforming our country into a smart Bangladesh, but surprisingly, we have not confirmed it. In this case, recent statistics reveal that only 35% of the general population in Bangladesh is digitally literate (Lester, 2019), but 65% of the mass population is still behind in digital literacy, which is considered a significant barrier to implementing Smart Bangladesh.

6. Economic Recession

Although Bangladesh has achieved economic growth comparable to that of the rest of the world, the sudden outbreak of the global pandemic has increased the economic recession significantly. At the same time, due to the overriding drought, flooding, and terrible poverty issues, our economic progress has been drastically impacted (Akter, 2022), which may have a drastic impact on attaining Smart Bangladesh.

7. Cyber Threats and Security Issues

Bangladesh has indeed made praiseworthy progress in the field of providing internet services at all levels. At the same time, using the internet at all levels is also alarming news to us due to our concern about cyber security. Cybercrime is a major concern in Bangladesh due to poor cyber security policies. The condition of the country's cyber security is insecure, and the rules and guidelines in existence are insufficient to tackle the increasing threat (Babu, 2023) which may create an influential barrier in terms of reaching the vision of Smart Bangladesh.

8. Lack of Simplifying of Digitalizing Services

The conversion of the manual to electronic services has a predetermined, transient purpose.

However, there aren't many indications—if any—that the service process has been streamlined. In that case, switching from a manual to an electronic service could make it harder and less effective for disadvantaged groups of society instead of providing benefits from smart Bangladesh (Joseph, 2001). Therefore, this is another potential challenge in transforming a digital Bangladesh into a Smart Bangladesh.

9. Lack of Public Awareness

Even though the government has started a number of ICT integration projects, only a tiny percentage of people—including those with low incomes—use the internet on their mobile phones for restricted access. Illiteracy and a lack of digital literacy make up this unit. Besides, people who live in rural areas and are illiterate are less likely to be helped or mentored in using digital services for their economic advancement (Kos-Labedowicz, 2017) which may pose severe challenges in implementing the vision of smart Bangladesh.

CONCLUSION

This study attempts to highlight the journey from digital Bangladesh to smart Bangladesh and explore how it is different from the journey of digital Bangladesh. This study indicates that the implementation of the initiatives of Smart Bangladesh will have an impact on all spheres of the public sector; it will not only focus on the service receiver perspective but also have an impact on the simplification of service delivery processes from the service provider perspective, which helps to ensure decentralization and good governance in the governance process. To fully realize the potential benefits of smart Bangladesh, the challenges to achieving smart Bangladesh should be reduced. Even though the government has started a number of ICT integration projects, rural areas, and illiterate individuals are less likely to receive support and mentorship for digital services. As a result, most people, especially those who are not using digital technology, are not familiar with the initiatives of Smart Bangladesh. In this case, first of all, for successful implementation of the initiatives, it is necessary to involve all people in this process.

So, the digital divide should be reduced, which could remain in various forms like gender, access to digital devices, location, income, and marital status. Research should be focused on this issue. Without

the involvement of every person in regard to majority, minority, ethnicity, rural, urban, low-, middle, or high-income people, etc., we cannot fully take advantage of the prospects of smart Bangladesh. So, in this regard, it is necessary to provide access to digital technology for everyone and provide training facilities about how to use it. Secondly, it is necessary to provide affordable and reliable broadband internet connections at the lowest cost so that everyone can access and use them without any difficulty. In this case, to ensure the high speed of the internet connection, it is necessary to provide an adequate power supply. In the current crisis of the electrical power supply, it is necessary to focus on alternative sources of power that help meet the demand for the power supply. Thirdly, though Bangladesh has made progress in internet services, concerns about cyber security remain. Poor policies and insecure cybersecurity make it difficult to tackle cybercrime and achieve Smart Bangladesh's vision. So, policymakers and the government should make and apply proper policies so that people can use digital technologies without any kinds of difficulties. Fourthly, there is a need for publicity about the initiatives of Smart Bangladesh, how they will be implemented, and proper instructions about how people will participate in those initiatives. This requires publication all over the country. Finally, there should be a clear outline about who will do which kinds of work and how that will help to reduce the conflict of work and the wastage of resources, which ultimately play an effective role in the implementation of initiatives in line with the vision of Smart Bangladesh.

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