BANGLADESH

Artificial Intelligence Readiness Assessment Report

DRAFT

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Acronyms and abbreviations

AI	artificial intelligence
a2i	Aspire to Innovate
BBS	Bangladesh Bureau of Statistics
COVID	COronaVIrus Disease
CSO	civil society organization
ID	identity, identification
FGD	focus group discussion
GDP	gross domestic product
GERD	gross expenditure in research and development
GPT	generative pre-training transformer
ICT	information and communication technology
IMLI	International Mother Language Institute
ITU	International Telecommunication Union
KI	key informant
KII	key informant interview
LLM	Large Language Model
NCTB	National Curriculum and Textbook Board
ODIN	Open Data Inventory
OSI	Online Service Index
RAM	Readiness Assessment Methodology
STEM	science, technology, engineering and mathematics
UN SDG	United Nations Sustainable Development Goal
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WIPO	World Intellectual Property Organization

Executive summary

In November 2021, UNESCO's 193 Member States unanimously approved the Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2022). This global framework aims to ensure that artificial intelligence (AI) is developed and used in ways that maximize benefits and minimize risks. Its unanimous endorsement reflects a worldwide commitment to responsible AI development. UNESCO also helps countries implement ethical AI practices through various capacity-building initiatives.

To facilitate the practical application of these Recommendations, UNESCO has developed a Readiness Assessment Methodology (RAM) (UNESCO, 2023a). This tool evaluates a country's preparedness to adopt ethical AI practices, identifying areas for improvement in institutional and regulatory frameworks. In Bangladesh, the RAM was launched in July 2024 by the Information and Communication Technology (ICT) Division[1] of the Ministry of Posts, Telecommunications and Information Technology and UNESCO in collaboration with Aspire to Innovate (a2i)[2] and UNDP[3].

This RAM country report has eight key sections. The first section provides an introduction to and overview of the current AI landscape in Bangladesh, which is supplemented by detailed quantitative and qualitative information, aligned according to the five pertinent dimensions of RAM.[4] The last two sections analyse the current status and offer a way forward through policy recommendations and a roadmap to implement them. The eight sections are:

1. Diagnosis of the national AI landscape
2. Legal and regulatory dimension
3. Social and cultural dimension
4. Scientific and educational dimension
5. Economic dimension
6. Technical and infrastructural dimension
7. Developing a national multistakeholder roadmap
8. Policy recommendations

[1] https://ictd.gov.bd/

[2] https://a2i.gov.bd/

[3] https://www.undp.org/bangladesh

[4] It should be noted that the RAM takes into account ICT-related indicators that are not directly related to AI but are closely linked to AI. Data centres, for example, provide the infrastructure necessary for AI's data processing and storage needs. Cybersecurity is another area that is essential for protecting AI systems from potential threats. These underlying ICT components play a vital role in supporting and enabling AI readiness.

Legal and regulatory

- Bangladesh has a draft National AI Policy, which is yet to be finalized. The findings of this AI readiness report for Bangladesh aim to strengthen the draft National AI Policy with a focus on ensuring the equitable and inclusive development and deployment of AI technologies.
- While Bangladesh has an extensive Right to Information Act, its National Data Protection Bill is still a draft. A Cyber Security Ordinance is currently undergoing a stakeholder consultation. The Ordinance aims to replace the Cyber Security Act, which has been controversial for its potential to enable suppression and surveillance.
- Bangladesh has been identified as one of the world's least cyber-secure countries according to the **Comparitech Cybersecurity Index**, though other assessments, such as the ITU Global Cybersecurity Index, place it mid-range, acknowledging efforts to improve.

Social and cultural

- The digital divide in Bangladesh manifests across demography and geography. For example, the number of male internet users is significantly higher than the number of female internet users. Additionally, the number of urban internet users is much higher than the number of rural internet users. There are no specific policies to address these disparities.
- AI systems trained in Bengali and indigenous languages face major challenges due to the lack of diversified datasets and structured data-sharing frameworks. Indigenous languages face even steeper challenges due to resource constraints.
- Bangladesh scores far above the global average in the Online Service Index, which assesses the scope and quality of online services provided by a government, and ranks very high in terms of trust in government websites and apps. However, stakeholder consultations indicate eroded trust in the previous administration.

Scientific and educational

- AI integration in Bangladesh's education system is **nascent**. While various teacher-training initiatives and platforms (e.g. Dikkha, Muktopaath) show promise, structured AI curricula and ethical AI education are largely missing. While over 75 per cent of secondary schools have access to computers, only about half of these schools have access to the internet.
- In 2021, almost 2,000 scholarly texts on AI were published in Bangladesh, showing steady growth in AI research.

Economic

- There are only three companies producing their own AI systems in Bangladesh: Marco Polo AI, MyAlice and Hishab. Hishab is the only company that has produced Bengali Large Language Models (LLMs).

- Bangladesh has a 0.2 per cent share of global high-tech exports according to the World Intellectual Property Organization (WIPO's) 2023 Global Innovation Index, which ranks it at 104 out of 132 countries.

- Private investment figures in AI are unavailable, and the AI startup ecosystem is still at an early stage of growth.

Technical and infrastructural

- While mobile phones are widespread (111 subscriptions per 100 inhabitants), only 44.50 per cent of Bangladesh's population uses the internet.
- Bangladesh has **eight data centres** and ranks **73rd of 76 countries** for colocation data centres.
- A significant gender gap persists in mobile and internet access, and rural areas continue to face infrastructural challenges, including frequent power outages.

Development of a national AI multistakeholder roadmap

UNESCO and the Government of Bangladesh have collaborated to develop the RAM in the country, forming a National Steering Committee that convened **three** times. The process involved extensive stakeholder consultations, conducted in collaboration with the ICT Division and a2i, including seven focus group discussions (FGDs), nineteen key informant interviews (KIIs) and one public consultation. The stakeholders included representatives from the government, private sector, academia and civil society organizations (CSOs). While the consultation brought together a diverse set of stakeholders, gender representation within the group was limited.

Topics for discussion included the RAM's indicators as well as issues around and suggestions towards AI governance and creating an AI ecosystem in Bangladesh that benefits all citizens. The outcome of these discussions, complemented by desk research, informed a roadmap for Bangladesh, including challenges and opportunities.

Towards a national AI strategy: high level recommendations

The opportunities identified during the consultations led to fifteen actionable recommendations, divided across three categories: regulation, institutional framework and capacity building. The recommendations are:

Regulation

- Finalize an inclusive and enabling National AI Policy.
- Finalize the Data Protection Bill and the Cyber Security Ordinance.
- Develop comprehensive AI procurement policies.
- Update the Right to Information Act.
- Mandate transparency and responsibility for contextual data in data collection.

Institutional framework

- Establish specialized institutions dedicated to AI development, which take into account community-level considerations.
- Establish a multistakeholder steering committee.
- Establish an independent Data Protection and Cybersecurity Authority.

- Establish a committee for a certification programme for AI vendors.
- Develop and curate datasets in Bengali and indigenous languages.

Capacity building

- Bridge digital divides and enhance public awareness of AI.
- Develop AI-focused curricula with special emphasis on uptake by girls and women.
- Invest in reskilling and upskilling for a future-ready workforce.
- Alleviate bias and discrimination in AI technologies.
- Encourage investments in AI research, development and infrastructure.

CHAPTER 1:
Diagnosis of the national AI landscape

In Bangladesh, artificial intelligence (AI) governance is primarily overseen by the Information and Communication Technology (ICT) Division of the Ministry of Posts, Telecommunications and Information Technology. The Division takes a collaborative approach, inviting additional support from other key institutions, including the Cabinet and the Ministries of Law, Public Administration, and Home Affairs.

The change of government in Bangladesh in August 2024 has been disruptive in many ways and has affected attempts towards developing an AI governance framework. Currently, there is a draft National AI Policy (Government of Bangladesh, 2024), which includes a proposal to establish a steering committee tasked with overseeing the ethical use of AI. However, the draft is yet to be finalized, with plans underway to complete it in 2025.

The new Government of Bangladesh has still to develop a comprehensive plan and prioritize specific sectors for AI interventions through regulations, strategies and guidelines. The draft AI policy includes ten priority sectors; however, concrete steps towards its implementation remain to be initiated (Government of Bangladesh, 2024).

AI systems have not yet been incorporated fully into decision-making or public service delivery in Bangladesh; therefore, developing mechanisms for public communication and transparency remains a priority for future implementation. However, establishing public declaration and transparency mechanisms would be beneficial and appropriate in anticipation of AI integration into public services. This would ensure that information related to AI, and particularly related to decision making and data usage, reaches the grassroots.

To conclude, the Government of Bangladesh is presently working to establish AI regulations and policies, and this report seeks to contribute to these efforts by offering a strategic roadmap and actionable recommendations.

CHAPTER 2:
Legal and regulatory dimension

2.1 AI policy and regulation

A draft National AI Policy for Bangladesh is in its final review stage (Government of Bangladesh, 2024) and a National Strategy for Artificial Intelligence 2019-2024 also exists, albeit in draft format (Government of Bangladesh, 2020a). Although the draft policy aligns well with the core values and principles of UNESCO's Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2022), it is important that the policy is updated to reflect recent changes in governance, ensuring coherence with the vision and priorities of the current government.

Section 5.2.2 of the draft policy, under 'Legal and Regulatory Framework', references plans to update the National Strategy for AI to incorporate AI ethics guidelines and principles aimed at providing guidance on the responsible and ethical development and use of AI technologies (Government of Bangladesh, 2024). As the draft policy is still being reviewed, the inclusion of a detailed implementation strategy for ethical guidelines is expected to be addressed in subsequent iterations. The 2019-2024 strategy draft has a strategic pillar (Pillar 4: Ethics, Data Privacy, Security and Regulations) that outlines a general guideline on what the strategy should emphasize (Government of Bangladesh, 2020a).

With regard to human rights, Section 3.6 ('Human-centred AI') of the draft policy reads 'The development and use of AI technologies in Bangladesh shall be guided by ... Ensuring AI technologies uphold the rule of law, human rights, dignity, values, and preferences, including human intervention scopes and human oversight in AI systems where necessary' (Government of Bangladesh, 2024). Stakeholder perspectives from the consultations reflect a shared understanding that adopting a human-centred approach to AI development and deployment is a key priority for Bangladesh. Section 5 of the draft policy, 'AI Policy Implementation Approaches', presents a detailed implementation framework encompassing institutional, legal and regulatory components. It also outlines roles and responsibilities for relevant ministries and departments, academia, private sector entities, and industries (Government of Bangladesh, 2024).

Additionally, the draft policy delineates an implementation plan for investment and funding in AI. While the framework identifies key focus areas, it does not currently specify budgetary allocations for the recommended measures. In comparison, the draft strategy includes a brief sub-strategy – Strategy 5: 'Funding and Accelerating AI Startups' – that touches upon potential budgetary provisions (Government of Bangladesh, 2020a).

Furthermore, Section 7 of the draft policy, 'Policy Review', stipulates that the national AI policy will undergo regular reviews every three years, with stakeholder engagement serving as a fundamental component of the review process (Government of Bangladesh, 2024).

The draft policy also incorporates AI-driven impact assessment within Section 4.6 ('Finance, Trade, and Economy'). In alignment with the principles outlined in Section 3.2 ('Transparency and Accountability'), the policy emphasizes the importance of ensuring transparency and accountability in the collection, storage and use of data, with the objective of making AI-driven decision-making processes explainable and interpretable, thereby enabling users and stakeholders to understand, question and challenge such decisions (Government of Bangladesh, 2024). Nonetheless, broadening AI impact assessments across all implementation domains would be essential to comprehensively address ethical and governance considerations. Moreover, provisions related to enhancing the transparency of opaque, 'black-box' AI systems, as well as mechanisms ensuring accountability and ethical compliance, such as oversight by independent and certified auditors, may be considered as the policy evolves.

Given the draft status of both these documents, Bangladesh does not have binding regulations or soft law instruments specific to AI governance in place. During the consultations, stakeholders suggested that the UNESCO Recommendation on the Ethics of AI could be further aligned with the ethical values articulated by the Islamic World Educational, Scientific and Cultural Organization (ICESCO)[5], given the relevance of such alignment for a Muslim-majority country like Bangladesh. Furthermore, certain AI technologies – such as intimate AI companionship and brain-computer interface applications – while accepted in other contexts, may not align with Bangladesh's cultural and religious values. Accordingly, the successful adoption of AI technologies will necessitate their adaptation to the country's specific cultural, religious and linguistic contexts. More broadly, the national approach to AI governance may benefit from parallels drawn from the popular discourse surrounding governance of social media platforms – fostering public trust through transparency, accountability and continuous public awareness initiatives. Clear and consistent communication between users, service providers and public authorities will be crucial as AI systems become more integrated into public services.

2.2 Data protection and privacy laws

The literature assessing the state of cybersecurity in Bangladesh presents varied findings. According to the Cybersecurity Index compiled by Comparitech, which is referenced within the RAM framework and was last updated in January 2024, Bangladesh ranks as the second-least cyber-secure country globally.

[5] https://icesco.org/en/2024/09/12/at-the-global-ai-summit-icesco-director-general-announces-the-launch-of-riyadh-ai-ethics-charter-for-the-islamic-world/

The index highlights several vulnerabilities, including a high incidence of ransomware Trojan attacks, a significant number of computers experiencing web-based malware infections, local malware attacks, and mobile devices affected by malware.[6]

However, the Global Cybersecurity Index 2020, published by the International Telecommunication Union (ITU) in 2024, places Bangladesh at 53rd out of 194 countries in terms of cybersecurity readiness. The report acknowledges Bangladesh, along with some other countries like Benin, Rwanda and Tanzania, as an outlier among Least Developed Countries (LDCs), recognizing its demonstrated commitment to strengthening cybersecurity. Notably, the report commends the establishment of a national cybersecurity industry as a key indicator of the country's capacity development efforts (ITU, 2024).

In terms of regulatory developments, Bangladesh is currently holding stakeholder consultations on a draft Cyber Security Ordinance 2025, which is intended to replace the Cyber Security Act of 2023 (Government of Bangladesh, 2023a). The draft ordinance introduces notable provisions relating to AI, such as the inclusion of AI systems within the definition of 'digital devices'. Specific terms like 'machine learning', 'machine vision', and 'large language model' are explicitly referenced, thereby ensuring that AI systems fall within the scope of all relevant provisions concerning digital devices. Furthermore, AI is explicitly incorporated into the definition of 'service providers', thereby extending accountability frameworks to encompass AI developers. The draft ordinance also outlines redress and remedy mechanisms, though its provisions regarding monitoring and redress for any harm specifically caused by AI systems may warrant further elaboration. Chapter 6 of the draft ordinance enumerates penalties for a range of cybercrimes, including cyberbullying, blackmailing, hate speech, and related offenses.[7]

Additionally, the Government of Bangladesh has prepared a National Data Protection Bill, which remains in draft form, with the most recent version published in 2023.[8] The political transitions and subsequent changes in governance in 2024 have diminished public trust in earlier legislative initiatives, underscoring the importance of revisiting and potentially revising the draft Bill to ensure alignment with the current administration's values and priorities. At present, there is no definitive timeline for the release of an updated version of the draft.

[6] https://www.comparitech.com/blog/vpn-privacy/cybersecurity-by-country/

[7] (in Bengali) https://ictd.gov.bd/sites/default/files/files/ictd.portal.gov.bd/notices/749b7e40_e05e_4c4f_a01f_ad007460412d/%E0%A6%B8%E0%A6%BE%E0%A6%87%E0%A6%AC%E0%A6%BE%E0%A6%B0%20%E0%A6%B8%E0%A7%81%E0%A6%B0%E0%A6%95%E0%A7%8D%E0%A6%B7%E0%A6%BE%20%E0%A6%85%E0%A6%A7%E0%A7%8D%E0%A6%AF%E0%A6%BE%E0%A6%A6%E0%A7%87%E0%A6%B6%20%E0%A7%A8%E0%A7%A6%E0%A7%A8%E0%A7%AB_v15-WOColor-22.01.2025.pdf and http://bdlaws.minlaw.gov.bd/act-1457.html

[8] https://docs.google.com/document/d/17cM3PJMrXpww-dS3TYg-EZd2u5gLnorO/edit#heading=h.gjdgxs

The current draft incorporates several noteworthy elements.

Section 18 of the draft ('Right to erasure') mentions the rights of the data subject to delete their data ('erasure' is the word used in the draft) and the responsibilities of the data controller in this regard. It outlines specific circumstances under which the right to erasure may be exercised and stipulates that such actions must be undertaken without undue delay. Moreover, it includes provisions that clarify the responsibilities of data controllers in cases where personal data has been made public – an aspect particularly relevant for private sector entities, which are tasked with ensuring compliance with data deletion requests and bearing associated liabilities.

Section 7 ('Consent for data collection and processing') outlines a foundational consent framework, stipulating that consent must be free, specific, clear and capable of being withdrawn. It is the data collector's responsibility to demonstrate compliance with these requirements. While this section addresses consent for data collection and processing comprehensively, it does not explicitly address data-sharing practices. Introducing clear provisions for sharing data, alongside a framework for classifying datasets based on sensitivity levels, would strengthen the Bill. Such enhancements could facilitate the effective implementation of access-control and data-minimization measures.

Section 11 ('Processing of sensitive data') outlines a general framework for sensitive data processing. However, the draft does not provide a definition or hierarchy of data sensitivity. Introducing classifications for distinct categories of sensitive data – such as personal health information or educational records – would offer additional layers of protection and ensure tailored safeguards.

Section 22 ('Transparency') outlines transparency requirements from the perspective of the data controller. This section could be enhanced by incorporating provisions addressing the transparency and explainability of AI systems, given the challenges posed by opaque, 'black-box' models.

Section 56 of the draft ('Compensation for failure to comply with this Act') has the very rough outline of a complaint and compensation process for when a data subject's rights have been violated.

Chapter 7 ('Accountability and transparency') and **Chapter 9** ('Establishment of data protection agency, office, etc.') establish accountability requirements and institutional arrangements, including the introduction of data protection officers and dedicated data protection agencies. However, the draft does not currently include explicit provisions regarding the right to privacy, respect for private and family life, or the requirement to conduct data protection or privacy impact assessments. Additionally, the draft lacks explicit references to data minimization principles. Integrating such provisions – along with frameworks for access control (e.g. classification labels such as confidential, secret and top secret) and sensitivity categorization – would bolster data protection efforts.

To ensure a comprehensive and cohesive approach to data protection, the Bill could further establish clear guidelines and standards for both public and private sectors, recognizing their unique characteristics and needs. Mechanisms enabling secure data sharing across sectors – public-private, private-private and public-public – would also contribute to a more robust framework, particularly in critical areas such as healthcare and e-commerce.

Several areas within the draft Bill require further attention to enhance its effectiveness. One is the inconsistent use of terms like 'data' and 'personal data', which may lead to ambiguities, particularly in translation. Additionally, the Bill could safeguard against potential conflicts of interest and mitigate concerns around surveillance, privacy and freedom of expression by ensuring that its proposed data protection authority operates independently.

Stronger limitations on unnecessary data collection are advisable, particularly in light of past instances – such as during the COVID-19 pandemic – when sensitive personal information was collected without adequate assurances regarding its use and protection, especially since neither the Information and Communication Technology Act (Government of Bangladesh, 2006a) nor the previous Cyber Security Act (Government of Bangladesh, 2023a) have effectively addressed the issue of data misuse. Enhancing transparency provisions, ensuring informed consent and fortifying enforcement mechanisms would contribute to fostering public trust and accountability. Furthermore, particular attention should be given to safeguarding sensitive data in emerging domains, such as smart cities and AI-driven healthcare solutions, where robust protections are essential.

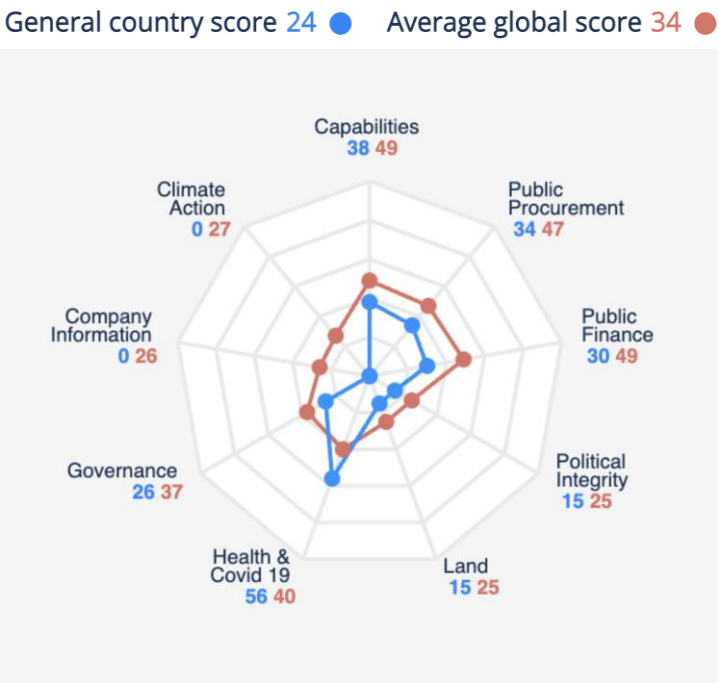
2.3 Data sharing and accessibility

In 2022, Bangladesh had an overall score of 40 (out of 100) in the Open Data Inventory (ODIN) by Open Data Watch and was ranked 140th of 195 countries.[9] Similarly, the Global Data Barometer – which assesses data governance, capability and availability, as well as the use and impact of data for the public good – gave Bangladesh a score of 24, compared to a global average of 34. Notably, Bangladesh performed above the global average in the 'Health & COVID-19' category, scoring 56 versus the global benchmark of 40.[10]

[9] https://odin.opendatawatch.com/Report/countryProfileUpdated/BGD?year=2022

[10] https://globaldatabarometer.org/country/bangladesh/

Figure 1: Bangladesh's score in the Global Data Barometer



Source: https://globaldatabarometer.org/country/bangladesh/

Bangladesh has not yet endorsed the international Open Data Charter, a set of principles and best practices for the release of governmental open data[11]. It is worth noting, however, that within the broader Asian region, only the Philippines, the Republic of Korea and Uzbekistan have formally adopted the charter.[12]

The country's primary data-sharing platform, Doptor Open Data, facilitates access to geographic and administrative information related to Bangladesh.[13] There is also the Bangladesh National Portal, where e-services are provided and government-related data are shared.[14] A separate national data-sharing framework also exists; however, this framework is currently not accessible externally and does not support cross-border data sharing.[15] The Bangladesh Bureau of Statistics (BBS) also shares data with various national agencies, although a dedicated and comprehensive data-sharing framework has not been identified.[16]

Bangladesh has formulated an Open Government Data Strategy under the Statistics and Informatics Division, Ministry of Planning (Government of Bangladesh, n.d.). It might consider enhancing the effectiveness of this strategy by introducing a structured assessment mechanism to evaluate its outcomes. Additionally, while the strategy aims

[11] https://en.wikipedia.org/wiki/Open_data
[12] https://opendatacharter.org/government-adopters/
[13] https://dpgdata.doptor.gov.bd/
[14] https://bangladesh.gov.bd/index.php?lang=en
[15] https://data.gov.bd/
[16] http://nsds.bbs.gov.bd/en

to facilitate research by making datasets accessible, providing specific guidance to researchers would be a valuable next step, ensuring access to information for those who can benefit from it.

2.4 Procurement laws and policies

At present, Bangladesh does not have dedicated laws or policies governing the procurement of AI systems, products or services. However, the country's procurement processes are regulated by the Public Procurement Rules (Government of Bangladesh, 2008) and facilitated by the electronic Government Procurement (e-GP) system[17], administered by the Bangladesh Public Procurement Authority[18]. The e-GP platform manages the entire government procurement process cycle and, in principle, could be extended to encompass AI procurement, too.

Given the distinct characteristics and implications of AI systems, the need to develop a robust and mandatory certification programme for AI vendors, which incorporates both technical standards and ethical considerations, is widely recognized. While traditional procurement guidelines prioritize financial and operational aspects, the procurement of AI systems may warrant additional frameworks that address ethical compliance, mechanisms for redress, and compensation provisions. Integrating these elements would ensure a more comprehensive and responsible approach to AI procurement.

2.5 Freedom of Information Acts/ Access to Knowledge Acts

Bangladesh has enacted a Right to Information Act (Government of Bangladesh, 2009a), which provides a comprehensive framework governing the preservation and publication of, and access to, information. The Act also stipulates the establishment, structure and functions of an Information Commission responsible for overseeing its implementation.

Several independent studies have evaluated the effectiveness of the Right to Information Act. It has been suggested that 'the legal framework needs to be reformed to make it [the Act] compliant with the international standards'[19]. A policy group called the Right to Information Forum has also presented a set of recommendations.[20] Given

that the Act was promulgated in 2009, it does not contain specific provisions addressing emerging technologies like AI. Nonetheless, Chapter 2 of the Act delineates the responsibilities and obligations of entities involved in the use or dissemination of

[17] https://cptu.gov.bd/e-gp.html

[18] https://cptu.gov.bd/

[19] https://www.thedailystar.net/opinion/news/challenges-making-the-right-information-act-effective-1968513

[20] https://mrdibd.org/wp-content/uploads/2021/04/35_RTIA-in-Bangladeshchallenges-of-implementation.pdf

data. Specifically, Section 5 and Section 6 address the preservation and publication of information, while Section 7 outlines exemptions to these provisions. Furthermore, the

Act details the procedures for requesting and providing information, thus contributing to a structured framework for public access to information.

2.6 Due process and accountability, online safety and integrity of speech

With respect to due process rights, the draft Cyber Security Ordinance 2025 delineates a range of cybercrimes and corresponding penalties. Chapter 6 of the ordinance lists offenses that fall within its scope, including unauthorized access to systems and digital infrastructures, fraud, sexual harassment, blackmailing, hate speech and other related offenses. Chapter 7 outlines the procedures for investigation and adjudication, providing guidance on matters like jurisdiction, procedural timelines and related judicial processes.

Previously, the Digital Security Act of 2018 (Government of Bangladesh, 2018a) was enacted in order to prevent the dissemination of hate speech, extremism and other harmful content in digital spaces. However, the law attracted significant scrutiny due to concerns regarding its application in restricting dissenting opinion and limiting freedom of expression, without adequately addressing online security challenges. Consequently, the Digital Security Act was repealed and replaced by the Cyber Security Act of 2023 (Government of Bangladesh, 2023a), which also prompted public debate and has since been earmarked for replacement by the forthcoming Cyber Security Ordinance 2025.

Recognizing the evolving digital landscape, the Government of Bangladesh has made efforts to establish a comprehensive digital safety framework aimed at safeguarding citizens in the online environment. This framework seeks to address issues like hate speech, violent content, misinformation and disinformation, while fostering a secure and inclusive digital space.

2.7 Public sector capacity

Bangladesh has no government strategy or programme aimed specifically at enhancing digital skills within the public sector. The Dikkha application, primarily designed to support teachers and students, contributes to digital capacity building to some extent.[21] However, a targeted government strategy or programme focused on strengthening digital competencies in the public sector would be a valuable step towards addressing the digital divide and ensuring equitable access to digital opportunities across various segments of society.

[21] https://dikkha.com/

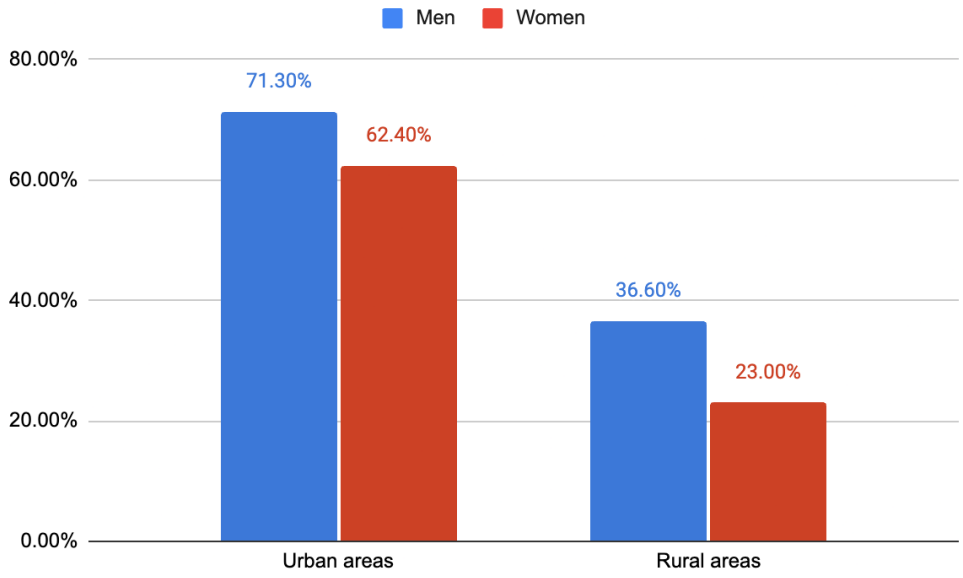
CHAPTER 3:
Social and cultural dimension

3.1 Diversity, inclusion and equality

As of June 2024, the gender gap in internet use in Bangladesh stood at 0.767.[22] Despite gradual yet consistent progress in this regard since 2020, the number of male internet users remains significantly higher than female users.

A pronounced disparity is also evident between urban and rural internet use. Approximately 66.8 per cent of the urban population uses the internet, compared to only 29.7 per cent of the rural population. Gender differences persist across both regions: in urban areas, 71.3 per cent of men and 62.4 per cent of women use the internet, while in rural areas, 36.6 per cent of men and 23 per cent of women are reported users.[23]

Figure 2: Internet users by area and gender, 2024 (in percentage)



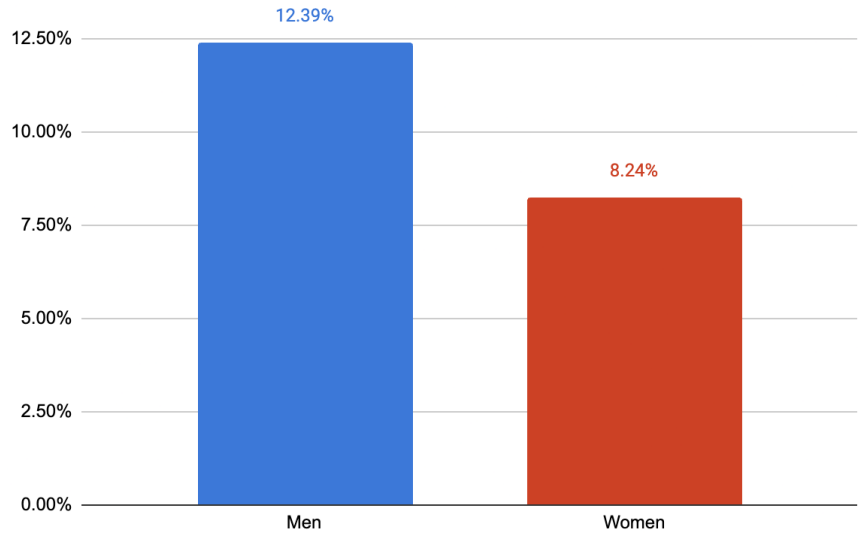
Source : https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

A gender gap exists in education, too. The proportion of females graduating from tertiary education programmes in science, technology, engineering and mathematics (STEM) fields is 8.24 per cent, compared to 12.39 per cent for males – a gender ratio of 0.67 (World Economic Forum, 2021).

[22] https://www.digitalgendergaps.org/

[23] https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

Figure 3: Graduates of tertiary education programmes in STEM fields by gender, 2021
(in percentage)



Source: World Economic Forum, 2021

Currently, Bangladesh has no specific laws or policies aimed at reducing the digital gender gap. The National Information and Communication Technology Policy (Government of Bangladesh, 2018b), in Chapter 2 ('Visions and objectives'), references social equity and universal access (Section 2.2.3). However, these concepts are not elaborated upon in the document. One notable initiative towards gender equity is the Her Power project, or প্রযুক্তির সহায়তায় নারীর ক্ষমতায়ন শীষক প্রকল্প (Woman empowerment through technology) initiated by the ICT Division.[24] This project offers women-focused training in ICT fields, including e-commerce, information technology (IT) services, web development and graphic design.

Moreover, policy measures that enhance online safety could play a pivotal role in narrowing the digital gender gap, as women frequently encounter harassment and abuse in digital environments. Under the ICT Act (Government of Bangladesh, 2006a), challenges around the admissibility of digital evidence – such as screenshots – have historically hindered efforts to address cases of online abuse.

Further, wage disparities in the ICT sector, including in entry-level roles such as data entry, highlight the need for policy interventions to promote equal pay and facilitate the upskilling of women, enabling them to transition into higher-value technological roles. While broader education policies, such as the National Education Policy (Government of Bangladesh, 2010), encourage increased female participation in education, they do not specifically address the digital gender divide.

[24] (in Bengali) https://herpower.gov.bd/

Bangladesh also lacks targeted policies to address rural-urban disparities, though general references to socio-economic disparities exist in various policy documents. The draft AI Policy (Government of Bangladesh, 2024) and the Smart Bangladesh ICT Masterplan 2041 (Government of Bangladesh, 2023b) acknowledge these inequalities. The previous government's manifesto included a My Village-My Town initiative[25], which sought to extend urban amenities to rural areas. Similarly, the 8th Five-Year Plan (Government of Bangladesh, 2020b) references the issue, contributing to initiatives such as Union Information Service Centres and district-level Information Portals managed by Aspire to Innovate (a2i), a special programme for the digital transformation of Bangladesh, located within the ICT Division and the Cabinet Division. However, the effective implementation of such initiatives is a challenge, compounded by infrastructural limitations and the erosion of public trust in initiatives undertaken by the previous administration, which are currently being reviewed.

While Bangladesh has benefited from previous digitalization initiatives, which proved particularly valuable during the COVID-19 pandemic (a2i, 2023), the pandemic also exposed a significant digital divide. For example, limited access to devices in urban slum areas hindered residents' ability to receive essential digital services, including mobile financial aid. In contrast, rural communities demonstrated resilience by relying on resource-sharing arrangements to overcome similar challenges.

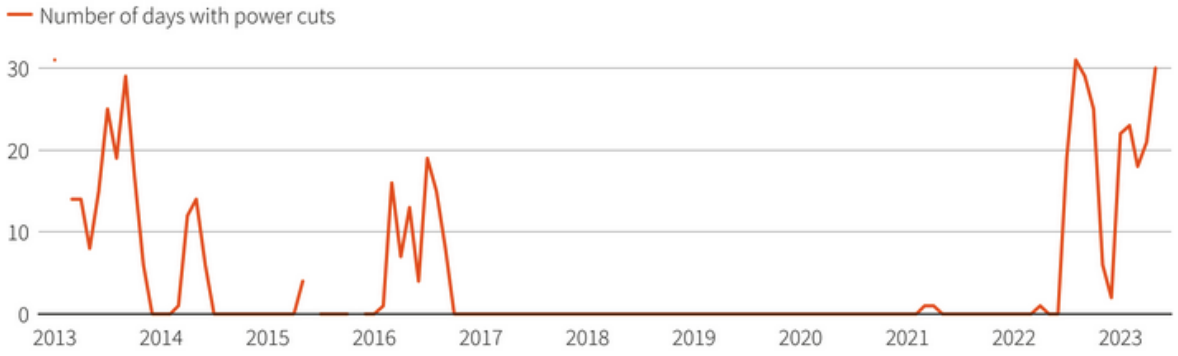
The availability of electricity poses a significant challenge, too. While almost 100 per cent of Bangladesh's population has access to electricity[26], power cuts are an issue[27], especially in rural areas, where daily interruptions can extend to seven or eight hours. These disparities are even more pronounced in geographically and administratively complex regions, such as the Chittagong Hill Tracts, where transportation difficulties and dual administrative systems often result in confusion regarding service delivery channels.

Figure 4: Number of days with power cuts in Bangladesh, 2013 to 2023

25 https://lged.portal.gov.bd/sites/default/files/files/lged.portal.gov.bd/page/184c146e_dde0_485c_9c05_930b771411bd/2023-06-17-09-31-2095884d23bd34b76e1290a7b628d886.pdf

26 https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=BD

27 https://www.reuters.com/world/asia-pacific/bangladeshs-worst-electricity-crisis-decade-2023-06-07/



Note: All figures in number of days; Data for Feb 2013, July and December 2015 unavailable
Source: Power Grid Company of Bangladesh

Reuters Graphics Reuters Graphics

Although previous digitalization initiatives, such as those rolled out under the Bangladesh Vision 2021[28] programme, improved connectivity and literacy, they often fell short in targeting marginalized populations. Gender and regional disparities persisted. For instance, garment workers, despite having smartphones, faced language barriers and lacked the time and resources to engage meaningfully with digital technologies. Similarly, communities in marginalized regions, including tea gardens, had limited internet access, leaving them disconnected from broader digital advancements.

Further challenges stem from disparities in the cost of communication between urban and rural areas, where marginalized populations often incur higher expenses. A collaborative approach between the government and mobile service providers, building on the regulatory framework established by the Bangladesh Telecommunication Act (Government of Bangladesh, 2001), may help to address these disparities and ensure equitable access to affordable communication services.

While the draft National AI Policy mentions workforce diversity, it lacks detailed provisions for it (Government of Bangladesh, 2024). Currently, there are no explicit government policies to promote diversity within the digital workforce, and there are no requirements mandating government contractors, academia, or technology firms to publicly disclose diversity statistics. Diversity requirements are often only applied in the context of collaborations with international organizations.

As AI continues to transform various sectors, it is crucial to prioritize the development of a diverse skilled workforce through vocational training. This will enable individuals to contribute meaningfully to AI-related tasks, including data entry and model testing, even without advanced AI knowledge. At the same time, the increasing adoption of AI technologies presents challenges to traditional employment sectors. Timely policy

interventions are essential to prepare the workforce for emerging job opportunities associated with AI; without such measures, progress may be delayed.

[28] https://cpd.org.bd/resources/2007/08/Bangladesh-Vision-2021-English.pdf

Language inclusion is also a key consideration. The scarcity of diversified datasets impedes effective AI systems' training in local languages. Despite access to advanced tools like ChatGPT, output in Bengali remains suboptimal due to the limited availability of open-source datasets. Data translation from English to Bengali often results in poor outcomes, negatively impacting model performance. The Enhancement of Bangla Language in ICT through Research & Development (EBLICT) project[29], under the Bangladesh Computer Council[30] and the ICT Division, is meant to address this gap. It has been working on several projects to increase the inclusion of Bengali in the AI landscape, and has developed solutions, such as a sentiment analyser,[31] an optical character recognizer,[32] a spell checker,[33] a speech-to-text and a text-to-speech generator[34], etc. These solutions are available online, but datasets remain unavailable.

The lack of a legal framework for data sharing is a significant barrier. Current laws, such as the Cyber Security Act (Government of Bangladesh, 2023a), regulate aspects of data privacy but do not include mechanisms to facilitate the data consolidation and sharing that would support AI development. Establishing a centralized data-sharing platform, as recommended by the draft National AI Policy (Government of Bangladesh, 2024), would support resource pooling and standardization, aligning with the broader objectives outlined in Bangladesh's National ICT Policy (Government of Bangladesh, 2009b).

Establishing a specialized authority would help bridge gaps between technology developers and corpus holders. Collaborative frameworks under the Right to Information Act (Government of Bangladesh, 2009a), which promotes transparency and accessibility, could support public-private partnerships in data sharing. International collaborations, leveraging platforms like UNESCO's Missing Scripts Program[35], present valuable opportunities to support such efforts.

The draft AI policy of 2024 lacks provisions to acquire and train datasets for indigenous languages. Terms like 'indigenous' and 'ethnic' are missing from policy discussions, reflecting gaps in addressing cultural diversity (Government of Bangladesh, 2024).

Resource limitations remain significant. Many indigenous languages lack written records, and some do not have dedicated fonts. While the International Mother

Language Institute (IMLI)[36] has made strides in language preservation, such as collecting Santali language data for Google Translate, most indigenous languages remain under-

[29] https://eblict.gov.bd/
[30] https://bcc.gov.bd/
[31] https://sentiment.bangla.gov.bd/sentiment-emotion-analysis
[32] https://ocr.bangla.gov.bd
[33] https://spell.bangla.gov.bd/
[34] https://read.bangla.gov.bd/
[35] https://www.unesco.org/en/articles/digital-preservation-indigenous-languages-intersection-technology-and-culture
[36] https://imli.gov.bd/

represented.[37] The UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage[38], which Bangladesh has ratified, could serve as a framework to document and digitize endangered languages effectively, thereby enabling their use in AI training datasets.

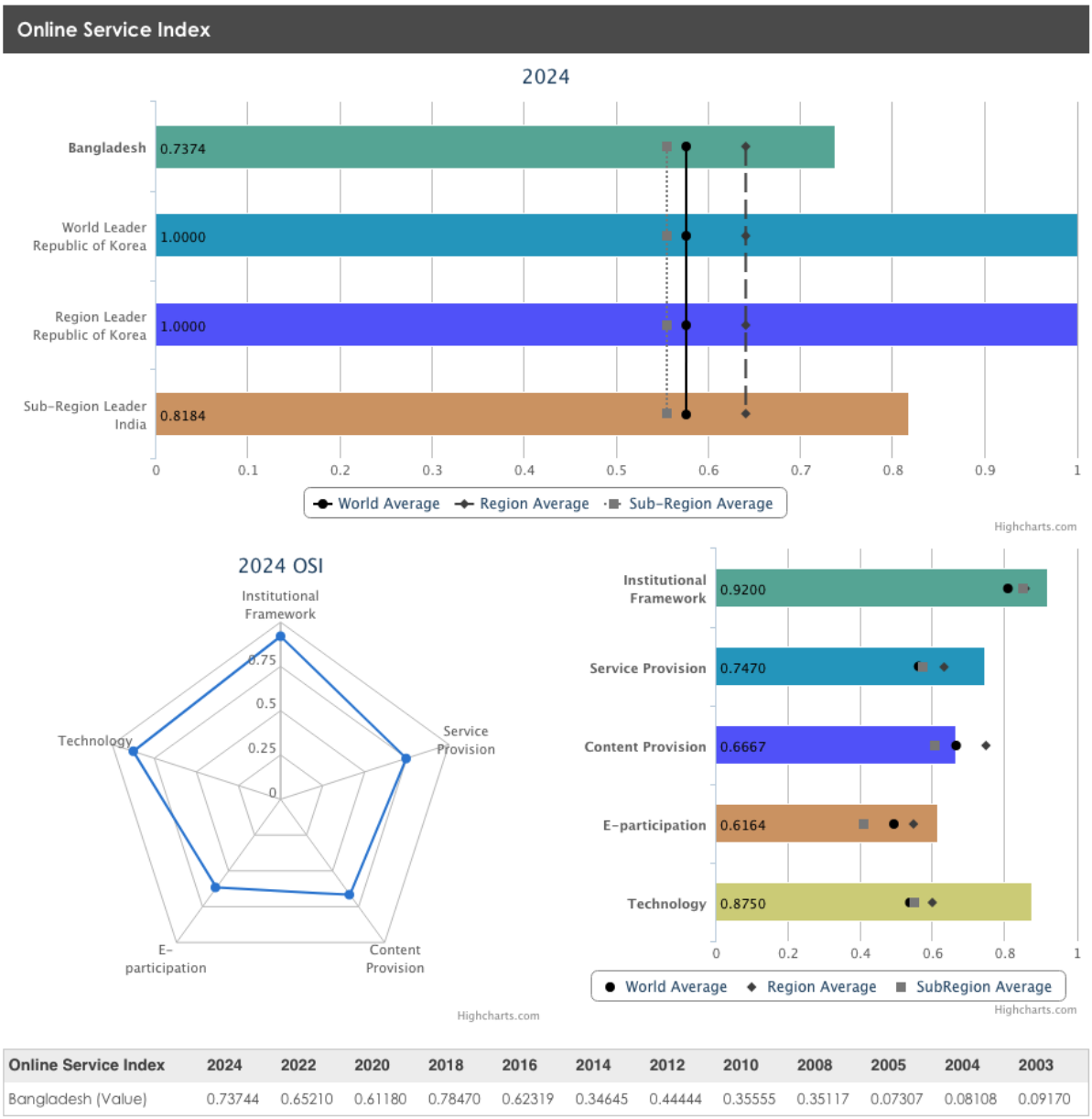
Additionally, disability inclusion is often overlooked in AI policymaking and governance, including in Bangladesh. The comprehensive Rights and Protection of Persons with Disabilities Act (Government of Bangladesh, 2013a) safeguards the rights of persons with disabilities. This legislation could be expanded to incorporate provisions addressing the digital divide faced by persons with disabilities and to introduce specific measures to bridge this gap. Digital technologies, like online banking, have demonstrated the potential to promote independence and dignity for persons with disabilities. Bangladesh's digital public infrastructure also includes measures to enhance accessibility in physical locations and call centres.[39] However, access to such services is not yet universal, and further efforts are required to ensure inclusivity.

3.2 Public engagement and trust

The Online Service Index (OSI), within the UN's E-Government Development Index (EGDI), assesses the scope, quality and accessibility of online services delivered by governments worldwide, with a maximum attainable score of 1.0. Bangladesh's performance in this area has improved steadily over time, progressing substantially from a score of 0.00917 when the OSI took its first measurements in 2003.[40] In 2024, Bangladesh received a score of 0.7374, significantly above the global average of 0.5754.

Figure 5-8: Bangladesh's performance in the OSI

[37] See here for a list of indigenous languages in Bangladesh: https://www.ethnologue.com/country/BD/
[38] https://ich.unesco.org/en/convention
[39] https://a2i.gov.bd/bangladeshs-phygital-public-infrastructure-bridges-dpi-theory-and-practice/
[40] https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/14-Bangladesh



Online Service Index	2024	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Bangladesh (Value)	0.73744	0.65210	0.61180	0.78470	0.62319	0.34645	0.44444	0.35555	0.35117	0.07307	0.08108	0.09170

Source : https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/14-Bangladesh

The E-Participation Index, a supplementary index to the UN's E-Government Survey, assesses the availability and effectiveness of e-participation mechanisms, including e-information, e-consultation and e-decision-making, offered by governments relative to each other.[41] Bangladesh ranked 70th of 193 countries in the E-Participation Index of 2024, scoring 0.6164.[42] The world average is 0.4893 and the highest possible score is 1.

Bangladesh ranked 8th of 100 countries in 'trust in government websites and apps' as per the Economist Impact's Inclusive Internet Index 2022, with a score of 72 per cent.[43] It is

[41] https://publicadministration.un.org/egovkb/en-us/About/Overview/E-Participation-Index
[42] https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/14-Bangladesh
[43] https://impact.economist.com/projects/inclusive-internet-index/2022

noteworthy, however, that this score may not fully reflect recent political developments in Bangladesh nor the perspectives gathered during stakeholder consultations, which indicated a degree of eroded trust in the previous administration.

As an example, the **e-Nothi system** is Bangladesh's one-stop electronic filing platform designed to streamline government operations, promote paperless offices, and ensure faster, more transparent, and accountable public service delivery for its 160 million citizens.[44] It contains a vast repository of government information, and AI could be used to generate summaries from it.

3.3 Environmental and sustainability policies

The draft National AI Policy 2024 identifies the environment as a priority sector for AI application. Specifically, Section 4.4 ('Environment, energy, and climate change') underscores the potential role of AI in optimizing renewable energy production, enhancing weather forecasting capabilities and improving water resource management (Government of Bangladesh, 2024). While the draft policy provides a comprehensive overview of AI applications in environmental conservation, it places comparatively less emphasis on the environmental impact of and sustainability considerations around AI technologies themselves. Addressing this gap may involve the development and implementation of legal and regulatory frameworks that not only foster responsible deployment of AI but also prioritize environmental sustainability in alignment with Bangladesh's broader development goals.

3.4 Health and social well-being

The Bangladesh Digital Health Strategy 2023–2027 was developed under the auspices of the Ministry of Health and Family Welfare (Government of Bangladesh, 2023c). The strategy mentions AI in the context of establishing a digital health information exchange programme (Section 4.2.2) and an accessible web-based health advisory service (Appendix 4, note 2). It comprehensively addresses both physical and mental health dimensions; however, it does not specifically examine the implications of AI technologies on children's health and well-being.

Currently, AI-based prediction models for various diseases in the health sector in Bangladesh rely entirely on foreign datasets. However, the process of seeking local data from institutions is often protracted by the absence of ethics committees and/or internal review boards to facilitate data sharing. Establishing clear policy mechanisms to streamline data-sharing processes would help address these challenges. Additionally, it is essential to raise awareness within the private sector about the

importance of ethical data sharing. Equally critical is the development and enforcement of a comprehensive and robust data protection framework to ensure the safeguarding of personal health information.

[44] https://www.tbsnews.net/tech/using-e-nothi-e-filing-govt-offices-timely-initiative-digital-bangladesh-44061

3.5 Culture

Bangladesh does not have a comprehensive policy framework dedicated to the preservation of cultural heritage using AI. The ICT Division has taken some initiatives, such as developing a local language keyboard and collecting approximately 12,000 minutes of audio data across 40 languages. However, these datasets are not yet publicly accessible, and several key issues, such as establishing annotation standards and ensuring validation, remain to be addressed.

The National Cultural Policy (Government of Bangladesh, 2006b) broadly addresses cultural preservation but does not incorporate AI-driven initiatives. AI technologies possess significant potential to contribute to the digital preservation of cultural artefacts, heritage sites and ecological elements in Bangladesh. For instance, AI could analyse patterns in cultural artefacts to trace connections with ancient traditions. The Bangladesh Environment Conservation Act could serve as a framework to explore the possible ecological applications of AI, ensuring relevance to local contexts (Government of Bangladesh, 1995).

Culturally nuanced AI models that reflect the country's distinct cultural context are necessary to effectively leverage AI in Bangladesh. This could involve adapting existing Western frameworks or creating bespoke models, such as a localized Bengali large language model. Currently, only the company Hishab[45] has released a Bengali language model, though its scale remains limited. Ensuring cultural sensitivity and appropriateness in the design and deployment of such models is essential to maximize their relevance and effectiveness.

As mentioned above, the digital documentation of endangered languages in Bangladesh is critical. While initiatives like the Nalinee Language Documentation Project, led by IMLI, are promising, resource constraints limit their progress. The annotation of collected data, amounting to 50 to 60 hours per language, requires substantial funding and skilled resources, both of which are currently inadequate.

International examples, such as the Indigenous Peoples' Rights Act of 1997 in the Philippines (Government of the Philippines, 1997), demonstrate how comprehensive legislation can safeguard minority languages and associated cultural contexts. Introducing similar legislative measures in Bangladesh could play a pivotal role in protecting indigenous languages and preventing their marginalization by dominant linguistic groups. Initiatives such as the National Linguistics Olympiad [46] launched by

IMLI, have proven effective in raising awareness and promoting engagement among younger speakers of minority languages.

[45] https://huggingface.co/hishab

[46] https://www.ls-bd.org/

In this regard, integrating language preservation initiatives within the framework of Bangladesh's National AI Policy may prove beneficial. A collaborative, community-driven approach that empowers local communities and fosters trust would strengthen these efforts. Aligning such initiatives with the principles outlined in the UN Declaration on the Rights of Indigenous Peoples[47] would also contribute to cultural preservation and the equitable allocation of resources.

[47] https://social.desa.un.org/issues/indigenous-peoples/united-nations-declaration-on-the-rights-of-indigenous-peoples

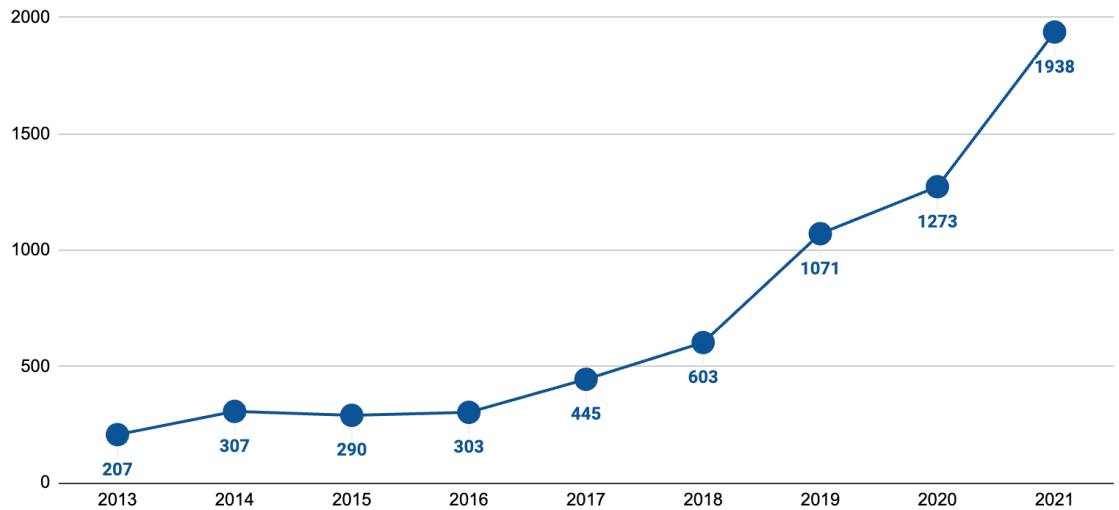
CHAPTER 4:
Scientific and educational dimension

4.1 Research and innovation

In 2021, Bangladesh's gross expenditure on research and development (GERD) equalled 0.3 per cent of its gross domestic product (GDP), according to a survey report released by the Bangladesh Bureau of Statistics (BBS) in May 2024. This is a slight decline from 2020 (0.31 per cent) and 2019 (0.35 per cent). For comparison, other countries in the region allocated the following proportions of their GDP to GERD in 2022: India 0.6 per cent; Pakistan 0.2 per cent; and Myanmar 0.0 per cent.[48] This indicator aligns with the UN's Sustainable Development Goal (SDG) indicator 9.5.1, which measures research and development expenditure as a proportion of GDP.

According to Our World in Data, there were 1,938 scholarly publications on AI in Bangladesh in 2021[49], an average of 0.000011 publications per capita.[50] This represents a marked increase from 2013, when only 207 publications were recorded. Notably, the number of publications more than tripled between 2018 and 2021, reflecting the country's growing engagement with AI-related research and academic contributions to it over recent years.

Figure 9: Number of scholarly publications on AI in Bangladesh (2013 to 2021)



Source : https://ourworldindata.org/grapher/annual-scholarly-publications-on-artificial-intelligence ?tab=table

[48] https://ourworldindata.org/sdgs/industry-innovation-infrastructure

[49] https://ourworldindata.org/grapher/annual-scholarly-publications-on-artificial-intelligence?tab=table

[50] All indicators in this RAM that refer to 'per capita' use the following population of Bangladesh: 169,828,911. This is based on the Population and Housing Census 2022 published by the BBS in 2023: https://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b343a8b4_956b_45ca_872f_4cf9b2f1a6e0/2024-01-31-15-51-b53c55dd692233ae401ba013060b9cbb.pdf

Scholarly excellence in AI may also be seen from performance in Kaggle, a data science competition platform and online community for data scientists and machine learning practitioners. Bangladesh has one double Kaggle grandmaster and one Kaggle grandmaster, both based in Dhaka. There is also a Kaggle grandmaster of Bangladeshi nationality based in the USA.[51] All three are male. There are 0.00000001 Kaggle grandmasters in Bangladesh per capita (excluding the one based outside the country).

4.2 Education

4.2.1 Integration of digital tools and AI in education

Bangladesh's National Information and Communication Technology Policy aims to integrate digital tools in education by providing multimedia classrooms (Government of Bangladesh, 2018b). However, implementing this vision across over 100,000 primary schools and 33,000 secondary schools poses significant logistical challenges. Despite these hurdles, the concept of blended education has gained momentum, especially during the COVID-19 pandemic, and a framework is now in place to support its development.

The previous government introduced several platforms or applications aimed at enhancing educational access and efficiency:

- Dikkha integrates digital and multimedia classroom solutions, establishing an effective network that connects teachers and students across the country.
- Noipunno[52] is another data framework designed to support teachers and students; however, it is currently not operational.
- Kishor Batayon[53] helps students manage their classes and coursework.

Another recent initiative by the ICT Division is called Hour of Code, which encourages school students to dedicate one hour each day to learning coding skills.[54] Moreover, UNICEF and the Directorate of Secondary and Higher Secondary Education have developed gamified learning content, which is being piloted in twenty-four schools.[55]

AI integration into the country's education system is still at an early stage, with significant potential for expansion. While the government has initiated training programmes for secondary and higher secondary school teachers, these efforts are

[51] Personal research by co-author.

[52] https://dme.portal.gov.bd/sites/default/files/files/dme.portal.gov.bd/notices/a0c7fd36_216c_4a4f_a341_7a1fc241858c/2nd_Noiounno%20App%20Web%20Version_User%20guideline%20(1).pdf

[53] https://www.undp.org/bangladesh/stories/kishore-batayan-konnect-becomes-students-way-out-during-pandemic

[54] https://file-rangpur.portal.gov.bd/uploads/c18c0a17-a73f-456f-8e66-11fb8d20103c//65b/e69/922/65be699227414967104915.pdf

[55] https://changeagentbd.com/

limited in both scope and implementation. The sessions provide foundational training, but largely exclude advanced AI tools, leaving educators underprepared to leverage AI effectively in the classroom.

A recent survey of 1,253 teachers, conducted by the Asian Development Bank, revealed a positive outlook towards the use of AI tools to enhance teaching practices and educational outcomes (Asian Development Bank, 2024). Teachers were confident about using AI for tasks like lesson planning and assessment, while being cautious about AI's role in areas that require human interaction. Importantly, participation in AI training programmes increased teachers' confidence and willingness to adopt AI technologies, underscoring the importance of continuous capacity-building efforts. However, challenges persist, including infrastructural limitations, insufficient training opportunities, and concerns regarding online safety. Teachers recommended comprehensive training programmes, greater investment in infrastructure, and the development of culturally relevant AI tools to address these challenges effectively.

An example from the National Curriculum and Textbook Board (NCTB) illustrates these challenges: AI was used to translate a mathematics textbook into English, but the results were both inaccurate and culturally inappropriate. This incident underscored the importance of localizing AI tools and training them to meet a country's specific linguistic and contextual needs. Moreover, it raised ethical concerns about the unauthorized use of AI in government projects.

The Master Plan for ICT in Education in Bangladesh (2012-2021), although formulated prior to the advent of AI-specific policies, demonstrates the government's intent to leverage digital tools for education, a precursor to AI-driven initiatives (Government of Bangladesh, 2012).

There is a directive for training educators on AI and technology ethics in Bangladesh. The Ministry of Education initiated such training in 2021, following formal processes that involved approvals from multiple stakeholders, securing budget allocations, and creating memoranda of understanding (MoUs). Training programmes are ongoing, with thirty educators per batch participating in both online and offline sessions. Additionally, blended learning programmes involving 30,000 educators from government and non-government schools have been implemented, focusing on AI-driven lesson plan development, peer reviews and moderation to ensure quality and understanding.

Intel has also provided some training on AI to educators within the Directorate of Secondary and Higher Secondary Education, preparing 'lead coaches' who could, in turn, teach other educators about AI and programming. This project ran between 2022 and 2024, and the contract with Intel will end in 2025. Current teacher-training programmes also incorporate blended learning methodologies, combining online and offline instruction, and are structured to accommodate future integration of AI components. Furthermore, the Higher Education Acceleration and Transformation

(HEAT)[56] project focuses on capacity building for tertiary level educators, emphasizing the enhancement of teaching and learning environments and practices. Notably, the project includes dedicated components addressing technology ethics. Platforms like Muktopaath[57], one of the largest e-learning platforms and learning management systems in Bangladesh, have been designed by the Government of Bangladesh with the flexibility to integrate AI applications, signalling a potential for scalability as formal AI policies evolve.

While these initiatives reflect the government's commitment to integrating AI into education, there remains a degree of uncertainty regarding the optimal timing and methods for introducing AI education to students. Additionally, specific guidelines on the ethical use of AI in education – such as clearly defined principles, codes of conduct or recommended practices – have not yet been systematically communicated or widely disseminated.[58]

Another challenge concerns the localization of AI tools, such as tutor assistants and content generation platforms, due to the absence of robust national or global frameworks that address contextual adaptation. To foster creativity and innovation while ensuring responsible use, policy frameworks might consider reducing unnecessary restrictions while incorporating comprehensive ethical safeguards. Despite significant progress in teacher training, the lack of a unified, cohesive approach to integrating ethical AI practices in the education sector continues to hinder its effective implementation.

The tables below illustrate the proportions of primary, lower secondary and secondary schools with access to the internet for pedagogical purposes.

Table 1: Percentage of primary schools with access to the internet for pedagogical purposes

Year	2020	2021
Percentage	49.3	49.3

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

Table 2: Percentage of lower secondary schools with access to the internet for pedagogical purposes

Year	2017	2018	2019	2020	2021	2022
Percentage	32.4	34.2	37.6	38.3	51.9	53.1

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

[56] https://heat.ugc.gov.bd/

[57] https://muktopaath.gov.bd/

[58] https://www.thedailystar.net/opinion/views/news/the-role-bangladeshi-universities-the-era-ai-3426641

Table 3: Percentage of secondary schools with access to the internet for pedagogical purposes

Year	2017	2018	2019	2020	2021	2022
Percentage	35.2	36.2	37.6	41.5	52.2	53.3

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

This indicator is calculated as part of the UN SDG indicator 4.a.1: Proportion of schools with access to basic services. Just under half of Bangladesh's primary schools had access to the internet for pedagogical purposes in 2021. For lower secondary and secondary schools, this number was just above 50 per cent in 2022. This is a remarkable increase, achieved within six years: in 2017, only around one-third of lower secondary and secondary schools had access to the internet for pedagogical purposes.[59]

The tables below show the proportions of primary, lower secondary and secondary schools with access to computers for pedagogical purposes.

Table 4: Percentage of primary schools with access to computers for pedagogical purposes

Year	2020	2021
Percentage	41.7	41.7

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

Table 5: Percentage of lower secondary schools with access to computers for pedagogical purposes

Year	2020	2021	2022
Percentage	77.8	74.5	75.5

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

Table 6: Percentage of secondary schools with access to computers for pedagogical purposes

Year	2020	2021	2022
Percentage	79.1	76.9	77.8

Source : https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

This indicator is calculated as part of the UN SDG indicator 4.a.1: Proportion of schools with access to basic services. While just over 40 per cent of primary schools had access to computers, this figure was much higher, over three-quarters, for secondary schools. However, it is concerning that the percentage for secondary schools has declined slightly over the years.[60]

[59] https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

[60] https://uis.unesco.org/sites/default/files/country-profile/Bangladesh.pdf

4.2.2 AI in educational curricula

Bangladesh has educational programmes that include both technical and ethical aspects of AI, but their implementation remains limited.

Education plans and programmes, which include ICT education, exist in primary (Directorate of Primary Education, 2019), secondary[61] and higher secondary levels[62]. Since 2010, The National Education Policy includes policies on ICT education at

primary, secondary, higher secondary and tertiary levels (Chapter 12), but does not mention specific technical or ethical aspects (Government of Bangladesh, 2010). The secondary education curriculum introduces a course on ICT at every level from Grade 6 to Grade 12 (National Curriculum & Textbook Board, 2012: Section 5.2). Every textbook includes a chapter on ICT safety, security and ethical use, but lacks focus on technical aspects like programming or database management:

- **Grade 6 > Chapter 3:** The safe use of Information and Communication Technology (National Curriculum & Textbook Board, 2017a)
- **Grade 7 > Chapter 3:** Safe and ethical use (National Curriculum & Textbook Board, 2017b)
- **Grade 8 > Chapter 3:** Safe and ethical use of Information and Communication Technology (National Curriculum & Textbook Board, 2017c)
- **Grade 9-10 > Chapter 2:** Computer and security of the user (National Curriculum & Textbook Board, 2017d)

Though rudimentary, this indicates the commitment of the Ministry of Education and associated stakeholders to promoting the ethical use of digital technologies within curricula development and implementation. Besides these institutionalized courses, the Digital Security Agency of the ICT Division offers a cyber security and usage of digital tools course for secondary and higher secondary students.

There is a significant gap between the technical and ethical aspects of AI education. Existing ICT and AI curricula are predominantly oriented towards technical competencies, such as coding and machine learning, with limited emphasis on critical ethical considerations, including privacy protection, bias mitigation and algorithmic fairness. Furthermore, soft skills relevant to ethical AI practices – such as prompt engineering and responsible data use – are not yet systematically integrated into educational frameworks, though they are essential for fostering responsible AI development and deployment.

While AI, including its ethical dimensions, is largely absent from primary and secondary education curricula, notable progress has been made at the tertiary level. Universities

[61] http://sedp.gov.bd/about.php
[62] https://cedp.gov.bd/

have begun incorporating foundational AI tools into curricula across disciplines. Alongside, teacher-training programmes for secondary and higher secondary educators employ blended learning models that create opportunities for future AI integration. Nevertheless, a stronger focus on embedding the ethical aspects of AI in curricula, alongside efforts to bridge existing gaps in funding, resources and monitoring mechanisms, is warranted.

Bangladesh is ranked 94th of 109 countries in data science in the Coursera Global Skills Report 2024 (Coursera, 2024). The report highlights significant gaps in technology and data science competencies, noting that Coursera collaborates with local institutions to design tailored programmes aimed at bridging these skill gaps.

Bangladesh has no structured, technical AI courses aimed at the general public. There are some suitable international resources like the Khan Academy's[63] AI in Education course, which emphasizes both AI development and ethical literacy. However, the adaptation of such programmes to local cultural contexts is constrained by the absence of pertinent policies, impeding broader adoption.

It is important, therefore, to create inclusive AI literacy programmes that go beyond formal education settings to reach all demographics. Singapore's model, where school students teach AI skills to elders and marginalized communities in libraries, could be an example of bridging the digital divide.

For example, Digitally Right, a Bangladesh-based organization dedicated to promoting a free and open digital space offers several courses and modules within the field of AI ethics for the general population. In 2024, it launched a Digital Safety School,[64] where security audits are performed and seminars and workshops are conducted. It offers capacity building on digital safety and is a repository for digital safety resources. However, the biggest obstacle for learning modules on AI ethics for the general public is the lack of public awareness.

To foster a responsible AI ecosystem in Bangladesh, it is essential to integrate ethical AI principles into both formal and informal education. Cultivating a culture of ethical literacy requires the dissemination of clear guidelines on best practices, such as bias mitigation strategies, understanding the limitations of AI systems, and promoting responsible, transparent use of AI technologies across all sectors of society.

[63] https://www.khanacademy.org/
[64] https://digitalsafetyschool.com/

CHAPTER 5:
Economic dimension

According to the draft of Bangladesh's National Strategy for Artificial Intelligence, the previous government was 'planning to fund and accelerate 1000 AI-based start-ups within the next five years' (Government of Bangladesh, 2020a, p. 42).

Since AI is a new trend in the country's industry, AI companies have begun to emerge only recently, and there are no figures available on either their total number or their contribution to the gross domestic product (GDP). Three AI companies in Bangladesh are pioneers in the field: Marco Polo AI[65], MyAlice[66], and Hishab[67]. Hishab is the only company that has published its own large language models (LLMs), some of which have been uploaded to HuggingFace[68], and has a strong team of AI engineers. Besides these three, over thirty companies supported by Startup Bangladesh Limited[69] – the first and only flagship venture capital fund established under the ICT Division and sponsored by the Government of Bangladesh – use AI technologies in their operations; however, they are not currently engaged in the development of AI systems themselves.

Overall, the extent of private investment in AI in Bangladesh is unknown. A start-up policy by the government to incentivize AI is still in draft format and has not been published.

Sylhet, a city in eastern Bangladesh, has a thriving AI ecosystem run by local entrepreneurs with local talent. This is unusual yet encouraging as most tech companies have historically been established and operated in Dhaka.

The use of AI in Bangladesh's private and public sectors may be categorized into three broad areas:
1. using AI solutions developed by external entities as operational tools
2. adapting and modifying off-the-shelf AI solutions
3. developing indigenous AI systems
Both the private and public sectors fall predominantly within the first two categories, employing pre-existing AI technologies or customizing them for specific needs. Currently, only the three companies named above are actively engaged in the development of proprietary AI systems. Data on investment in AI research and development by public and private sector entities are not readily available.

[65] https://www.markopolo.ai/
[66] https://www.myalice.ai/
[67] https://www.startupbangladesh.vc/startup-bangladesh-invests-in-hishab-telephony-driven-generative-ai/
[68] https://huggingface.co/hishab
[69] https://www.startupbangladesh.vc/portfolio-2/portfolio/

5.1 Labour markets

Bangladesh does not have a comprehensive strategy to address the impact of AI on labour markets. Strategies for upskilling and reskilling workers do not exist, either. Aspire to Innovate (a2i) predicts that AI and automation will have a significant impact on the job market and estimates that around 40 per cent of the workforce in Bangladesh is at risk of losing jobs due to automation. a2i has presented guidelines how this can be addressed (a2i, 2022).

5.2 Investments and output

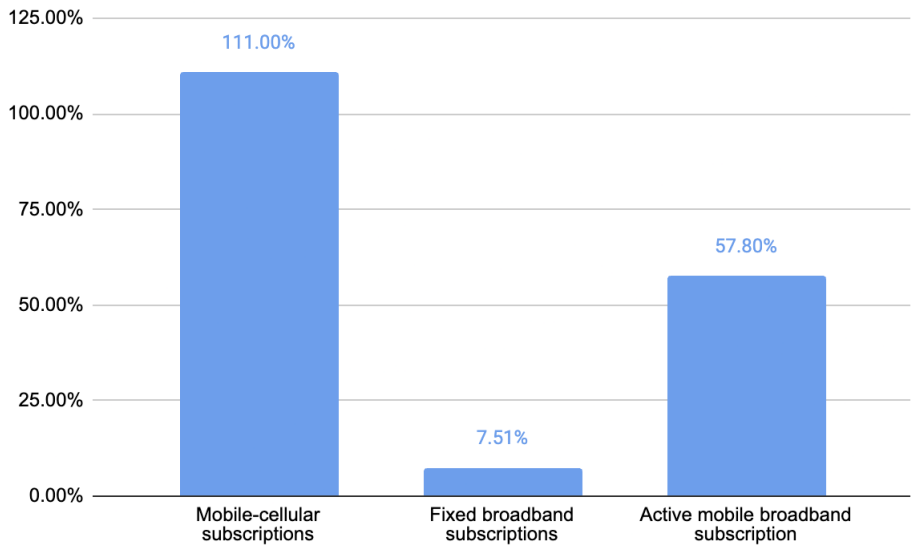
Bangladesh has a 0.2 per cent share of high-tech exports according to the 2023 Global Innovation Index, which ranks it at 104 out of 132 countries (WIPO, 2023).

CHAPTER 6:
Technical and infrastructural dimension

6.1 Infrastructure and connectivity

According to the International Telecommunication Union (ITU), Bangladesh had 111 mobile-cellular subscriptions per 100 inhabitants in 2023 and 7.51 fixed broadband subscriptions per 100 inhabitants in the same year.[70] The ITU also states that 57.8 per cent of the population of Bangladesh had an active mobile-broadband subscription in 2023[71] and that the country had an average international bandwidth of 6,300,000 Mbit/s in that year[72].

Figure 10: Prevalence of telecommunication subscriptions in Bangladesh, 2023



Source: International Telecommunication Union

In August 2024, the average fixed broadband download speed in Bangladesh was 47.43 Mbps. This ranks the country at 100 out of the 159 countries where Speedtest records this measure.[73]

The UN SDG indicator 17.8.1: Proportion of individuals using the internet, tracked by the ITU, reveals that internet usage in Bangladesh reached 44.50 per cent in 2023.

[70] https://datahub.itu.int/dashboards/?id=2&e=BGD
[71] https://datahub.itu.int/data/?e=BGD
[72] https://datahub.itu.int/data/?e=BGD&i=242
[73] https://www.speedtest.net/global-index

This reflects a steady and significant increase from 2000, when internet penetration stood at merely 0.07 per cent.[74]

Similarly, the proportion of the population covered by a 3G mobile network, at least, aligns with the UN SDG indicator 9.c.1: Proportion of population covered by a mobile network, by technology (per cent). In 2022, approximately 98.5 per cent of Bangladesh's population had access to at least a 3G mobile network, demonstrating extensive mobile connectivity across the country.[75]

According to the World Bank, 99.4 per cent of the population of Bangladesh had access to electricity in 2022.[76] However, it must be noted, as mentioned above, that rural areas are especially affected by frequent power outages.

According to Economist Impact, Bangladesh recorded a gender gap of 13.2 per cent in internet access and 18.6 per cent in mobile phone access in 2022, indicating notable disparities in digital connectivity between men and women.[77] The Mobile Gender Gap Report 2024 records different numbers, as shown in Table 7 (GSMA, 2024):

Table 7: Gender gap in mobile ownership and mobile internet adoption in Bangladesh, 2024

	Women	Men	Gender gap
Mobile ownership	68%	85%	20%
Mobile internet adoption	24%	40%	40%

Source: GSMA, 2024

In 2023, according to the ITU, 63.1 per cent of urban households had internet access at home but only 37.1 per cent of rural households.[78]

6.2 Applied standards

There is no standardized protocol in Bangladesh for AI and digital technologies, such as ISO/IEC or IEEE7000, neither for their technical nor their ethical dimensions. Domestic products are not currently subject to mandatory standardization. However, should Bangladesh seek to export AI and digital technology products in the future, adherence to such internationally recognized protocols would become necessary to ensure compliance with global standards.

[74] https://www.itu.int/en/ITU-D/Statistics/Pages/SDGs-ITU-ICT-indicators.aspx
[75] https://www.itu.int/en/ITU-D/Statistics/Pages/SDGs-ITU-ICT-indicators.aspx
[76] https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS
[77] https://impact.economist.com/projects/inclusive-internet-index/2022
[78] https://datahub.itu.int/data/?e=BGD

6.3 Computing capabilities

There are ten data centres in Bangladesh, seven in Dhaka, one in Jashore, one in Gazipur, and one in Chittagong.[79]

According to The Global Cloud Ecosystem Index 2022, Bangladesh's score for 'Colocation data centres per million population, 2020' is 1.1, with 1 being the lowest value and 10 the highest. This means that Bangladesh is ranked at 73 out of the 76 countries covered by the study.[80]

Bangladesh has restrictive cloud computing regulations to protect sensitive data, prohibiting such data from being stored in foreign cloud systems. A guideline for domestic cloud computing is being prepared and targets companies in Bangladesh. However, the lack of robust local cloud infrastructure makes it challenging for industries, like banking, to store data. Thus, many companies still keep their customer data in foreign clouds.

It has been suggested that the Bangladesh Data Center Company Limited[81] and the Bangladesh Computer Council[82] develop a policy for AI-driven cloud computing specifically (that is, cloud computing that leverages cloud infrastructure to power AI applications in particular) to address current gaps and challenges. Furthermore, improvement in local cloud infrastructure and encryption technology as well as collaboration with international cloud providers are required.

6.4 Statistical performance

Bangladesh has a score of 70.8 in the World Bank's Statistical Performance Indicators, which places it is in the third quintile globally.[83] In data products, defined as the availability of data for the 17 UN SDGs, Bangladesh scores 83 points, as follows: 21 points in the dimension of social statistics, 22 in economic statistics, 17 in environmental statistics, and 23 in institutional statistics. Moreover, Bangladesh scores 58 points in data sources and 70 points in data infrastructure.[84]

[79] https://www.datacenters.com/locations/bangladesh
[80] https://docs.google.com/spreadsheets/d/1DjUfsihHolE806qLFYqCu-FAHrPWNYX1NYYjs73FXp8/edit?gid=288419984#gid=288419984 Spreadsheet extracted from the Global Cloud Ecosystem Index 2022 report: https://www.technologyreview.com/2022/04/25/1051115/global-cloud-ecosystem-index-2022/
[81] https://bdccl.gov.bd/
[82] http://analytics.bcc.gov.bd/
[83] https://www.worldbank.org/en/programs/statistical-performance-indicators
[84] https://www.worldbank.org/en/programs/statistical-performance-indicators/explore-data

Figure 11: Bangladesh's Statistical Performance Index

Bangladesh has a framework for consistent data management in draft format, which should be extended to law, policy, strategy and guidelines. There is also a Statistics Act (Government of Bangladesh, 2013b), which mainly moderates the activities of the Bangladesh Bureau of Statistics.

CHAPTER 7:
Developing a national multistakeholder roadmap

7.1 Overview of the stakeholder engagement process

A National Steering Committee was formed for the RAM evaluation in Bangladesh, co-chaired by the Secretary of the ICT Division and the Head of Office and UNESCO Representative to Bangladesh. The committee convened **three** times to provide strategic guidance throughout the process. Additionally, the RAM process included seven focus group discussions (FGDs) and nineteen key informant interviews (KIIs) to gather insights.

The stakeholders in the committee included representatives from the government, private sector, academia and civil society organizations (CSOs). While the consultation brought together a diverse set of stakeholders, gender representation within the group was limited. The stakeholders' discussion focused on two main areas: 1. the indicators of the RAM; and 2. ways to develop effective AI governance and a thriving AI ecosystem in Bangladesh to benefit everyone.

Findings from desk-based research, complemented by these comprehensive stakeholder consultations, informed the diagnosis of Bangladesh's AI landscape as outlined in the preceding chapters. Further analysis of the AI ecosystem highlighted both challenges and opportunities, along with potential ways to address the challenges identified, as summarized below.

7.2 Main AI actors in Bangladesh

The ICT Division of the Ministry of Posts, Telecommunications and Information Technology primarily handles AI governance in Bangladesh. Other key institutions, such as the Cabinet, and the Ministries of Law, Public Administration, and Home Affairs, are also involved as needed. Governance efforts rely on a multi-ministry approach, with vetting processes and steering committees that include representatives from various ministries.

Another important actor is Aspire to Innovate (a2i), a special programme for the digital transformation of Bangladesh, located within the ICT Division and the Cabinet Division. a2i has successfully streamlined public service delivery in Bangladesh for many years through digital transformation and innovation. It was launched in 2007 and is funded by the UNDP, the Gates Foundation and the Government of Bangladesh.

7.3 AI governance in Bangladesh

Challenges

- **Erosion of trust in governance:** Public scepticism of previous government initiatives may affect the acceptance and implementation of new regulatory measures.
- **Limited stakeholder engagement:** Current regulatory drafts have not involved academia, the private sector, CSOs and representatives from local communities sufficiently, leading to a lack of diverse perspectives and expertise in policy formulation.
- **Insufficient data protection and cybersecurity measures:** The absence of functional data protection and cybersecurity laws hinders effective regulation and accountability, especially in the light of a whole range of AI-supported cybercrimes, which are likely to become even more sophisticated and perilous in the future.
- **Lack of frameworks for procurement of AI systems:** There are no specific laws or policies governing the procurement of AI systems, which can lead to inconsistent practices and potential misuse.

Opportunities

- **Development of comprehensive AI policies:** The ongoing development of a national AI policy presents an opportunity to establish clear regulations.
- **Incorporation of AI ethics:** Establishing regulations focused on ethical AI practices, including the UNESCO Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2022), can foster public trust and confidence in the AI sector.
- **Integration of international standards:** Aligning national and local regulations with international standards can enhance the credibility and effectiveness of AI governance in Bangladesh.
- **Transparency in data collection:** Data collection in a transparent manner, particularly data in Bengali and minority languages, would foster greater trust in AI among Bangladesh's diverse population, promoting inclusive and equitable AI development.

7.4 Institutionalizing AI governance in Bangladesh

Challenges

- **Reform of previous government structures:** The interim government formed in Bangladesh in August 2024 faces many complex tasks, of which AI governance is just one.
- **Political interference:** The potential for political interference in AI governance could undermine the autonomy and effectiveness of institutions tasked with overseeing AI initiatives, making it crucial to establish clear boundaries and accountability mechanisms.
- **Absence of an independent data protection and cybersecurity authority:** The lack of an authority to oversee data protection and cybersecurity in Bangladesh creates gaps in regulatory enforcement, accountability and public trust.
- **Lack of specialized institutions for AI:** The absence of dedicated institutions focused on AI, especially at local levels, limits the capacity for localized research and data collection, and the development and implementation of AI solutions.

Opportunities

- **Creation of a multistakeholder committee:** A multistakeholder steering committee can enhance collaboration between the government, academia, the private sector and local communities, leading to more comprehensive and inclusive AI policies.
- **Establish an independent data protection and cybersecurity authority:** An independent authority dedicated to data protection and cybersecurity would enhance regulatory oversight, ensure compliance with international standards, and build public trust in AI systems and digital technologies in Bangladesh.
- **Create specialized institutions for AI development:** Establishing dedicated institutions focused on AI research, development and education in Bangladesh would foster innovation and enhance local expertise tailored to the country's unique setting.
- **Develop AI strategies for local communities:** Targeted AI strategies at local levels would enable communities to leverage AI technologies effectively to address specific local challenges.

7.5 Creating AI knowledge and competencies in Bangladesh

Challenges

- **Limited awareness and understanding:** There is a general lack of awareness and understanding of AI technologies, including ethics, risks, data privacy and responsible AI, among government officials, the private sector and the public.
- **Digital divide:** There is a significant digital divide in Bangladesh, with marginalized communities lacking access to electricity, technology and the internet, which limits their ability to benefit from AI advancements.
- **Gender gap:** The gender gap in technology education, particularly in STEM fields, is exacerbated by harassment and abuse in digital spaces, and poses a significant challenge to capacity-building efforts in technology and AI.
- **Resource constraints:** Many institutions face budgetary limitations that hinder the development and implementation of comprehensive capacity-building initiatives.

Opportunities

- **Public awareness campaigns:** Conducting awareness campaigns can educate the public about AI technologies, fostering a more informed population. Such campaigns could include online learning platforms, which require electricity and connectivity to overcome the digital divide.
- **Investment in educational initiatives:** There is an opportunity to develop targeted educational programmes and workshops, at all levels, that focus not only on AI technology, but also on AI ethics, data protection and responsible AI deployment.
- **Bridging the gender gap:** Female participation in such educational programmes can be enhanced by addressing the barriers that hinder women's access to AI and digital skills training.
- **Development of multilingual AI solutions:** AI systems that are inclusive of minority languages would not only enhance accessibility for diverse populations but also promote cultural preservation and representation in the digital space.

7.6 Conclusion

The opportunities and challenges described above lead to the following conclusions:

1. **Need for comprehensive AI frameworks**:
   Establishing regulatory AI frameworks, which include ethical guidelines and risk assessments, is essential to address the challenges of dual-use technologies and innovation, and to ensure that AI development aligns with the societal values and needs of Bangladesh.

2. **Awareness and education initiatives**:
   Raising awareness about AI technologies and their benefits as well as their risks is essential and can foster public trust.

3. **Investment in capacity building**:
   Investing in education and training programmes will help bridge the skills gap, empowering individuals and organizations to effectively engage with AI technologies.

4. **Focus on inclusion**:
   Prioritizing the inclusion of women as well as local and marginalized communities in multilingual AI initiatives is crucial for promoting equitable access to technology and enhancing overall well-being.

5. **Addressing infrastructure gaps**:
   Creating more comprehensive digital public infrastructure by overcoming silos and with a special focus on rural areas is vital for forming an enabling environment for AI development and investment throughout Bangladesh.

6. **Encouraging collaboration and innovation**:
   Public-private partnerships, international collaborations, and government incentives and support for start-ups can stimulate innovation and attract investment in the AI sector, driving economic growth.

7. **Sustainability considerations**:
   Integrating sustainability into AI development by aligning with the UN Sustainable Development Goals (SDGs) will ensure that technological advancements contribute to positive environmental and social outcomes.

CHAPTER 8:
Policy recommendations

This section specifies recommendations for the effective development of Bangladesh's AI ecosystem, in line with UNESCO's Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2022), inferred from the opportunities outlined above and categorized in three dimensions:

1. regulation
2. institutional frameworks
3. capacity building

Table 8: List of recommendations (to be completed once finalized)

Dimension	Recommendation	Responsible institution	Partner	Timeframe	Priority
Regulation					
Institutional frameworks					
Capacity building					

8.1 Regulation

Finalize an inclusive and enabling national AI policy

The policy should include components on ethics and human rights, aligned with the UNESCO Recommendation on the Ethics of Artificial Intelligence and its ten core principles laying out a human-rights-centred approach (UNESCO, 2022). The policy should also focus on the protection of the cultural nuances and languages of Bangladesh.

To ensure that the AI policy is grounded in principles of responsibility and inclusion, it is crucial to involve various stakeholders, including representatives from academia, the private sector, civil society organizations and local communities, in its development and implementation. The AI policy should also address concerns around discriminatory AI practices as well as accessibility, and should ensure transparency and accountability in AI decision-making processes, especially for AI systems deployed by the government.

The AI policy should require human rights risk assessments for all high-risk AI systems, such as facial recognition in law enforcement and predictive analytics in healthcare. These assessments should involve independent oversight prior to procurement or deployment, ensure transparency in algorithmic decision-making, and provide recourse mechanisms for affected individuals.

The AI policy should also include provisions for strategic investments and funding in AI research, development and deployment, with a focus on building crucial interoperable digital public infrastructure, such as data centres, high-performance computing facilities and innovation hubs, covering non-urban areas as much as possible, too.

Additionally, the policy should prioritize investments in human capital, including programmes for accessible education, training and upskilling of professionals in AI and related fields, to ensure a steady supply of skilled talent to drive AI adoption and innovation in Bangladesh.

The AI policy should address the environmental implications of AI, including energy consumption, e-waste generation and carbon footprint, to ensure sustainable and eco-friendly AI development and deployment as far as possible.

Moreover, the AI policy should be a living framework, flexible enough to adapt to the rapidly changing and unpredictable nature of AI. Strategies and guidelines for AI must be incorporated in other existing policies, too, for more effective integration.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Finalize a data protection Bill and a cyber security ordinance

A balance between data privacy and open data sharing is required to enhance the pool of local AI training data. The laws should be robust, mandate the appointment of data protection officers in organizations, and incorporate data privacy education in academic curricula, including transparency requirements and enforcement mechanisms.

The data protection Bill should address unfiltered government access to personal data, protecting the people of Bangladesh from surveillance, safeguarding their privacy and freedom of speech, and preserving their safety. Transparency provisions should be robust, and mechanisms for informed consent should be implemented. Further, a comprehensive policy on cloud computing is required.

The cyber security ordinance should consider current and, as far as possible, future AI risks, and cover the whole range of AI-supported cybercrimes, including spreading disinformation, spoofing, cloning and faking agents (through fake citizen IDs and deepfakes, for example), as well as financial frauds. The ordinance should also focus on detecting and mitigating various forms of spreading disinformation.

The cyber security ordinance must also address the online harassment, abuse, bullying and stalking of women, and thus create safer digital environments for women. The ordinance should mandate accountability and ensure accessible redress mechanisms.

UNESCO has published guidelines for Member States on how to open their data sustainably and how to build pertinent capacities and an open-data-driven culture (UNESCO, 2023b).

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Develop comprehensive AI procurement policies

To ensure the effective and ethical integration of AI technologies within the operations of the Government of Bangladesh, it is essential to develop comprehensive AI procurement policies that address both technical and ethical dimensions. These policies should establish clear guidelines for the procurement process, including criteria for vendor certification, and redress and compensation measures that emphasize data privacy, security and ethical considerations.

Additionally, the procurement framework should facilitate collaboration between government agencies, academia, civil society organizations and the private sector to ensure that AI systems are not only efficient but also culturally and contextually appropriate for Bangladesh. By prioritizing transparency and inclusivity in procurement,

the government can build trust among stakeholders and promote the responsible use of AI technologies that align with national interests and societal values.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Update the Right to Information Act

The existing Right to Information Act should be reformed to align it with international standards and to ensure better access to information and transparency in AI governance. This update should focus on key areas like broadening the scope of information, enhancing accessibility, strengthening compliance mechanisms, incorporating international best practices and facilitating public participation. By reforming the Right to Information Act in these ways, Bangladesh can create a more transparent and accountable framework for AI governance, ultimately enhancing public trust and ensuring that the deployment of AI technologies serves the interests of all citizens of Bangladesh.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Mandate transparency and responsibility for contextual data in data collection

The accurate reflection of Bangladesh's sociocultural context is crucial in AI training data. In particularly, the AI systems that the government intends to integrate in decision-making processes must be fine-tuned to understand and adapt to how people in Bangladesh communicate. To solve Bangladesh-specific problems, appropriate training data should be made available, in de-identified formats, from various sectors, such as finance, health and agriculture.

However, to foster public trust and ensure ethical practices in the deployment of AI technologies, it is crucial to mandate transparency in data collection processes across all sectors. This can be achieved by implementing strict guidelines that require organizations to clearly communicate the types of data they collect, the purposes for which they use them, and the measures they take to protect individuals' privacy and avoid undue surveillance.

Moreover, organizations should be obligated to obtain informed consent from individuals before collecting their data, ensuring that users are fully aware of their rights

and the implications of data usage. Establishing independent oversight mechanisms to monitor compliance with such transparency mandates will enhance accountability and

safeguard against the potential misuse of data, ultimately promoting a more responsible and ethical AI ecosystem in Bangladesh.

The collection of data in Bengali and minority languages should be encouraged if the rules outlined here are abided by. This is elaborated on below (see 'Develop and curate datasets in Bengali and indigenous languages').

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

8.2 Institutional framework

Establish specialized institutions dedicated to AI development, including at community levels

A central 'Office of AI' should be established. Such an office would enable faster progress on AI initiatives but would require autonomy to prevent political interference and ensure impartial oversight. However, while autonomy is crucial, state involvement would be necessary for the office to function effectively. The office could be affiliated with the ICT Division of the Ministry of Posts, Telecommunications and Information Technology, which oversees specialized institutions dedicated to AI development. This would be a critical step towards fostering a responsible AI ecosystem in Bangladesh.

Robust sectoral representation, including government, academia, the private sector, civil society organizations and local communities, would be vital. A well-defined legal framework, metrics for monitoring progress, and safeguards for individual rights would also enhance the office's credibility and impact.

Further sub-institutions, which could take the form of dedicated schools or research centres, would focus on critical areas such as AI safety, ethics and the preservation of the country's cultural diversity and heritage. Besides establishing new institutions, repurposing existing community infrastructure, like school laboratories and community centres, could significantly enhance digital access and training for underserved groups.

By transforming such spaces into hubs for AI education and training, the government can provide essential resources and support to marginalized communities, thereby promoting inclusivity in the digital landscape. Such a collaborative approach would also facilitate knowledge exchange between academia, the private sector and local communities, ensuring that AI solutions are not only innovative but also relevant to the needs and values of the people of Bangladesh.

- Responsible institution: ICT Division of the Ministry of Posts, Telecommunications and Information Technology
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Establish a multistakeholder steering committee

A multistakeholder steering committee that brings together delegates from academia, the private sector, civil society organizations and local communities, representing an array of cultural, societal and generational groups, is necessary to effectively govern the ethical use of AI technologies in Bangladesh. The inclusivity of the committee is crucial to address concerns that it may lean too heavily on bureaucratic leadership. Since decision-makers often have limited understanding of AI's capabilities, risks and strategic importance, it is vital that experts with proven track records in AI research take on decisive positions in this committee. This committee should play a crucial role in overseeing AI governance and ensuring that policies reflect a wide range of perspectives and expertise.

A promising model to consider is Bangladesh's digital public infrastructure,[85] which has successfully captured the voices of its people and used them for policy development.

The following elements should be considered for the establishment and functioning of this committee: diverse representation; collaborative decision-making; focus on ethical standards, public engagement and awareness; advisory role to the government; and monitoring and evaluation.

By establishing a multistakeholder steering committee, Bangladesh could create a robust framework for AI governance that is inclusive, transparent and responsive to the needs of its citizens. A collaborative approach will not only enhance the ethical use of AI technologies but also foster public trust and confidence.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

[85] See, for example: https://a2i.gov.bd/bangladeshs-phygital-public-infrastructure-bridges-dpi-theory-and-practice/

Establish an independent data protection and cybersecurity authority

To ensure robust data protection and cybersecurity, it is essential to establish an independent data protection and cybersecurity authority. This authority would be independent; offer effective oversight, transparency and accountability; prevent and mitigate AI-facilitated cybercrimes; and protect sensitive data and, in particular, women's rights.

Such an authority should adopt a forward-thinking approach, considering not only current AI-related risks but also potential threats. Its scope should encompass the entire spectrum of AI-facilitated cybercrimes, including emerging trends and tactics, to ensure a comprehensive and proactive portfolio. It is essential that the data protection and cybersecurity authority is robust and effective in holding bad actors accountable and preventing further malicious activities, ensuring a safer and more secure digital ecosystem for the citizens of Bangladesh.

The authority would develop and enforce regulations, investigate and penalize non-compliance, promote public awareness and collaborate with stakeholders. An independent data protection and cybersecurity authority could ensure robust data protection, prevent the harassment and abuse of women in digital spaces, and promote a safer and more secure online environment for all.

The authority could develop a phased national data-sharing framework in cooperation with relevant stakeholders. This would involve hiring and training data protection experts and conducting sensitization campaigns, including on transparency requirements, user consent, secure storage mechanisms and protection against misuse.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Establish a committee for a certification programme for AI vendors

A dedicated committee that implements a certification programme for AI vendors is essential to ensure that AI systems deployed in Bangladesh meet both technical and ethical standards. This committee would require vendors to demonstrate compliance with established guidelines before their products were used in sectors such as healthcare, education and other public services.

The certification process would involve a thorough evaluation of the AI systems, focusing on performance benchmarks, reliability and security, thereby mitigating risks associated with untested or poorly designed technologies. In addition to technical criteria, the certification programme would emphasize ethical considerations,

including data privacy, consent and transparency. Vendors would need to show that their systems protect user data and comply with relevant laws while minimizing biases in AI algorithms.

By addressing these ethical dimensions, the programme would promote responsible AI development and usage, fostering public trust in these technologies. The committee, composed of experts from various fields, would oversee the certification process, developing criteria, conducting evaluations and issuing certifications.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Develop and curate datasets in Bengali and indigenous languages

To ensure that AI technologies are effectively tailored to the linguistic and cultural context of Bangladesh, it is essential to develop and curate comprehensive datasets in Bengali and indigenous languages and use them to develop and train large language models locally.

Such an initiative will enrich the diversity of AI models through inclusivity and reduce biases that may arise from the predominance of English-language datasets. Rigorous quality assurance processes should be established to ensure the effectiveness of the datasets. This includes the careful annotation of data to provide context and meaning, which is crucial for training AI models. Involving native speakers and linguists in the annotation process will improve the accuracy and relevance of the datasets.

The curated datasets should be made accessible to researchers, developers and organizations working on AI technologies. An open-access model could encourage collaboration and innovation, allowing various stakeholders to contribute to the development of AI applications that are linguistically and culturally appropriate. Establishing a centralized repository for these datasets could facilitate easy access and sharing.

By developing and curating datasets and large language models in Bengali and minority languages, Bangladesh can significantly enhance the accessibility and effectiveness of AI technologies. This initiative would also empower local communities by ensuring that their languages and cultures are represented in the digital landscape, ultimately contributing to a more inclusive and equitable technological future.

- Responsible institution: International Mother Language Institute (IMLI)
- Partner: UNESCO's Language Preservation Program
- Timeframe: in years
- Priority: low, medium, high

8.3 Capacity building

Bridge digital divides and enhance public awareness of AI

Addressing the digital divides, limited knowledge and apprehension surrounding AI is essential to fostering an inclusive, informed and digitally empowered society in Bangladesh.

To achieve this, it is crucial to strengthen public awareness and understanding of AI technologies, with particular emphasis on reaching rural populations, local communities and minority groups. This can be accomplished through comprehensive awareness campaigns that educate the public about the benefits of AI, its applications and its ethical considerations. It is critical that such campaigns be accessible to all, especially to persons with disabilities.

By demystifying AI and highlighting its potential to improve daily life, these campaigns can help alleviate fears and misconceptions, empowering individuals to engage with technology confidently. Besides spreading general awareness, it is also vital to educate communities about data rights and privacy practices. As AI systems rely increasingly on personal data, understanding how to protect one's information becomes critical.

Moreover, grassroots awareness efforts must be culturally sensitive and tailored to the unique needs of different communities. Collaborating with civil society and local organizations can facilitate this process. Online campaigns could be considered, bearing in mind, however, these require electricity, connectivity and literacy.

- Responsible institution: International Mother Language Institute (IMLI)
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Develop AI focused curricula with a special emphasis on uptake by girls and women

AI, including its ethical use, must be included in secondary and higher secondary education in Bangladesh, and be strengthened within science, technology, engineering and mathematics (STEM) programmes in tertiary education. This requires qualified educators as well as resources to provide educational institutions with necessary infrastructure, including electricity and connectivity, especially in rural areas.

A promising model to consider are the Olympiads, which have been popularized in Bangladesh, especially for mathematics[86] and physics.[87] Similar events for programming and AI could attract talented students from across the country.

[86] https://matholympiad.org.bd/

[87] https://www.bdpho.org/

This initiative should focus on girls and women, who have been historically under-represented in STEM fields. By integrating AI education into the secondary school curriculum, educational institutions can spark interest in technology among young girls, providing students with the foundational knowledge and skills necessary to pursue further studies in STEM disciplines. Such early exposure is crucial to break down stereotypes and encourage girls to envision themselves as future leaders and innovators in technology.

Strengthening STEM programmes in tertiary education is equally important, as it creates pathways to advance education and careers in AI and related fields. Universities and colleges should develop specialized programmes that not only teach technical skills but also emphasize the ethical implications of AI technologies. Moreover, collaborations with the private sector could enhance the practical relevance of such curricula, and lead to internships and job placement opportunities.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Invest in reskilling and upskilling for a future-ready workforce

To harness the benefits of AI, mitigate its potential disruptions and prepare the workforce for an AI-driven economy, Bangladesh must invest in reskilling and upskilling initiatives. By upskilling and reskilling its workforce, Bangladesh can reduce the risk of job displacement and create new opportunities for economic growth and development. This involves comprehensive training programmes for government officials, industry professionals and academia, focusing on both AI technology and AI ethics. The latter should include legal, social and human rights dimensions. Leveraging the expertise of Non-Resident Bangladeshis as tutors for this purpose might be considered.

Lifelong learning is essential to counter age discrimination in the workplace. If given continuous training and upskilling opportunities, workers can acquire new skills and adapt to changing job requirements, regardless of age. This approach will help promote age-inclusive workplaces and reduce the risk of age-related job displacement. The UNESCO Institute for Lifelong Learning[88] offers some guidance on this matter.

'Training of trainers' mechanisms could be established, especially in local communities, to amplify the impact of training programmes. This approach would help create a network of 'AI ambassadors' who promote digital literacy and responsible AI use across the country.

[88] https://www.uil.unesco.org/en/unesco-institute

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Alleviate bias and discrimination in AI technologies

To effectively alleviate bias and discrimination in AI technologies, a robust capacity-building framework that focuses on educating stakeholders about the ethical implications of AI and the importance of inclusivity in technology development must be established. This framework should target a wide range of participants, including policy-makers, AI developers, educators and community leaders. Through comprehensive training programmes that emphasize the identification and mitigation of bias in AI systems, stakeholders can develop a deeper understanding of how their decisions impact diverse populations.

It is especially important that AI systems be designed and developed to ensure that they do not discriminate against persons with disabilities and instead provide equal access and opportunities for all.

Efforts should also be made to avoid biases against elderly and rural citizens in Bangladesh, who tend to generate less online content, thereby limiting their representation in AI training data. Conversely, measures should be taken to protect the younger, urban population, who rely increasingly on AI for information, from being exposed to biased or discriminatory AI outputs.

Moreover, collaboration between academia, the private sector and civil society organizations is essential to build the capacity required to address bias and discrimination. Community organizations should also be engaged in this process to ensure that the voices of marginalized groups are heard and considered. Such a collaborative approach not only enhances the quality of AI systems but also builds a sense of shared responsibility among stakeholders to promote equity in technology. By creating a culture of accountability, stakeholders can work together to identify and address instances of bias and discrimination as they arise.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

Encourage investments in AI research, development and infrastructure

To foster a thriving AI ecosystem in Bangladesh, it is essential to encourage investments in AI research, development and infrastructure, including international investments. This involves developing data centres, cloud computing facilities and

high-performance computing infrastructure, outside urban areas, too, as much as possible.

For the Government of Bangladesh, a more comprehensive and interoperable digital public and data infrastructure without silos is another prerequisite for a flourishing AI ecosystem. This would facilitate increased data sharing, thereby expanding the pool of available local training data for AI systems in Bangladesh. Additionally, improving electricity and connectivity, especially in rural areas, and enhancing cybersecurity measures, would help create a conducive environment for AI innovation and adoption.

Decentralized and accessible AI Centres of Excellence, well equipped with computational resources, could become hubs for research and innovation as well as collaboration and partnerships. Research funds should be provided to researchers, ideally from Bangladesh, who have a proven track record of producing excellent AI research.

This can be achieved through a multifaceted approach that involves public-private partnerships and support for start-ups while taking into account environmental considerations and the cultural appropriateness of AI systems.

Public-private partnerships can facilitate the sharing of resources, expertise and risks, thereby creating opportunities for knowledge transfer and skill development. Start-ups are a vital component of Bangladesh's AI ecosystem, and providing them with support can help stimulate innovation and job creation. This could include access to funding, mentorship programmes and incubation facilities. By nurturing start-ups, Bangladesh could foster a culture of entrepreneurship and innovation, leading to the development of novel AI applications.

As Bangladesh invests in AI research, development and infrastructure, it is essential to keep the environmental impact of these initiatives in mind. This includes assessing the energy consumption and e-waste generation associated with AI systems as well as their alignment with the UN Sustainable Development Goals (UN General Assembly, 2015).

Finally, developing AI systems that reflect Bangladesh's sociocultural realities is crucial for ensuring that these technologies are accessible, effective and respectful of local values.

- Responsible institution: xx
- Partner: xx
- Timeframe: in years
- Priority: low, medium, high

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