Artificial Intelligence and its Impact on Information Technology (IT) Service Sector in Bangladesh

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Acknowledgement

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1. Introduction

1.1 Background

❑ The world is going through the phase of the **Fourth Industrial Revolution (4IR)**.

> ❑ It is **changing the nature of work and services in various sectors**.

❑ A number of sectors are already experiencing this phenomenon.

> ❑ The Information Technology (IT) sector is a sector that has embraced 4IR more than any other sector.

❑ Organisations in the IT sector are focused on deploying advanced technologies such as **artificial intelligence (AI)**, **Blockchain**, **cloud computing**, **Robotic Process Automation (RPA)**, **big data**, and **machine learning (ML)** as **products of 4IR** to enhance productivity and improve customer experience.

1.2 Global IT sector growth

☐ IT sector has been growing over the years.

☐ By **2021**, the **worldwide** information technology business will be worth around **USD 5 trillion**.

☐ **Asia, at 32 per cent**, is also anticipated to make a sizable **contribution** to the **global** IT industry (Statista, 2021b).

☐ Looking ahead, the **global sector** is forecasted to continue growing at a **5 per cent compound annual growth rate until 2024**. (CAGR) (Statista, 2021b).

Figure 1: Global distribution of the information technology (IT) industry by region from 2019 to 2021.
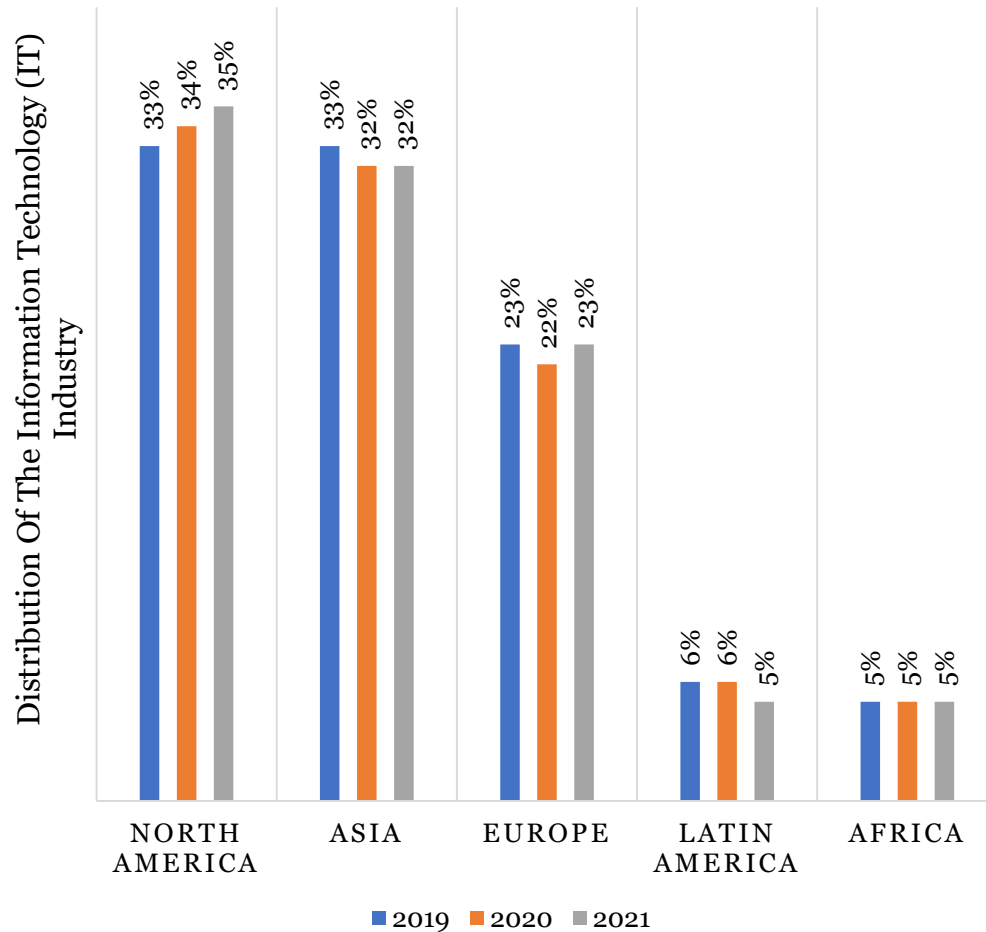
Source: Statista (2021b)

1.3 Bangladesh IT sector and 4IR

❑ Currently, enormous scope **automation** has been broadly executed in the **telecom**, **banking**, **pharmaceutical**, and **ready-made garment industry** in Bangladesh.

❑ The IT industry is growing with time, and the 4IR is penetrating the sector.

    ❑ It is emerging with service offerings generally range from transactional **IT-Application Development Maintenance (ADM) and IT help desk** to niche services such as big data analytics, the Internet-Of-things (IoT), 3D image processing, and the other components evolved from 4IR (Jain & Gupta, 2017).

1.4 Objectives

❑ This report aims to analyse the penetration and consequent implications of the 4IR on the IT service sector in Bangladesh. More precisely, the **objectives** are:

- To understand the **4IR technologies' entry** into **Bangladesh's IT services industry**;

- To analyses the implications of **4IR on employment**, particularly in the IT services sector in Bangladesh;

- To **review the existing policies and initiatives** taken by the government to address the needs of IT services sector and;

- To suggest **measures** for **preparing the workforce** for employment in the IT services sector.

2. Conceptual Issues

2.1 Industry 4.0 at a glance

❑ The 4IR that has been shaping since the late twentieth century builds upon the third revolution and digital innovation (Schwab, 2016).

❑ In comparison to the previous revolution, the 4IR is expanding exponentially rather than linearly, and it is impacting nearly every industry in every nation (Xu et al., 2018).

❑ 4IR technologies are differentiated in several ways (Philbeck & Davis, 2018):

   ❑ Inventive way in which hardware, software, and connectivity are reconfigured and combined to accomplish ever-higher goals;

   ❑ Collecting and analysis of huge amounts of data;

   ❑ Continuous interaction of AI;

   ❑ Blurring of the physical and virtual components of output.

2.2 IT services sector at a glance

❑ The IT services sector comprises businesses which provide IT consultation or information processing services to other businesses (Miller, 2019)

  ❑ IT-es industry is a component of the IT service sector (UNCTAD, 2015).

❑ 4IR is a notion that defines the prospect and everything in the IT services sector.

❑ Not only has 4IR altered traditional computing methods, but it has also penetrated other industries, substantially transforming them.

❑ As the world has become more digitized and all sectors develop significantly more capable, IT businesses need to stay up with growing process by introducing and increasing innovation (World Economic Forum, 2016).
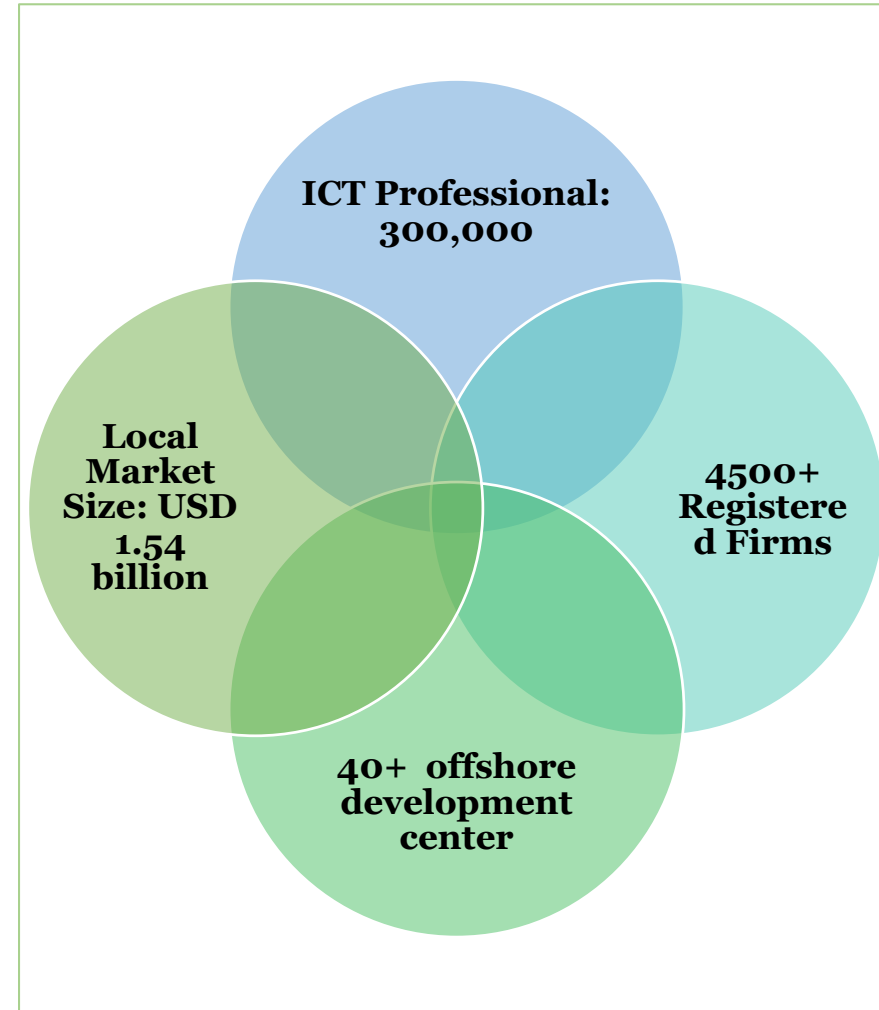
2.4 Implications of 4IR components in IT service sector

❑ **Industry 4.0 is projected to be enabled by AI solutions, along with other enablers like industrial IoT devices and platforms in the IT sector.**

❑ Machine learning, virtual personal assistants, decision support systems, automated data analysers, and others are seen as having a strong influence on the IT organizations in the future.

❑ Data manipulation from smartphones and linked items is enabling new service options and lowering IT costs.

❑ Intuitive consumer intent detection is made possible by Big Data, a technology that spans technology, apps and processes.

3. Overview: IT service sector in Bangladesh

3.1 Bangladesh's IT sector in 2021 - A Snapshot

- [ ] The IT sector in Bangladesh can be categorised into **Software**, **Internet Service Provider (ISP)**, **Telecommunications**, **Call centres** and **hardware sectors**.

- [ ] Excluding telecommunications and hardware, the market size of the IT sector is now about **USD 1.54 billion** in Bangladesh, of which export earnings is about **USD 1 billion** (BASIS, 2021)

- [ ] While specific figures on Bangladesh's IT service industry revenue earnings is difficult to access, **USD 1–2 billion is less than 1 per cent of GDP** and significantly **less than USD 30.6 billion** in readymade garment exports FY2018 (ADB, 2019)
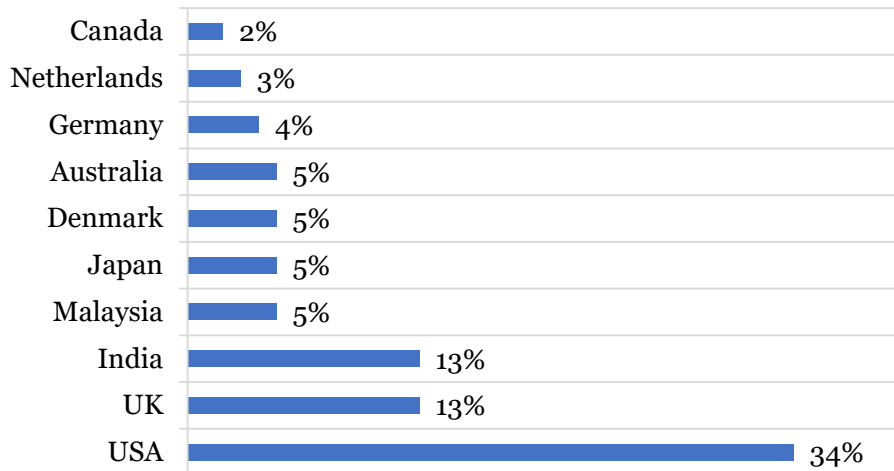
ICT Professional: 300,000

Local Market Size: USD 1.54 billion

4500+ Registered Firms

40+ offshore development center

Source: BASIS (2021)

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3.1 Bangladesh's IT sector in 2021 - A Snapshot

- Though relatively small in size, the IT sector in Bangladesh is observing an **increasing number of exports**.
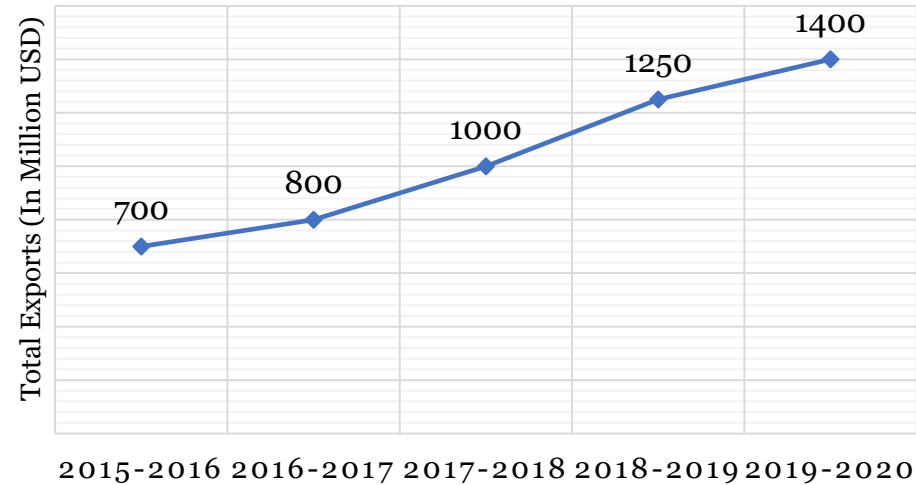 - The growth rate in exports in this sector **has been flat for some time** and at **a rise till 2019-2021**.

Figure 3: Major Bangladesh IT sector Export destination, 2020

Canada	2%
Netherlands	3%
Germany	4%
Australia	5%
Denmark	5%
Japan	5%
Malaysia	5%
India	13%
UK	13%
USA	34%

Source: BASIS (2021)

Figure 2: Bangladesh IT sector export trend over last 5 years (in million USD)

Total Exports (In Million USD)

700 800 1000 1250 1400

2015-2016 2016-2017 2017-2018 2018-2019 2019-2020

Source: BASIS (2021)

- Local software enterprises are rapidly expanding,
  - with **local businesses** contributing for **75 per cent** of the total and
  - foreign firms accounting for **25 per cent**.
  - **United States (34 per cent)** is the major export destination.

4. IT sector Workforce and Employment in Bangladesh

4.1 Workforce and Employment

❑ At present, there is **more than 4500 Software and IT organizations** are enlisted in Bangladesh. These organizations utilize **more than 300,000 nearby IT experts** (BASIS, 2021).

❑ Over **40 companies**, among the exporters, are established through joint-venture with an overseas company or as an offshore development centre (ODC) by **100 per cent foreign capital** (BASIS, 2021).

❑ The sector currently employs **roughly about 0.22 million IT professionals**, of which **35000 belong to software industries**, **30000 belong to freelance software service**, **50000 belong to IT jobs in different Non-government Organizations (NGOs)** and other sectors (Hossain, 2018).

4.1 Workforce and Employment

❑ Employment forecasts for 2021 are **significantly higher than recent steady improvement** (PMIS, 2019).

❑ According to the current distribution of IT professionals according to job classification, **most IT experts in a typical programming firm are either developers or computer programmers, which is about 60 per cent** (Hossain, 2018).

❑ The majority of call centres and re-evaluating firms use Business Process Outsourcing (BPO) administrators or professionals, with just around **15 per cent of their employees working with broad courses and other specialized areas of expertise** (Khan & Pradhan, 2018)

Figure 4: Trend of Employment in the IT services sector, 2019
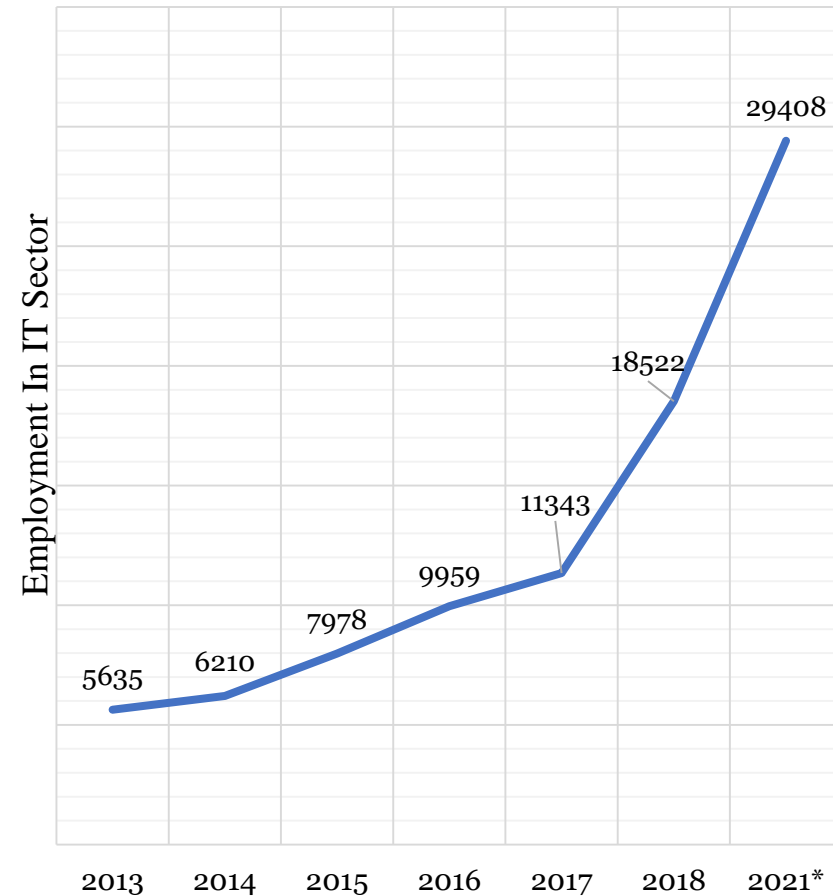
Source: (Center for Project Management and Information System (PMIS), 2019) * Shows predicted value

4.2 IT Education/Trainings

❑ Bangladesh now grants academic qualifications in ICT disciplines at **over 100 institutions, including universities, colleges, and institutes**.

❑ Bangladesh presently produces over **10,000 IT graduates each year** from more than **95 universities and 200 polytechnic or technical colleges** (Hossain, 2018).

  ❑ Around 2,500 of them are computer science or software engineering majors.

❑ Additionally, there are approximately **300 training/education facilities** that **provide IT technologies and techniques**, hence contributing to the development of human resources for Bangladesh's IT services businesses.

4.3 Women in the IT sector

❑ The IT industry looks to be **falling behind in terms of attaining gender equity** in the sector.

❑ According to gender-aware analyses of current representatives in different sub-areas of information and communications technology, except Call centres, the proportion of female employees in most occupational classes is **less than 20 per cent** (Rahman & Islam, 2013; Hossain, 2018).

❑ According to a survey, women participated in Computer Science Engineering (CSE) programmmes at **a rate of around 21.5 per cent between 2013 and 2018**, whereas **female graduates secured jobs at a rate of 58.6 per cent, 23.6 per cent** growth **lower than male graduates** (ADB, 2019).

5. Opportunities and Challenges due to 4IR emergence in the IT service sector
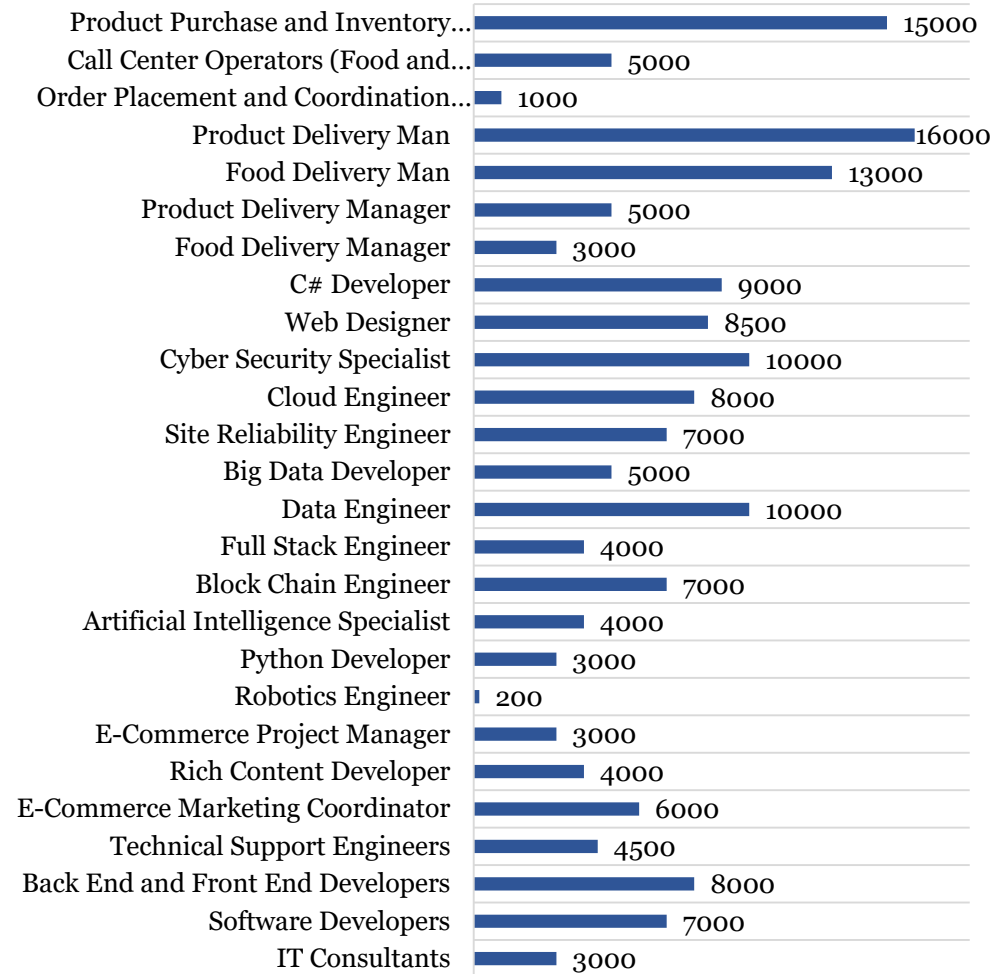
5.1 Opportunities and Utilisation

❑ In 2020, Bangladesh's **labour force participation rate** was reported to be **55.7 per cent** (ILO, 2020).

    ❑ In 2019, **around 67.61 per cent** of Bangladesh's entire population was between **the ages of 14 and 64** (Statista, 2021a).

        ❑ This group can learn IT skills and knowledge through enrolling in IT-focused universities, colleges, and training centers, as well as on-the-job training.

❑ For some ICT jobs, such call centers and e-commerce, **proficiency in English** with minimum skills in computers are adequate for occupation (Raihan et al, 2017).

    ❑ With over **7 million English speaking population** in Bangladesh (KMPG, 2012).

        ❑ It gives the advantage to prepare for 4IR interventions.

5.1 Opportunities and Utilisation

☐ **10,000 new employment** in IT and tech industries were to be created in Bangladesh by 2020 (a2i, 2020)

  ☐ As enterprises invest in digitalisation of numerous services in response to work-from-home arrangements.

**Figure 5: Jobs to Be Created by End of Year 2020**

Job	Number
Product Purchase and Inventory...	15000
Call Center Operators (Food and...	5000
Order Placement and Coordination...	1000
Product Delivery Man	16000
Food Delivery Man	13000
Product Delivery Manager	5000
Food Delivery Manager	3000
C# Developer	9000
Web Designer	8500
Cyber Security Specialist	10000
Cloud Engineer	8000
Site Reliability Engineer	7000
Big Data Developer	5000
Data Engineer	10000
Full Stack Engineer	4000
Block Chain Engineer	7000
Artificial Intelligence Specialist	4000
Python Developer	3000
Robotics Engineer	200
E-Commerce Project Manager	3000
Rich Content Developer	4000
E-Commerce Marketing Coordinator	6000
Technical Support Engineers	4500
Back End and Front End Developers	8000
Software Developers	7000
IT Consultants	3000

source: a2i (2020**)**

5.2 Challenges

Bangladesh **lags behind** both India and US in terms of **Fixed-telephone subscription, international bandwidth per user** and **households with a computer** except for household with internet in 2019:

- **0.9 fixed telephone subscriptions per 100 habitants.**
- **5.6 per cent of the households own a computer.**
- **37.6 per cent** of the households has **internet access at home.**
- The **international bandwidth per internet user** is only **21904.4 kbit/s.**
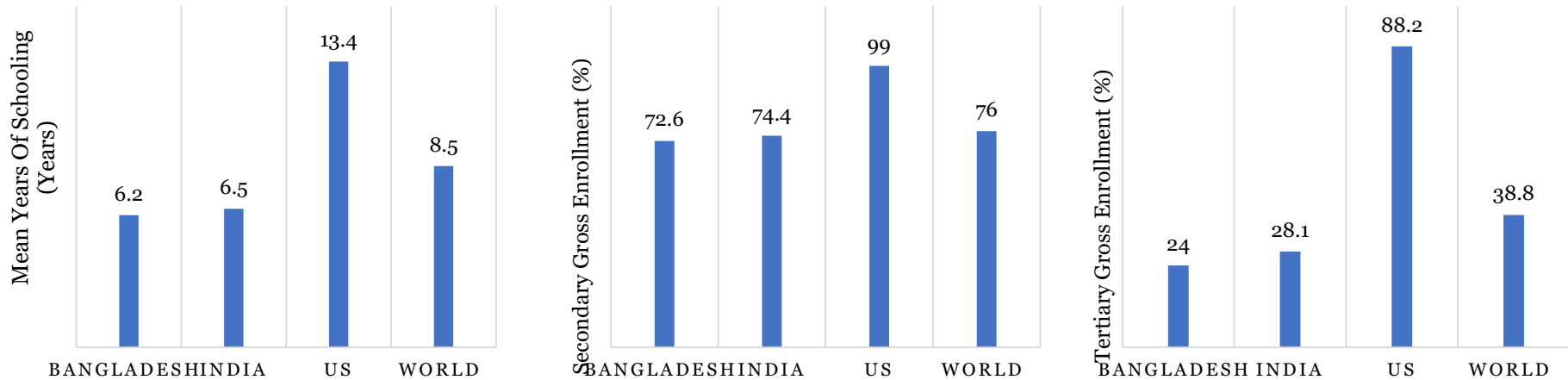
Figure 6: Technology access
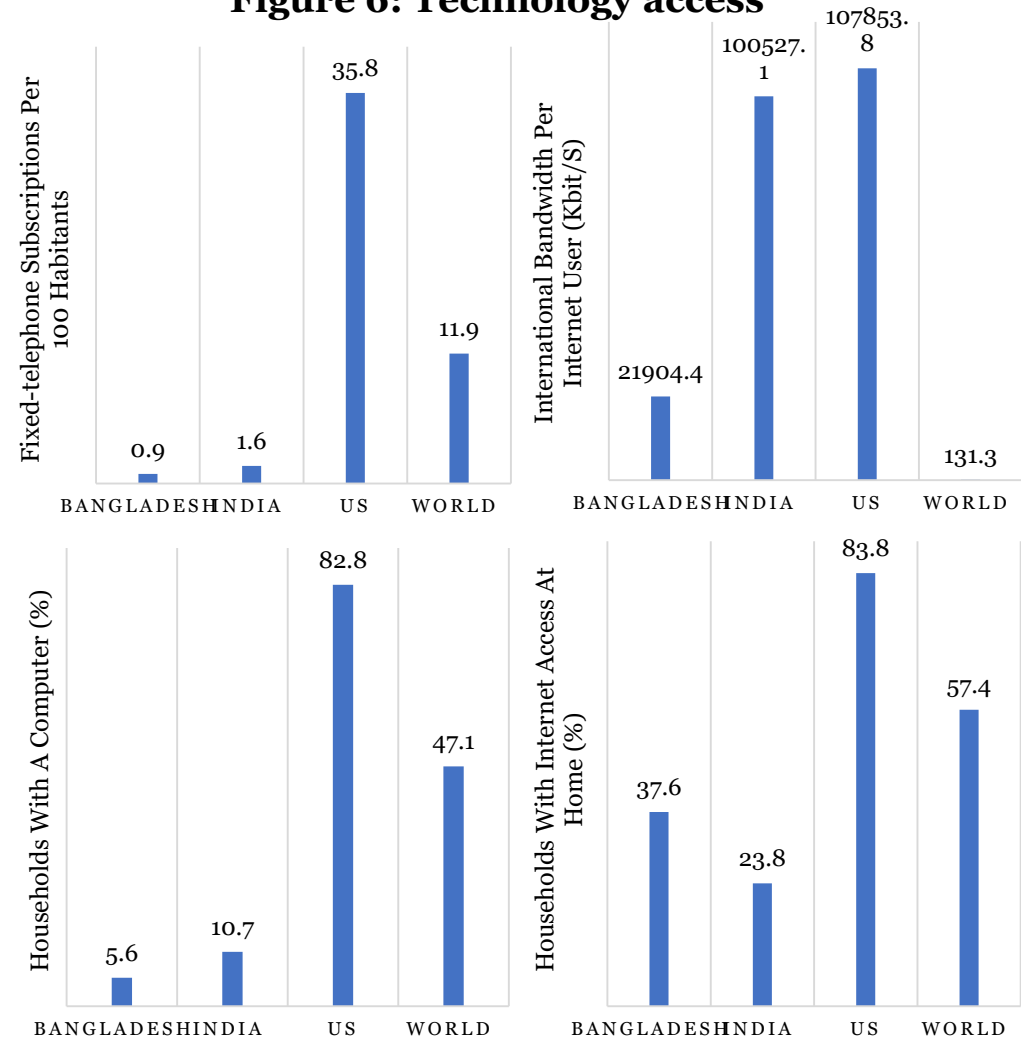
Source: Compilation of (ITU, 2020) and (ITU, 2021)
Note: 2019 data for Bangladesh and World; 2017 and 2018 data for US and India, respectively.

5.2 Challenges

Figure 7: Technology skills

Source: Compilation of (United Nations Development Programme (UNDP), 2021) and (World Bank, 2021) Note: 2019 data for Bangladesh and World and 2017 and 2018 data for United States (US) and India, respectively.

❑ Bangladesh is at a neck-on-neck position with India in terms of technology skills.
  ❑ The mean years of schooling of Bangladesh is 6.2 years in 2019.
  ❑ Bangladesh's per centage of gross secondary enrollment   is 72.6 per cent in 2019.
  ❑ There is 24 per cent tertiary, gross enrollment in Bangladesh in 2019
❑ Therefore, Bangladesh has to cover a considerable gap to adapt 4IR completely.

5.3 Other Challenges

❑ Due to the increasing possibility of human roles being replaced by new technological innovations, different jobs becoming redundant or obsolete.

❑ Qualification requirements for new jobs will become more stringent, and new skills and experience will be obligated.

❑ Upskilling and re-skilling is nearly absent in the industry.
  ❑ 25 per cent of the employees receives the training from company's own training institutes (Hossain, 2018).

❑ Labour skills are not at the requisite level.

❑ Universities' curricula are disconnected from market demands.

❑ Teaching method in Bangladesh is incapable of producing experts who meet market need, and IT graduates frequently find themselves unsuitable for job in the IT sector.

❑ Low investment in the high-tech sector

❑ Automation will increase gender discrimination.

❑ There is no effective gender-sensitive policy in our country to upskill the women workforce.

6. Policies and Legislations for IT sector in Bangladesh

6.1 Policies – Direct Impact on IT sector

❑ **Digital Bangladesh Vision says**, *"Bring socioeconomic changes through ICT and digital revolution across the country"*

❑ **National IT policy 2018** is to integrate eight strategic objectives, including **digital government**, **digital security**, social equity and **universal access to education**, **research and innovation**, **skill development and job creation**, and **strengthening domestic capacity to cope with emerging technology changes.**

❑ **National Telecommunications Policy 2018** aims to ensure **affordable and universally accessible communication**, quality of service and customer protection, **development of telecommunication market and services**, management of scarce resources, investment, safety and security from cybercrime, **efficiency and innovation**, employment and entrepreneurship, **standardization and local hardware and software production** and environment friendly networks

❑ **Broadband Policy 2009** aims to ensure **easy accessibility to the Internet** through the **up-to-date IT network** and **effective service delivery** for the realisation of the Digital Bangladesh vision.

6.1 Policies – Indirect Impact on IT sector

❑ **Industry Policy 2016** aims to ensure sustainable and inclusive industrial growth through **generation of productive employment** to create **new entrepreneurs**, **mainstreaming women** in the industrialisation process and international market linkage creation

❑ National Strategy for Artificial Intelligence of Bangladesh has **Six strategic pillars of AI** are **research and development**, **skilling and reskilling of AI workforce**, **data and digital infrastructure**, ethics, data privacy, security & regulations, **funding and accelerating AI start-ups**, and **industrialization for AI technologies**.

❑ **National Blockchain Strategy Bangladesh** recognises the need to explore blockchain technology in order to **advance its technical capacity**, **develop resilient infrastructure, increase efficiencies in e-Governance** and **foster innovations**.

❑ **National Cybersecurity Strategy** aims to **work collaboratively home and abroad**, to **manage all major cyber risks** that affect us directly irrespective of their origin and type, thereby **creating a safe, secure** and **resilient critical national information** infrastructure for our economy and society.

7. Recommendation

7.1 Recommendations

❑ The focus required for **developing and aligning the coursework and curriculum** of engineering and polytechnic institutions with industry requirements
  - ❑ Establishing **interpersonal skills;**
  - ❑ Instituting **core technical skills;**
  - ❑ Establishing **psychological behaviour**, to nurture the **quality**.

❑ Professionals must design a methodology that **incorporates automation capabilitie**s.
  - ❑ Employees should **develop their skill sets** and **acquire new ones** in emerging technologies.

❑ Organisations need to develop a strategy for educating employees by **engaging with companies** to build workforce skills and knowledge.

❑ Organisations may establish innovative **research and development centres**:
  - ❑ To analyze and comprehend recent developments in global technology trends, forecast the industry's growing technology demands accurately, and
  - ❑ Assist professionals in **upskillin**g by establishing up-to-date training centres in-house within the nation.

❑ IT entrepreneurship must be promoted through **scholarship programmes** and **sponsorship of training courses** to develop its skills and foster a vibrant IT services industry with uplifting financial growth.

Thank You

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