

Digital Bangladesh: High-speed connectivity via mobile phones and the Internet



Islamic Development Bank Group

People across the world want to be connected – to information, to markets, to each other. And in recent years, being connected has increasingly come to mean two things – mobile phones and the Internet.

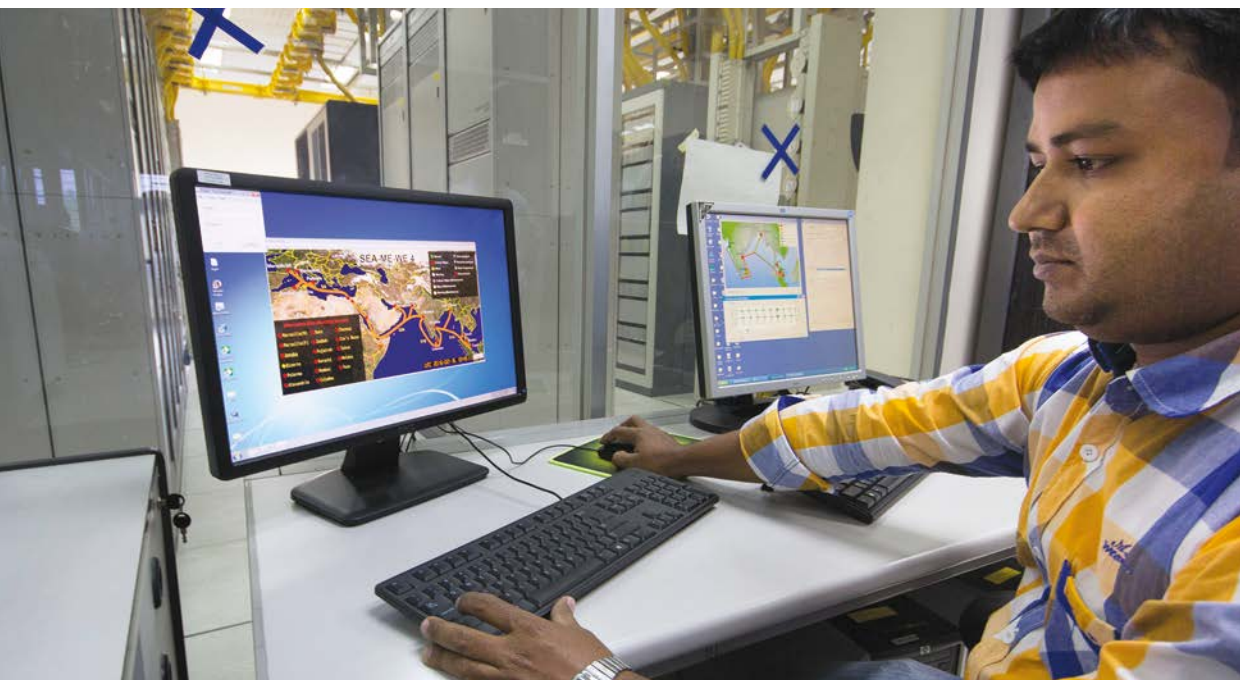
Faster Internet and better mobile connections provide a host of benefits. Traders can contact their suppliers to find out market prices; families can communicate quickly and cheaply across the globe; while students and professionals have access to a range of digitized information that was once unimaginable.

But to take advantage of these opportunities, connection speeds need to be fast enough to cope with the pace of modern life. And in the early years of the 21st century, Bangladesh was lagging behind the rest of South Asia: its citizens had to rely on out-of-date satellite

systems while neighbouring countries were already benefitting from high-speed fibre-optic cable connections. This disadvantage was slowing down Bangladesh's development.

To address this, the Government of Bangladesh approached the Islamic Development Bank (IsDB) for support to install a submarine fibre-optic cable, to provide fast, reliable and secure access to the Internet and to improve mobile phone connections. This was installed in 2008 and Bangladeshis have been quick to capitalize on the benefits.

The system surveillance equipment at the SEA-ME-WE-4 Landing Station, Cox's Bazar, monitors alarms, signal levels and power levels.



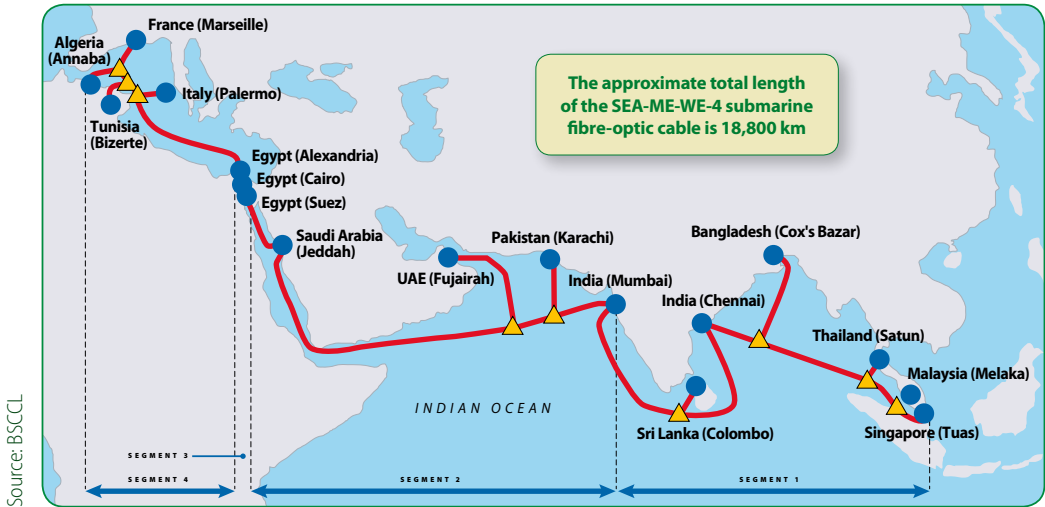
The SEA-ME-WE-4 submarine fibre-optic cable

The project began in 2005 and was completed in 2008. IsDB provided US\$60 million, with the Government of Bangladesh contributing the remaining US\$8.02 million. This covered the cost of 1,065 km of cable, which was installed by the international submarine cable consortium South East Asia (SEA)-Middle East (ME)-Western Europe (WE), along with technical partners Alcatel-Lucent of France and Fujitsu of Japan. The SEA-ME-WE-4 submarine fibre-optic cable already served 13 other countries, from France in Europe,

via Saudi Arabia in the Middle East, to Singapore in South-East Asia (see map); it now connects to Bangladesh at Cox's Bazar, in the south-east of the country. The project also covered the costs of implementation and testing equipment and facilities.

Bangladesh became a member of the SEA-ME-WE-4 Consortium through the Bangladesh Submarine Cable Company Limited (BSCCL). To ensure the project's sustainability, BSCCL also acted to guard against technological, market, operational and pricing risks.

Location of the SEA-ME-WE-4 submarine fibre-optic cable



The submarine cable project by numbers . . .

US\$60 million – IsDB's contribution, **88 per cent** of the total project cost

200 Gbps (gigabits per second) – the newly available bandwidth supplied by the submarine cable; in 2006, this was **7 Gbps**

54 million – Internet users in Bangladesh in December 2015, compared with **23,000** in 2004

133 million – mobile users in Bangladesh in December 2015, compared with **3 million** in 2004

Less than **1,000 Taka** (around US\$13)¹ – the cost of **1 Mbps** (megabit per second) of data in 2016

Fifty-four million users and rising

The impact of the new fibre-optic cable has been incredible. In 2004, there were just 23,000 Internet users, who used poor quality VSAT² technology. But since the project was completed, the number of users has soared, reaching 54 million by December 2015 – a phenomenal rise in just over a decade. Over the same period, the percentage of the population that is connected to the Internet has also grown rapidly (see Figure 1).

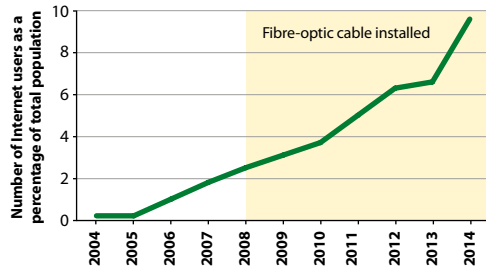
The number of mobile phone users has also climbed steeply, from around 3 million in 2004 to 133 million by December 2015.³ This is largely because the submarine cable makes the use of data on mobile phones cheaper and easier to use.

People are using the improved connectivity for a diverse range of functions.

- ◆ **Better overseas communication:** this is important for the many Bangladeshis who have family members living abroad.
- ◆ **Online transactions:** a number of tasks can now be done online or on mobile phones. For example, domestic utility bills are payable over the Internet and many people are using mobile banking.
- ◆ **Business and trade:** faster connections have benefitted a range of economic sectors; for example, garment makers – a major export sector in Bangladesh – can now conduct their business more efficiently.
- ◆ **Information and knowledge dissemination:** students, academics, government officials and many others now have faster access to the unlimited amount of digitized information available online – and can share their own knowledge more easily.

The manhole where the cable comes to land.

Figure 1. Growth of Internet users in Bangladesh, 2004–2014



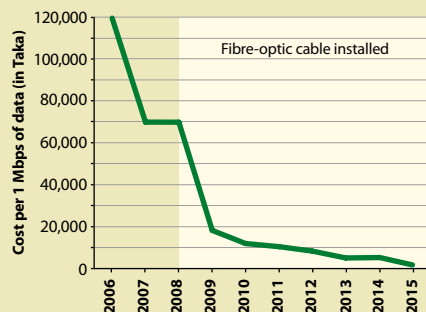
Sources: 2004–2012, International Telecommunication Union; 2013–2014, World Bank. No official figures available for 2015.

Better connectivity at lower prices

The fibre-optic cable provides far more reliable coverage than was previously available. There is no weather interference, which was often a major issue with satellite connections, while latency (the amount of time it takes for a 'packet' of data to travel from source to destination) is low.

However, the major change has been in the cost of these services. The wholesale cost for 1 Mbps of Internet data has reduced considerably since 2006, thanks largely to the new fibre-optic cable (see Figure 2). The cost of mobile calls has also fallen significantly, opening up this technology to some of Bangladesh's poorest people (see page 6).

Figure 2. Cost per 1 Mbps of data (Taka), 2006–2015



Source: BSCCL

Logging on to the virtual library

University life around the world has been transformed by the Internet. Gone are the days of students spending hours searching for a book in the library; today, they find much of the information they need online, including international digital resources.

One such student is Tanvir Ahmed Khan, who is working towards a Masters in Computer Science Engineering at the Bangladesh University of Engineering and Technology (BUET) in Dhaka. The high-speed connectivity on campus is invaluable. "I use it to access lecture notes, video lectures on YouTube, emails and social networks," he explains. "For example, I often use Google to find research material and published papers for free."

A good Internet connection also brings students into closer contact with people in their field – even those on the other side of the world. Tanvir has used Skype to connect with a senior researcher at the University of Michigan about his project. He also uses Skype to talk to the supervisors at his part-time job with a US-based software start-up company, where he works as a software developer.

As well as helping students, the improved Internet connection makes life easier for the staff



As well as getting online for his studies, Tanvir Ahmed Khan uses the Internet to communicate with a US company that employs him for programming and coding – a job he can only do thanks to the high-speed connections and bandwidth now available in Bangladesh.

at BUET. Mr A.B.M. Alim Al Islam is an Assistant Professor in the Department of Computer Science Engineering, having previously studied here.

This improved connection has enhanced his teaching. "A good lecture needs recent [research] works," he confirms. "If Internet access speeds are slow, there is limited access to published papers or videos." This problem is now consigned to the history books; the BUET is fully up to speed with the modern world of academia.

"I encourage my students to go beyond my lecture contents.

I give them the raw ingredients; they should find out the recipe online"

– Mr A.B.M. Alim Al Islam, Assistant Professor in Computer Science Engineering, BUET

From conference calls to cricket

It's not just Bangladeshis who appreciate high-speed Internet; visitors to the country can also now enjoy the improved connectivity available.

According to Mr Salman Kabir, Assistant Director of Marketing and Public Relations at Dhaka's Pan Pacific Sonargaon Hotel, this was desperately needed. "Around 10 years ago, when the Internet first arrived [at his hotel], the connectivity in Dhaka was poor," he recalls. "It was very expensive, and not of great quality initially, as the service providers in Dhaka had limited capacity."



Mr Kabir in his hotel.

The majority of travellers visit Dhaka for business purposes, so getting a faster connection was an urgent issue: it was falling behind other cities in South Asia. Broadband became available in 2008, and in 2011, the hotel installed a '360-degree' Wi-Fi system. This meant that its clients were now fully and reliably serviced with Internet connectivity throughout the building – just in time for the Cricket World Cup, which Bangladesh co-hosted and brought a rise in visitor numbers.

The hotel has even installed Wi-Fi in its vehicles, using mobile 3G technology.⁶ This means guests can check emails or surf the net on route from the airport to the hotel – a journey that often takes two hours because of Dhaka's traffic. "We now need more vehicles, such is the demand for this service," says Mr Kabir.

Get online at home

Away from the bustle of Bangladesh's business sector, people young and old are enjoying the faster Internet connections when logging on at home. This keeps families in contact with each other, even when they have spread across the world: many Bangladeshis have relatives living overseas. "I use the Internet for everything," says Zulfa Ferdous Alam, a university lecturer. "Especially Skype, as my brother lives in Australia."

Home connections have also expanded the number of leisure activities available to her children. Her son Iftikhr Zakir (12) uses the Internet to help with his homework and to watch cartoons on YouTube. "I also like playing games with my friends when they are online, and share my photos on Facebook," he says.



Iftikhr Zakir.

"I use the Internet at home for everything – email, Google, finding recipes, YouTube, Facebook and Skype"

– Zulfa Ferdous Alam, university lecturer

Telemedicine in rural areas

As well as supporting Bangladesh's fast-growing cities, improved mobile and Internet coverage will, in time, help the poorer rural parts of the country too. This is part of the Government of Bangladesh's aim to make the whole country 'digital' by 2021. Under this target, all rural districts will have access to the digital resources available online.

At present, data speeds in most rural areas are largely restricted to 2G technology (although 3G is increasingly widespread). The remotest rural areas still rely on microwave and satellite connections, but there are plans to establish at least one 'data centre' per group of villages. This will provide better quality international calls and data services to people in these regions.

Where rural connectivity has improved, people are already demonstrating the benefits this can bring. One example is 'telemedicine', which is providing a huge boost to rural health care. Doctors in remote villages hold online video conferences with their counterparts in Dhaka, who help them with diagnoses. Once connected to a faster system, this service should become even more widespread and further increase access to digital global medical resources.

At the same time, private-sector investment from companies such as Aamra Networks is creating a number of publically available data Wi-Fi hotspots, for example in schools, colleges and hospitals – and in smaller rural clinics. These companies aim to install Wi-Fi services in all government hospitals by 2017.

The rising use of mobiles: 130 million new users

Alongside the growth in the number of Internet users, the submarine fibre-optic cable also brought about an increase in mobile phone use, largely due to better data access. Mobile user numbers had grown to around 133 million users by December 2015, from just 3 million in 2004.



A rural mobile phone shop in the north-eastern Sylhet region.

This growth is not just due to the better quality of coverage available, but also because costs have lowered. For example, in 2005 local calls cost 7 Taka (US\$ 0.09) per minute on average; in 2016, they cost just 0.5 Taka (US\$ 0.007). Overseas calls are also cheaper: a one-minute call to the USA used to cost up to 100 Taka (US\$1.30) via VSAT, but now it costs around 7 Taka (US\$0.09) via the submarine cable.



Installation equipment at the cable terminal in Cox's Bazar.

The project has transformed the communications landscape in Bangladesh, bringing mobile and internet connectivity to millions of new customers and improving the service available to existing customers. Such is Bangladesh's capacity that the

country is even exporting its spare bandwidth. Some is exported to north-east India, as it was impractical for India to route a land-based fibre-optic cable via the hilly region north of Bangladesh. Further exports are planned to Bhutan, Myanmar and Nepal.

Success factors

- **A national priority.** The Government of Bangladesh placed a high priority on bringing the mobile and Internet sectors up to date, which brought considerable political will to the project.
- **High-quality equipment.** The fibre-optic cable is top-of-the-range hardware, and had been used in several other countries before Bangladesh. This removed some of the risks of installing new equipment, as it was tried and tested.
- **Good maintenance.** There is a surveillance monitoring system to detect faults, not only on the Bangladesh link, but also on the main fibre-optic cable that runs between France and Singapore (to which Bangladesh's cable connects).
- **Strong rates of return.** The wide use of the improved connectivity means that returns on the investment are good.
- **Purchase and lease-back financing.** The mode of financing used enabled the rapid disbursement of funds, and IsDB's funds were provided as one payment, so the executing agency could quickly gain control and use of the equipment. Also, contractors and suppliers were paid directly for specific components. All of this helped towards the timely completion of the project, and demonstrated that this mode of financing can be effective for realizing IsDB's development objectives.
- **Transfer of knowledge.** The SEA-ME-WE-4 Consortium's knowledge base and technical expertise added substantial value to the project. For example, it transferred its knowledge about low-cost operations and maintenance to the executing agency.
- **Technical expertise.** BSCCL has the technical capacity and know-how to ensure the long-term sustainability of the project, for example through the regular maintenance of the cable equipment by trained staff.

The next generation of cables

The key lesson learned in this project was the need to work with experienced partners. The SEA-ME-WE-4 Consortium had considerable experience of managing national-level installation projects. This proved to be a better option than working with individual contractors. The choice of technology – fibre-optic cable – also led to an affordable option to operate, manage and upgrade the system when needed. Furthermore, the final project cost was lower than expected, just 90 per cent of the amount agreed at appraisal. This was due to better prices for hardware and services being agreed through competitive bidding, and adjustments in some project components.

The submarine fibre-optic cable will form the basis of Bangladesh's Internet and mobile provision for years to come, but it has a lifespan of 25 years, and so a replacement plan must be in place long before this. Bangladesh has already signed a contract with the SEA-ME-WE-5 Consortium to build a second submarine cable link, which will cater for the future redundancy to SEA-ME-WE-4 and allow for continual upgrading of facilities. This will 'future-proof' the technology to ensure it can cope with increasing traffic; once that is installed, then the SEA-ME-WE-4 will become Bangladesh's emergency back-up system.

- 1 All currency conversions at March 2016 exchange rates.
- 2 Very small aperture terminal.
- 3 Source: www.btrc.gov.bd/content/mobile-phone-subscribers-bangladesh-december-2015
- 4 Source: www.itu.int/en/ITU-D/Statistics/Individuals_Internet_2000-2012.xls
- 5 Source: http://data.worldbank.org/indicator/IT.NET.USER.P2?order=wbapi_data_value_2008%20wbapi_data_value%20wbapi_data_value-last&sort=asc&cid=GPD_44
- 6 Third generation mobile telecommunications technology.

A mobile phone user.

Acknowledgements

This story is part of a series in the IsDB Success Stories Special Programme, implemented under the guidance and direction of H.E. the Vice President (Operations), Dr Mansur Muhtar, and the Director of the Operations Policy and Services Department (OPSD), Mr Anasse Aissami. The preparation of this success story was managed by Dr Intizar Hussain and Mr Muhammad Ismail of the Operations Policy and Compliance (OPC) Division of the OPSD at IsDB Headquarters in Jeddah, Saudi Arabia.

This success story document is based on the 'Project Performance Evaluation Report' (PPER) on the Submarine Cable Telecommunications Project, Bangladesh' (2014) prepared by the Group Operations Evaluation Department (GOED), and the 'Report and Recommendations of the President to the Board of Executive Directors on the Regional Submarine Telecommunications Project' prepared by the Infrastructure Department. The story was supplemented by additional material from a field visit to the country by Mr Fuad Huseynov and Mr Luai Osman of the OPSD and Green Ink, facilitated by the Government of Bangladesh (February 2016).

All direct and indirect contributions by colleagues (in particular Mr Shaharyar Jawaid, Mr Mohammed Wosabi and the GOED) and partners of IsDB for the successful implementation and evaluation of the project, and for the preparation of this document, are gratefully acknowledged.

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