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**Author(s):** Ali, Khawaja Sazzad; Faroque, Anisur R.

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# Addressing the Complexity of the Digital Divide and the Role of Government in Addressing It

*Khawaja Sazzad Ali,*

*School of Business and Economics*

*North South University, Dhaka, Bangladesh*

[khawaja.sazzad@northsouth.edu](mailto:khawaja.sazzad@northsouth.edu)

*Anisur R. Faroque*

*School of Marketing and Communication*

*University of Vaasa*

[anisur.faroque@uwasa.fi](mailto:anisur.faroque@uwasa.fi)

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## Abstract

The digital divide refers to the gap among citizens of a country or across borders due to the lack of ease of access to digital means for some and the difficulty for others. The possession of electronic gadgets, smooth internet connectivity, and other forms of digital communication can have a wide gap in availability among countries. This gap is mostly influenced by factors that are of infrastructural, political, cultural, demographical, generational, and socio-economic nature. On account of developed and developing countries, the gap is disseminated and thoroughly complex. Although the developed nations around the globe proved to have narrowed digital divide as a major source of development and advancement in respective countries, it is quite challenging for emerging economies to adhere to the same processes for development. For an emerging economy, the prudent cost-benefit analysis carried out by the government can have varying effects on undertaking projects related to minimizing the digital divide. Nevertheless, the importance of narrowing the gap of the digital divide is unparalleled and governments of emerging economies are realizing the benefits of it and investing their resources accordingly. Furthermore, information technology can be a catalyst in facilitating processes that save a lot of costs, bring holistic quality improvements, and implement effective and efficient government policies that lead to digitalization and sustainable consumption of resources. Consequently, governments are getting actively involved in the digitalization of their respective countries to turn their smart cities into more intelligent ones. Even so, it is important to understand that taking one policy to address all citizens is not realistic. Hence, understanding the foundational knowledge of the citizens, the demand of the population under various sectors, framing well-rounded policies with alternatives, and effectively and efficiently implementing them are extremely crucial.

Keywords: Digital divide, sustainable development, e-government, emerging economy

## **Digital Divide**

In this ever-changing world, science and technology are shaping our foreseeable future. It is bringing innovation and exploring new options leading to ground-breaking discoveries. This has been mainly possible due to the digitalization that the world is currently going through. Sophisticated electronic devices that can solve months' problems in seconds with internet connectivity connecting and bringing all people together under the same roof to communicate is essentially making us more efficient but is it always the case? The developing nations around the world would argue over their digital divide. The digital divide refers to the division of people having a different range of accessibility to information and communication technologies (Cullen, 2001). Emerging economies have to face multifaceted challenges on an ongoing basis. Their population mostly living under the poverty level puts downward pressure on comprehending the means to achieve such accessibility (Okunola et al., 2017). As much as this gap can be visible across borders, it can even exist within a country. This gap is mostly influenced by factors that are of infrastructural, political, cultural, demographical, generational, and socio-economic nature.

Infrastructural factors include the necessary means to set up information and communications technology in a country (Mills & Whitacre, 2003). Information and communication technology is important to a country as it lets a country ride the wave of technological innovation and eases the form of communication across people within and outside a country. Telecommunication is one aspect of it. It is the service provided by the telecom industry which includes call time, cellular data, and international roaming. For a country to succeed and bridge the gap of the digital divide, it is of utmost importance to have strong network services. The United States of America has Silicon Valley located in California, a hub of Information and Communication Technology (ICT) and start-ups, which solely works to innovate the landscape of the country based on the technological aspects of life. From providing a smooth and efficient lifestyle through numerous applications to bringing innovations that are strengthening connectivity across borders, the government of the United States of America is developing their citizens and other parts of the world to be better equipped with the same level of technical skills (Reggi & Gil-Garcia, 2021). When the mass population of the world receives the same products, it is easier to trade across borders and give both the producers and consumers better negotiation for the goods and services. On the contrary, third-world economies such as Sudan and Afghanistan have the worst possible telecommunication services in the world. Does the political situation affect the digital divide?

As aforementioned, political reasons too can play a notorious role in widening the gap. Both Sudan and Afghanistan have dreadful political systems. The government of the respective countries failed to provide their citizens the means to have smooth connectivity, as tested by Ookla, one of the pioneers in testing internet and mobile connectivity. However, how does a government benefit from it? All the answers may just lead to one straight fact: corruption. Corruption is extremely high in the said economies. It is also seen that the legislative body of the country provide one or two telecom companies to take charge of the entire country encouraging monopolistic behavior (Olken & Pande, 2012). Those companies, in turn, charge as they like making a hefty profit for themselves but deprive the population of the country of having the desired utility level. This also allows the governments to run and control the media as they prefer. One of the best examples can be North Korea in this case. The government of the country does not allow its citizen to communicate outside their borders and in some cases, it is prohibited to communicate freely within their own country. This gives the ultimate power to the government to dictate as they like abandoning all senses of democracy (Byman & Lind, 2010).

Demographical factors such as age and gender can have a massive impact on the digital divide. The possession of electronic gadgets, smooth internet connectivity, and other forms of digital communication can have a wide gap in availability and may not be equally divided among the males and females of a country. However, the more important factor to worry about is the generational gap that exists in every country. The technological advancements we see today were not present in our forefather's generations. The elderly citizens of a country may not have an interest in technology as they have no prior knowledge. This creates a gap between the millennial and Generation Z age cohorts. Nevertheless, a lot of people may also argue that socio-economic reasons can aggrandize the digital divide but researches show no strong correlation between the two (Zhao et al., 2014). A relevant example can be the sudden development of COVID-19 and its impact on countries around the world. Governments created websites for people to register for the vaccination program streamlining the process; however, in emerging economies such as Bangladesh, many people did not have the access to information and communication technology to register themselves to avail of the services. They had to go to internet hubs to register them and this discouraged thousands. This challenge was absent in countries that are technologically advanced and have minimal digital divide among their population.

## **E-government**

The sole responsibility of any government is to govern the well-being of its citizens. It can be by producing an adequate budget to meet all demands and supplies, It can also be enacting effective policies for the betterment of the citizens of the country. The improved business environment also falls under the umbrella of government's governance as businesses seek to expand outside the borders of a country. E-governance refers to connecting all three parties: government, the citizens of the country, and the businesses in a country together with the means of electronic support (Kumar, 2017). This does not mean only having websites will serve the purpose but the way a government encourages everyone in the country for embracing information and communication technology is the predicament.

A good example that can be considered for this purpose is the vaccination project. With the sudden appearance and the destruction of the COVID-19 pandemic all over the globe, governments had to swiftly adhere to ways to vaccinate the people of their respective countries, which also meant the bigger the country in terms of population, the harder it ought to be. Nevertheless, first-world countries such as the USA, China, Canada, the United Kingdom, and India had successfully launched the registration program and got their citizens to be vaccinated (Ramsetty & Adams, 2020). Now, this was easy given the accessibility to the necessary means to register in the first place, which does not only include internet connectivity and electronic support but also the knowledge of the population itself. These governments were previously investing in their ICT sectors and encouraged people to take part in sustainable development. All these aforementioned countries comprise the majority of the population of the world, yet they succeeded in their tasks. However, governments from lower-income countries were bombarded with challenges. First, they had to wait for the major countries to take action on the predicament and follow their steps in terms of minimizing the impact and loss but more importantly about the development of vaccines and other precautionary steps. Second, they needed to invest heavily in the accessibility of such a registration program. People from these third-world countries having a disseminated digital divide found it difficult to be a part of it. Third, the governments had to invest more in educating the population about the measures taken by the government and how common people could avail of them. This lack of knowledge seemed to be one of the biggest barriers to the said issue. Therefore, the importance of good governance through e-government is unparalleled and can shape the future of a country unimaginably.

## **Role of Government in Minimizing the Digital Divide**

The number of people, both in developed and developing countries, using the mobile network and internet connectivity is increasing exponentially. More people are trying to communicate online with their families and friends. Even the traditional emailing system has recently taken a hit by the presence of social media in the workplace. The digital divide that we talked about earlier can be categorized into two broad categories or points of view: access point of view and skill point of view (Bélanger & Carter, 2006). The access point of view mainly comprises socio-demographic factors such as ethnicity, age, income, and education. Alongside, the skill point of view includes general computer use and the purpose it is used, use of the internet, and other computer and smart devices experience. As seen earlier why digital divide can be extremely complex and overcoming the challenges is of utmost importance, the government has a major role to play.

Any policies taken by a government have to be well backed by proper research. The policies have to be cost-effective, efficient, technologically innovative, manageable, and socially acceptable. Therefore, one policy may not govern all the issues underlying the digital divide predicament due to its complexity, rather a portfolio of policies is needed with alternative options to reach out for inclusion of every individual in the country. The best way, perhaps, is to go for Cost-Benefit Analysis. Cost-Benefit Analysis refers to the analysis of a project that consists of various costs such as installation cost, maintenance cost, implementation cost, social cost, environmental cost, and many more. The benefits considered can be both tangible and intangible. These future costs and benefits are discounted to the present value subject to a fixed rate of return which is set by the analysts based on the market return. This is a comprehensive way to weigh all the policies available for the policymakers to choose the best policy or policies out of a menu of choices.

Nevertheless, all governments should encourage sustainable consumption and aim for sustainable development. This refers to the limited consumption of only the resources that are required for a process without putting pressure on it for the future generation. This induces sustainable development by encouraging everyone to adhere to processes that bring long-lasting benefits. A relevant example can be MicroMentor, an online platform to support female entrepreneurs to minimize the digital divide.

## **MicroMentor Shaping the Future**

MicroMentor is a cost-free mentorship platform for women entrepreneurs all over the world. Being established in 2008, the organization has served over 13,000 women entrepreneurs in just over a decade (MicroMentor, 2022). The main idea of this innovative platform is to collaborate with mentors and mentees all over the globe despite having a form of geographical, cultural, financial, and language barriers. This idea helped all the people availing the service to take up projects that have an everlasting impact on the world contributing to sustainable development.

A program led by Mercy Corps and well supported by the USA government (Programs-For-Corporations-and-Governments, 2022), MicroMentor has succeeded in minimizing the global digital divide. Many entrepreneurs all over the world face multifaceted challenges, which leads them to not pursue their dreams that could change the world. Many, even after pursuing, cannot keep up with the business demands or simply just fall out of the loop. MicroMentor's responsibility is to guide these entrepreneurs to efficiently use of their resources to reach a successful outcome. This in turn has created a wider range of job opportunities for people around the globe. The USA government supported the initiative by providing them with resources as the program fosters a culture that thrives on a wider skillset. Additionally, the mentors, donated over 50 million pro-bono USD to the mentees to encourage them in their entrepreneurial journey ("MicroMentor", 2022). Furthermore, renowned companies such as Apple, Chevron, MasterCard, and JP Morgan Chase & Co. are to name a few global partners of the program ("Programs-For-Corporations-and-Governments", 2022).

From providing training programs on basic software skills needed to run and take decisions in small companies to teaching global market insights and providing a holistic industry view, MicroMentor has encouraged thousands of women from emerging economies to turn their dreams into reality. Anita Ramachandran, the Executive Director of the company believes that women across the world face many more challenges than men in general ("About MicroMentor", 2022). These challenges are multifold if emerging economies are considered. For example, in emerging economies, the wage rate is lower along with other social and cultural challenges adding more pressure on women to pursue any entrepreneurial activity. Subsequently, every start-up business or any form of business possesses a certain level of risk that cannot be mitigated. Many find this discouraging and that is where MicroMentor contributes. However, more importantly, MicroMentor aims for sustainable development that has a long-lasting impact by providing the



means necessary to these women to have them on board to launch their businesses. This chapter will next look into a few distinct countries on how they have minimized their digital divide and what role their government plays in achieving it. These distinct cases will try to highlight the complexity of the digital divide amongst different countries and how E-government can implement policies to bridge the gap.

## **The Case of the United States of America**

In 1996, the government of the USA realized the digital divide the country had was creating a bigger social divide. People who did not have internet access were not being able to avail of online government services and were going through lots of hassles. Their predicament was further elevated when people from both the Democratic and Republican parties could not take part in the “point and click” debate during the US national convention in 1996 (Sipior & Ward, 2022). They could not exercise their rights to vote only in person, which caused long queues of people to stand idle. The government realized the bottleneck and invested in providing more and more public internet access. This way more people could have access to free internet for their work or pass their leisure time in public.

An exploratory analysis was carried out to observe the effect of e-government inclusion and whether it bridges the gap of the digital divide. 158 households from William Penn Housing Development that had less to no technological access were selected for the analysis (Sipior & Ward, 2022). The methodology of the research conducted both qualitative and quantitative data for observing a holistic view of people. The research followed the *Assets-Based Community Development Model* to see how the society of William Penn Housing Development could be empowered through e-government inclusion. The hypothesis was that the more people can be brought under the roof of the internet and technology, the more self-sufficient the members of the community can be. The results highlighted among the 158 households, 60% required a job and were not skilled due to not having proper means, i.e., a computer or internet. 12% of the households did report necessary computing skills to work at corporates, but unfortunately none of them had any access to a computer to work remotely if needed (Sipior & Ward, 2022). This small housing development, located in Pennsylvania, with a population of 39,000, reported many disturbing issues. Drug abuse among the people, teenage pregnancy, poor performance in academia, vandalism, murders, and poor electrical and sewage system are to name a few. The author Sipior (2022) and team found that the lack of connection with the mainstream society and external factors pose threat to the society of William Penn Housing Development.

To subdue the issue laid out, the local government along with Villanova University’s Institute for Teaching and Learning launched a training program. The law firms in the neighborhood provided 15 fresh personal computers followed by 14 refurbished ones donated by the local schools (Sipior & Ward, 2022). A Community Centre was booked to train the individuals in the society. The

training program was found to be effective among the members of the community which further spread positive word of mouth among the community influencing more people to sign up. A second location was soon booked to cater to the demand of the local community. People were also able to take their personal computers to their homes to practice. 15 more refurbished personal computers were donated. Upon successful completion of the training program, the participants were given certificates and free computers which boosted their morale and empowered them to be self-sufficient (Sipior & Ward, 2022). Although the lack of internet connectivity persisted, receiving free computers encouraged them to gain computational skills and expertise. They were given a range of tasks that tested a wide range of skills. As more and more people gained basic computer skills, the analysis of the data suggested that governmental websites incurred more traffic. People were also able to retain the information available on websites and name at least one government website when asked.

The biggest lesson the government acquired from this investigation is that they need to listen to the citizens more closely and streamline the technologies available to harness higher human capital. If their demands are well met, people are more likely to return multifold. Usage of computers was an important skill that many people found interesting which eventually increased the awareness and traffic for government websites. More people were interested in availing of online services rather than waiting in lines for hours which brought a paradigm shift. The members of the community were also found to be partnering with external parties for trade and commerce inducing sustainable development.

## **Digital Divide and Role of E-government in European Economies**

The European economies too did not fall behind in realizing the importance of minimizing the gap between the people in society in terms of their access to technology and the ability to use it. Eurostat's Community Statistics in Information Society collected micro-data over a decade from 2008-2017 (Botrić & Božić, 2021). They wanted to find out the digital divide among all the European countries along with the impact of different age cohorts on the adoption of e-government services. The institute followed the *Heckman selection methodology* that tries to explain three types of effects; first, distinct effects on young and old due to gender, size of their respective household, and overall population density. The second effect this form of methodology tried to figure out the similar effects among the different age cohorts due to their economic activity.

Thirdly, and lastly, the adverse effects on young and old due to their education level was found to be crucial.

Although prior research showed that approximately all citizens aged between 25 and 34 used the internet, it was quite the opposite for the elderly in the communities (Botrić & Božić, 2021). Even though the senior citizens could benefit from the adoption of e-government services, there was a significant demotivation among them from using it. The European governments has been investing a lot of resources since the late 1990s; however, the adoption of e-government services is substantially low. The government thought it would be widely accepted due to its cost reducing policies, improving the overall quality of the services provided, and ultimately helping the government to take more effective policies. However, the older age cohort seemed to completely shun the project. In 2005, the government tried to enforce the e-government declaration which moved some part of the population towards their agenda of having all the citizens to inclusion and ease of accessibility of these online services with increased trust but all were spoiled due to the COVID-19 pandemic.

The findings of this research were quite interesting yet complex. The researchers used three dummy variables which included acquiring information from websites, downloading official forms, and submitting the completed forms. Even though different countries had similar population levels, their young and old age cohort behaved differently. The Irish senior citizens tend to use government websites for their services while the younger age cohort of Estonia seemed to use the websites more (Botrić & Božić, 2021). The researchers associated this change in behavior with socio-economic reasons as Italy, another European country, showed a similar behavior as young people tend to live with their parents even after turning 18, implying their lesser usage of government websites because of it is usually navigated by their parents. Downloading online forms indicated active participation of users and required some level of computational skill and expertise. This variable showed lower participation and engagement among the people of the countries. However, the older population from the Netherlands, Ireland, and the United Kingdom showed a higher level of engagement while younger people from Estonia and Finland showed higher engagement in going to government websites and navigating through them to acquire their desired information and download forms (Botrić & Božić, 2021).

The next step of the research showed the outcomes perhaps the governments across countries were trying to retrieve. Completing the forms required moderate to advanced computer skills that many

did not possess. The older cohort reported that they did not have the necessary skills to complete the forms and submit them. This is the place where government needed to focus on for including more people to have necessary computer skills and overall inclusion in the digitalization of the country. To highlight the main findings from the paper:

- Older males had the necessary skills more than females to navigate through government websites. The younger cohort did not show such a correlation.
- Household income had a positive correlation with the usage of computers and the internet. The higher the level of income for a household suggested the higher the chance of possession of technological means.
- Elderlies from rural areas had a lesser chance of inclusion compared to their similar part in urban areas. People are more likely to adopt services in less dense areas.
- The higher the level of education, the more the attainment of necessary computer skills among the netizens. This, however, is arguable as the foundational level of education did not previously provide computer skills and expertise and requires implementation of specific policy towards it.

The ease of user interface particularly played an important role in adopting e-government services bridging the gap of the digital divide. Younger people generally showed more interest in availing of these services from websites regardless of their gender or education level.

All in all, the European countries showed a wide range of data. This demanded the governments to enact a portfolio of policies as previously discussed to find the best possible way to minimize the gap by streamlining the technologies and to foster culture of sustainability in their economies.

## **The Efforts of India**

India is one of the most populous countries in the world. Along with the population explosion, the country also suffers from a lack of electricity, tele density, internet industry, and several other challenges. Having several states with people from numerous backgrounds, the digital divide is quite vivid in this country. To mitigate the issue, the government has taken some initiatives such as Akashganga, Akshaya e-centres, Bhoomi etcetera (Rao, 2005).

Over a billion citizens coming from various backgrounds add upward pressure to the digital divide. India has 18 different languages recognized so far, however, the literacy rate was 74.37% as of 2018 (India Literacy Rate | Macrotrends, 2022). The IT industry is also thriving but access to

Information and Communication Technologies is the main issue the country is facing at the moment due to the infrastructural prerequisites not being met. These infrastructural prerequisites include electricity generation, tele density, the internet industry, and IT penetration. India had produced only 363 kW of electricity compared to the major technology powerhouses like Hong Kong which had generated 4959 kW of electricity (Rao, 2005). Tele density refers to the density of telecom companies or subscribers within a given population frame. India had one of the lowest tele density in the world with around only 16% presence of telecom subscribers in urban areas as of 2003. The IT sector too did not penetrate the population quite well. Due to the high price of computers, majority of the people cannot simply afford personal computers putting huge pressure on the digital divide. The internet industry in the early 2000 was not flourishing. Only 0.4% of the population were internet subscribers. Only 193 licensed internet service providers were available all over the country. As of 2003, India saw only 3.5 million internet subscribers (Rao, 2005). This low rate was caused by low IT penetration, high costs associated with internet connectivity but having a poor connection, and higher prices of personal computers. Nevertheless, the country has developed multifold in the past couple of decades proving to be a giant across industries.

With all these issues at hand, the Indian government announced “Internet for all” policy to shape society and in turn the whole country into a knowledge country. The digital divide does not only hamper the communication medium but it can slow down trade and commerce. Realizing the importance of bridging the gap, the government of India had undertaken a lot of policies which include every household having one telephone in urban areas whereas in rural areas with a population of 2000 people. In every 5 kilometers, there must be digital data facilities available for the rural people. This policy is expected to grow Voice Over Internet Protocol (VOIP) lowering the cost and making it affordable for the Indians. All these policies are strictly governed by the IT Task Force and the Ministry of Information Technology. The government also took initiatives to widen the technology options for better connectivity among people. Apart from traditional terrestrial wireless connectivity, the government also launched satellite connection which was much easier and did not require setting up issue. On the other hand, terrestrial wireless technology included Wi-Fi, cellular data, wireless pay phone, multi-access radio etcetera. Wireline technology included Integrated Services Digital Network (ISDN), Digital Subscriber Line (DSL), Power Line Communication (PLC), and cable-based broadband (Rao, 2005). Along with them, the government also launched IT-based programs:

- **Akashganga:** Milk is one of the nutritious drinks that are consumed by people of India from all layers of background. To facilitate the production and distribution of milk better, the government of India launched a program known as Akashganga. Located in 600 places and running for 8 hours every day around the year, the program has provided a multifold increment in milk production and supply.
- **Passenger Reservation System:** The Railway Ministry saw the gap in communication among the people from different states and heavily invested in building a better communication infrastructure. The railway system soon reduced the digital divide among the population.
- **Akshaya e-centres:** This program was launched all across Kerala. A training program for the locals was set up to provide them with basic IT training enhancing their computational literacy skills and expertise. The program was spatially distributed so that people from all phases of life can participate and earn knowledge and necessary skills for e-commerce and trade.
- **Bhoomi:** Joining forces with National Informatics Centre (NIC), the government of India launched this program to record all land ownerships. As this process was previously done manually, people had to wait in lines for hours to avail of the services which also involved bribery. However, upon implementation of Bhoomi, people could fill up the necessary forms online and document their land ownership.
- **Gyandoot:** 35 Internet Kiosks were placed in every 5 blocks of Madhya Pradesh State to elevate the knowledge of IT among the people (Rao, 2005). This program's main aim was to influence people to learn foundational to advanced computer skills which will later help them to be self-employed in their entrepreneurial journey.
- **Information Village Research:** This program aimed to empower villagers of the country with knowledge about different aspects of life; for example, the effective ways of farming, planned birth and family development, instant health care, fighting against social taboos, and many more. This volunteer-led program was found to be highly effective as the elders were observed to pass down the knowledge to the youth which is further likely to the generations henceforth.
- **TARahaat:** This event led to the penetration of the internet into the daily lives of rural people around the country. This program aimed to engage people in e-trade and e-

commerce via websites to retrieve information from the internet to tap into the markets that were previously left untouched. This brought a fortune for the country as more people engaged in freelancing bringing foreign currency into the country.

- **Warana Project:** This project was based on providing a marketing platform to people across the country. The wired communication services allowed people to sell agricultural products influencing numerous states to initiate a similar program.

## South Africa and its Efforts in Bridging the Digital Divide

South Africa, being one of the poorest countries in the world, faces multifaceted challenges. While the majority of the population lives in poverty, the government can barely invest in infrastructure to minimize the digital divide (Okunola et al., 2017). Most of the investments go to support other aspects of the livelihood of the population. The digital divide is orchestrated by humongous inequality across genders, races, and economic aspects followed by rural areas having weak information technology infrastructure, and an absence of governmental support (van Deursen & van Dijk, 2018). Although the presence of mobile phone usage is vivid, fixed line usage is quite absent from mainstream communication channels along with poor internet connectivity.

Indicators	Numbers
Population	47,390,900
GDP	USD 200.5 billion
GDP per capita	USD 4,230
Gini coefficient	57.8
Main (fixed) telephone lines	4,729,000
Tele-density or Tele subscribers (fixed)	9.90%
Number of fixed line operators	2
Mobile telephone subscribers	39,066,000
Tele-density (mobile)	68.20%
Number of mobile operators	3
Internet subscribers (estimated)	5,100,000
Broadband internet subscribers	283,839
Number of personal computers	5,300,000
Number of internet service providers	355
Number of television sets	10,000,000
Number of television stations	6
Number of radio stations	130

*Table 1: Distribution of Information and Communication Technology (Mphidi, 2010)*



The table above adapted from Mphidi (2010) highlights the condition of the digital divide in South Africa. With only 3 mobile operators, the telecommunication companies charge a higher call rate than the ones in the neighboring countries (Mphidi, 2010). The number of internet service providers and television stations are also minimal enhancing the digital divide.

Nevertheless, observing other countries receiving benefits of e-governance, South Africa is also investing in developing its infrastructure. However, this poses several challenges:

- **Privacy:** A lot of personal details of individuals are stored in the government directory which induces a threat to the privacy of the citizens
- **Security:** Any breach of data can result in a huge number of personal information being leaked which can deteriorate the security and safety of individuals
- **Economic turbulence:** People from lower income groups naturally have lesser access to information and communication technology increasing the divide
- **Education:** The level of education divides the population; the more a person is educated the more they are likely to use the internet and have the necessary computer skills and literacy
- **Accessibility:** Accessibility varies greatly among rural and urban areas mainly due to the government's lack of interest in sustainable development
- **Awareness and confidence among citizens:** It has been found through research that citizens are concerned about their details being stolen by anonymous sources. This makes it even harder for the government to persuade the citizens of the country.
- **Lack of leadership:** South African government failed to show leadership on bigger platforms. Any misconduct in the past is expected by the government to take accountability.
- **Legal framework:** The legal framework of the government is not too strong. Perpetrators can easily get away with their misconduct.
- **Bureaucratic government:** Bribing is extremely high as many government officials are found to be connected to different cases of misconduct.

Upon its birth in 1994, South Africa tried to rope in e-governance as it has over 30 websites for the citizens to avail of services. Although the country is by far the best one in the entire continent of Africa, it is still struggling to minimize the gap of the digital divide due to its natural complexity

embedded in the country. The State Information and Technology Agency (SITA) along with the government is relentlessly trying to have all the companies in the country have user-friendly websites (Mphidi, 2010). This will enhance the inclusion of the citizens and engage them in a manner that fosters sustainable development. They are doing this by a wide range of applications which includes government documents and forms being available to the citizens to avail a wide range of services, tenders and vacancies advertisements, search and feedback facilities, and useful links to different websites. These steps showed an overall growth in the numbers of people having access to their desired information bridging the digital divide.

## **Bangladesh and its Take on Digital Divide**

Bangladesh, being a developing country, has a bigger digital divide than the countries that fall in the same economic category. With a population of over 16 million, Bangladesh faces a multifaceted challenge due to its exponentially increasing birth rate. The country needs a holistic developmental approach to mitigate the issues such as traffic congestion, in the health care industry, education system, and other aspects of life. The current government has undertaken a wide range of projects to mitigate the issues aforementioned which include megaprojects that connect divisions across the country saving a lot of costs and time along with e-governance. The government has announced the slogan "Digital Bangladesh" which aimed to digitalize Bangladesh by 2021 (Rahman, 2016). This included delivering internet connection to every corner of the country, providing training programs in rural and urban places alike to enhance computer literacy skills and expertise, affordable computers and an internet connection, and a smooth mobile network (Hoque et al., 2022). People can now avail online services with the luxury of sitting at home, making online payments anywhere in the world, serving clients across borders, and even receiving telemedicine services. The projects undertaken have proved to bring fortune for Bangladesh as importers are eyeing the country as a hub of technologically smart individuals.

Nevertheless, this was no easy feat and Bangladesh still has a lot of room for improvement. The major challenges the government had to endure along the way were:

- **Lack of sufficient electricity:** The country is facing one of the hardest challenges it ever faced that is a lack of sufficient electricity. Major development projects require a high amount of electricity along with industries, schools, hospitals, and households. However, the country does not have sufficient electricity to meet these ever-rising demands. Roughly 30% of the population

(Hoque et al., 2022) has continuous access to electric connections which puts upward pressure on the digital divide.

- **Lower bandwidth of internet:** The speed of internet in Bangladesh is tested to be one of the lowest in the world. However, the price of obtaining and maintaining a connection is quite high which discourages the majority of the rural population to not buy a connection increasing the digital divide.

- **Lack of ICT infrastructure:** The government does not have a strong ICT infrastructure as many governmental offices are found to have computers providing poor performance. Many computers are also found to be sitting idle due to a lack of proper planning and research while setting up an office. The websites too are not well maintained and often contain incorrect information.

- **Accessibility among demotivated employees:** A lot of employees are found not to use personal computers. This is mostly because of the low-grade computers provided in the first place, but some are not interested in using them due to their lack of knowledge of computers. Some government employees still do their everyday tasks manually consuming a great deal of their time making the overall process slow.

- **Extreme bureaucracy and presence of middleman:** People are often found to be exploited while using government services. The presence of a middleman creates a bottleneck for the processes to be going smoothly. People often need to pay a high amount of money to these middlemen to get their work done. Bureaucracy is also present in the structure of a ministry. This hierarchy consumes a lot of time for the citizens that could have been spent elsewhere.

Nevertheless, the government seeing the success of its neighboring country India has implemented policies based on a few models explained below that focuses on minimizing the digital divide among the population through good e-governance and being registered as a digital country.

- **Broadcasting Model:** This model aims to spread the usage of e-governmental services to the mass population (Hoque et al., 2022). As aforementioned, many people find it enigmatic to use a computer because of not having the necessary skills and refrain from using the websites. The government created a bunch of websites to empower these individuals by making it easier for them to access their desired information. People can confirm the validity of the information provided by cross-checking with the local source if needed. This way people can assess their rights and responsibilities well and take well-rounded decisions.

- ***Critical Flow Model:*** The model allows the information with significant importance to flow to the target audience. In everyday life, we are bombarded with information, and not all this information carries the same weight. If people were fed the right and only the information they require, that would likely make us more efficient and productive. The model uses media to disseminate critical information to the targeted people intended to save time. This reduces the bottleneck and dependability on others to receive the needful information.

- ***Comparative Analysis Model:*** Comparative Analysis Model is the most effective model implemented by the government, however, it could not get the popularity it deserves (Hoque et al., 2022). The model aims to compare information that is available to public and private websites with the already known information circulating. This helps the government to better govern its population by understanding the perception of people regarding a certain topic. This also allows the government to revise its policies if required to better fit and serve the population of the country. The comparative analysis model uses information before and after a certain change is implemented to better understand the effectiveness of the project.

- ***Mobilization and Lobbying Model:*** This model is the most frequent model used by the government to strengthen the connection with the rest of the world. The model aims to build virtual partners globally who share similar values to take planned, directed and strategic decisions on a particular aspect. This does not only create a strong bond among the countries but also exchanges ideas to use strict e-governance for sustainable development of the countries involved. The diversity among the parties involved strengthens this model and is widely used around the world.

- ***Interactive Service Model:*** This model is an accumulation of all the previously explained models. This model aims to engage the citizens in a way where they can convey their problems or concerns about a certain issue to the governmental body who in turn can take a solid approach to cater to the needs of the citizens of the country. Engaging people in this way empowers them and enhances faith in the government.

<b>Paradigm shifts in public service delivery</b>		
	<b><i>Bureaucratic paradigm</i></b>	<b><i>E-Government paradigm</i></b>
<i>Orientation</i>	Production cost-efficiency	User satisfaction and control, Flexibility
<i>Process organization</i>	Functional rationality, departmentalization, Vertical hierarchy of control.	Horizontal hierarchy, network Organization, information sharing.
<i>Management principle</i>	Management by rule and mandate	Flexible management, interdepartmental team work with central coordination
<i>Leadership style</i>	Command and control	Facilitation and coordination, innovative entrepreneurship.
<i>Internal communication</i>	Top down, Hierarchical	Multidirectional network with central coordination, direct communication.
<i>External communication</i>	Centralized, formal, limited channels	Formal and informal direct and fast feedback, multiple channels
<i>Mode of service delivery</i>	Documentary mode and interpersonal interaction	Electronic exchange, non face to face Interaction
<i>Principles of service Delivery</i>	Standardization, impartiality, equity.	User customization, personalization

*Table 2: Paradigm shifts in public service delivery after E-Governance (Hoque et al., 2022)*

As depicted in the table above, e-governance in Bangladesh has brought several positive changes. The hierarchal bureaucracy has declined, coordination among departments along with the relationship between government and the citizens has improved, services are available online and can be availed by anyone from any corner of the world, and customization according to one's needs are to name a few of the benefits of e-governance had on the citizens of Bangladesh.

With all the successes in the past, Bangladesh has been ranked 148 out of 193 countries (Rahman, 2016) in the world in E-Government Development Index (EGDI) and has improved two steps from the last time the assessment was carried out. The country has a long way to go but even small steps will add value. However, the country needs to strictly govern the people and eliminate any form of bureaucracy and crime.

## **Discussion**

The presence of the digital divide can be found across the globe. From one of the strongest economies like the USA to a developing economy like Bangladesh, the digital divide may not simply correlate with economic conditions. It is quite evident that economic conditions play a role but other determinants are equally important and demand to be addressed to minimize the digital divide. The determinants according to various research included age, gender, household income, lack of ICT infrastructure, absence of good governance, and many more. It is also evident that governments of emerging economies have to cater to other needs of the country inducing less investment in minimizing the digital divide. Emerging economies have to face multifaceted challenges on an ongoing basis. Their population mostly living under the poverty level puts downward pressure on comprehending the means to achieve such accessibility. As much as this gap can be visible across borders, it can even exist within a country. This gap is mostly influenced by factors that are infrastructural, political, cultural, demographical, generational, and socio-economic reasons (Helbig et al., 2009). Nevertheless, decreasing the digital divide empowers people from all spheres of life. It can also bring an increased amount of trade and commerce inducing sustainable development. As seen earlier why digital divide can be extremely complex and overcoming the challenges is of utmost importance, the government has a major role to play. Any policies taken by a government have to be well backed by proper research. The policies have to be cost-effective, efficient, technologically innovative, manageable, and socially acceptable. The main goal of government is to streamline the processes in SDGs and technology to minimize the digital divide. Therefore, one policy may not govern all the issues underlying the digital divide predicament due to its complexity; rather a portfolio of policies is needed with alternative options to reach out for inclusion of every individual in the country. The best way, perhaps, is to go for Cost-Benefit Analysis. Additionally, the models enacted by various governments were also found to be fruitful as they are providing promising results. However, as seen previously, a country implements a wide range of policies, and this is quite realistic based on the fact that people have a different range of knowledge or accessibility to digital processes. One policy would not be effective compared to portfolio of policies being implemented. Nevertheless, only making information and communication technology available to the public is not enough as people need to be trained properly to sustain the knowledge they acquire and use it in their lives. As seen in the case of the USA, the training programs at Penn Housing were very effective and it also influenced

other people to take up the training as the people living in that society understood the importance of computer literacy skills and expertise. It is also important to note that people who could not afford personal computers were given refurbished computers to be taken to their respective homes to practice. This gesture is truly commendable and circulated positive word of mouth in the neighborhood influencing others.

Sustainable development is another aspect governments should be focusing on as the resources are depleting at an alarming rate. Both developed and developing countries are susceptible to change in climate and using resources sustainably can help mitigate the issue. Furthermore, economies can receive benefits even in the long run from attaining a process that focuses on sustainable development. Minimizing the digital divide is one-way countries try to reach sustainable development. It reduces inequality among people regarding knowledge, skills, and expertise.

To conclude, the importance of e-governance in minimizing the digital divide is unparalleled. Governments across the world need to focus on e-governance and strictly maintain them to streamline a smart society into an intelligent one, which in turn will lead to sustainable development. This will lead to global prosperity and lead newer and better innovations shaping the world.

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