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Digital Inclusion Challenges in Bangladesh: A Case of National ICT Policy

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Abstract

This study assesses the impact and effectiveness of the National Information and Communications Technology Policy (NIP) in Bangladesh, which is a key legal framework for “Vision 2021” and “Digital Bangladesh”. It investigates the extent to which digital inclusion can be achieved by the NIP strategies, as well as exploring the conceptualisation of digital inclusion, which undergirds the contemporary debate on the digital divide and inclusion. The study employs a qualitative approach using policy goal-means analysis to explore critical scrutiny of the internal rationality and logic of the NIP based on three distinct criteria of the digital inclusion analytical framework: ICT access, use and skills. The analysis argues that the policy is ambiguous and techno-centric, with a narrow digitization frame of reference, which does not comprehensively address the issues associated with digital inclusion. Policy needs to be consistent and relevant to a person’s daily life, giving the user a sense of empowerment and skill. The article concludes that a focus on a skill-based approach and the context of societal challenges of Bangladesh is crucial to ensuring digital inclusion.

Keywords: ICT policy; ICT4D; digital inclusion; ICT access; engagement; skills; Bangladesh

Introduction

In the discourse of international development, Information and Communications Technology (ICT) is often claimed as a catalyst for socio-economic development to resolve social problems in developing countries. At the same time, moving toward a ‘knowledge-based’ and ‘digital society’ has had economic and social impacts that exacerbate existing inequalities (James, 2005; Selwyn, 2004). The World Bank (2016: 171) reports that ‘digital technologies, too, often fail to empower citizens. Such a divide can be located across societal levels in many contexts. It creates barriers to employment and escalates social exclusion among low income, rural people and older or disadvantaged groups (Hilbert, 2011). This has led to scholarly debates and discussions about the reasons for failure (e.g. Dada, 2006; Heeks, 2002), including the role of government policies. Moreover, the United Nations Conference on Trade and Development (UNCTAD) reports many developing countries have not yet defined policy strategies (UNCTAD, 2014), while some have developed their national plans to accelerate broadband adoption and network connectivity to develop their ICT policies (Duncan-Howell & Lee, 2008).

Many South Asian countries like India and Pakistan have implemented ICT policies and digital agendas in order to tackle social problems and encourage economic growth. Both countries have experienced several successes and failures in ICT projects. Palvia, Baqir, and Nemati (2015) find many drawbacks and gaps between policy design and outcome in the ICT policies of Pakistan. In India, analysing the ICT policy of Andhra Pradesh (1994-2002), Dabla (2004) has found that different ethnic minorities and other social groups remain excluded due to lack of contextual appropriation. Policymakers and social scientists have worried about equal distribution of ICT and Internet access since the inception of the Internet as a mass medium in the mid-1990s (Epstein, Nisbet, & Gillespie, 2011). Since 2014, UNCTAD has carried out the

ICT Policy review framework (2014) and programs to identify policies, plans and implementation mechanisms in order to leverage ICT for developing countries (UNCTAD, 2018).

As in many other developing countries, the government of Bangladesh introduced several ICT policies, acts and strategies (see, annex 1) to establish a transparent, inclusive and accountable government for economic growth and social development. However, Bangladesh, in the past, has experienced both success and failure of implementation of policy goals (Hasan, 2012). Recently, there have been quite a number of government initiatives (such as access to information [a2i]) for implementing ICT driven activities, and the government is planning to amend the existing policy to make it more relevant due to the ‘emergence of 5G technology and fourth industrial revolution’ (New Age, 2018).

This research was driven by the literature on ‘ICT policy’, “digital inclusion”, “Information and Communication Technologies for Development” (ICT4D), which has begun questioning and rethinking digital inequalities and development (Avgerou, 2010; J. A. V. Dijk, 2005; Epstein et al., 2011; Heeks, 2010; Helsper, 2008; Warschauer, 2004). However, many studies (e.g., Choi, Park, Rho, & Zo, 2016; Mansell, 2014) argue that little academic attention has addressed the digital inclusion from a policy perspective and the consequence of ICT policies in developing countries. Whereas, existing studies have been conducted on either ICT policy or the government’s ICT driven projects, no significant studies have addressed the issue of digital inclusion from the ICT policy perspective. Therefore, it is crucial to evaluate and review the policy critically in order to facilitate future policymaking mechanism and application (Kim, Shin, & Lee, 2015).

This article aims to critically evaluate National ICT policy (NIP) in order to develop better policies that incorporate a broader understanding of digital inclusion beyond ICT access.

The theoretical section of this study discusses the relevant literature to conceptualise the idea of digital inclusion; it subsequently explores socioeconomic challenges and the ICT Policy framework to explore the digital context of Bangladesh. Following the Dutch political scientists Gijsbert Kuypers (1980), Henk Van de Graaf and Rob Hoppe (1992), this study employs the method of ‘goal-means tree analysis’, an approach to qualitative document analysis that allows a detailed methodological process to uncover (mis)matches between goals and means in media policy and strategy texts (as cited in Vanhaeght, 2019). Applied in an ICT policy context, the method is used as a technique to assess ICT policy mechanisms, contextualizing the research problem and identifying potential gaps with a visual overview of goals and means of the policy plan. The findings of this study highlight the significance of a more contextualised approach in order to take the social context of digital exclusion into consideration and argues for policy that clarifies goals consistently in order to ensure better outcomes.

Bangladesh: Socio-economic Structure and Challenges

Bangladesh is a relatively small country by geographic area, encompassing 147,570 square kilometres with 162 million residents, making it the world’s most densely populated country (BBS, 2017). The Asian Development Bank (ADB) reports that, the country’s economic progress has been strong over the past decade with a gradual increase in Gross Domestic Product (GDP) expected to reach 7.2% in 2019. The population living below the national poverty line has dropped from 31.5% in 2010 to 24.3% in 2016 (ADB, 2018). In addition, Bangladesh has made substantial progress in improving outcomes on the Human Development Indexes and has met several targets of the UN Millennium Development Goals. According to the World Bank report, ‘Rapid growth enabled Bangladesh to reach the lower middle-income country status in 2015. In

2018, Bangladesh fulfilled all three eligibility criteria for graduation from the UN's Least Developed Countries (LDC) list for the first time and is on track for graduation in 2024' (2019).

However, like many other developing countries, Bangladesh has a high level of inequality along with many social problems. The country continues to have structural constraints on employment, including high levels of income inequality, gender discrimination, overpopulation and political instability (Williams, 2018). There are many marginalised and socially excluded groups, such as Hijra continue to experience discrimination due to their gender identity (Aziz & Azhar, 2019). The majority of Bangladeshis (66.2% of the population) live in rural areas (BBS, 2017). While rapid industrialization has shifted the country's economy to manufacturing and industry, the economy remains largely dependent on agriculture (Khan, 2015). Moreover, Bangladesh is one of the most climate-vulnerable countries in the world intensifying its socioeconomic problems. The World Bank reports (2018) that the country's low-lying and climatic topographies, combined with its continued population growth make it extremely vulnerable to many natural calamities, like floods, droughts, cyclones and earthquakes.

Bangladesh has all the indicators of an underdeveloped political environment where democracy is yet to be institutionalized (Khan, 2015). A recent study by Asadullah and Chakravorty (2019) shows that there are fewer signs of progress in economic governance as well as less control in combating bureaucratic corruption at all levels of government. Recent debates about Bangladesh's war of liberation continue to polarize citizens at social, political, and intellectual levels (M. N. Islam & Islam, 2018). In addition, recent concerns have been raised about emerging authoritarian tendencies and a developing 'culture of fear' as the ruling government imposes surveillance mechanisms and censorship practices against journalists and the media (Adams, 2019). In this context, the state of governance in Bangladesh can be

categorised as an immature polity with an authoritarian regime that is highly influenced by those who have money and political power.

ICT Policy Context: Bangladesh as a Digital Society

The government places extensive emphasis on digital technologies as a significant force in the development process. ‘Digital Bangladesh’ is a state sponsored digital initiative to promote several ambitious ICT projects aiming for a poverty free and more inclusive society by 2021. It is part of an electoral pledge of the ruling party, the *Awami League*, and has become a major political commitment over the last decade (M. S. Islam & Grönlund, 2011). The phrase Digital Bangladesh has become a “political tool” that has been often used by the ruling party in relation to any ICT development project. It has frequently been mocked as a “joke” by the opposition parties and intensively criticized as government propaganda. In this context, certain ICT policies have emerged with the cooperation of international agencies (such as UNDP and USAID) to accelerate the digitisation process as a means to economic growth and social development. The government has initiated the Public-Private Partnership (PPP) model to expedite ICT infrastructure and public services development, and consequently the shares of ICT investment have been increased from around 2% to 6% of the country’s Gross domestic product (GSMA, 2018).

The National ICT Policy (NIP)¹ has become a flagship regulatory framework for the digital agenda in Bangladesh. As a policy promise, there is an extensive network of 4500 Union Digital Centers (UDC)² across the country designed to ensure rural empowerment and inclusion (ITU, 2018). One of the strategic outputs of the digital agenda is the *Access to Information (a2i)*

¹ This study considers the latest version of National ICT Policy, 2015 that is published in Bangla language. The policy texts are analysed with additional consultation of NIP 2009, which is written in English.

² It was previously known as Union Information and Service Centre (UISC).

programme, which aims to improve the quality and ease of access of decentralised administrative services to the citizens of Bangladesh (A2I, 2009). The NIP offers a long-term plan for ICT as a catalyst for socioeconomic and human development. The long-term strategy for ‘Vision 2021’ was defined in the Perspective Plan (PP) (*see figure 1*), while specific strategies and the task of implementation were articulated through two phases: the Sixth Five Year Plan (6FYP) (2011–2015) and the Seventh Five Year Plan (7FYP) from 2016 to 2020 (Commission, 2012).

WHAT	Digital Bangladesh	Bring socioeconomic changes through ICT and digital revolution across the country.
HOW	<i>Vision 2021</i>	The goal is to alleviate poverty and become a middle-income country following the strategy of two phases 1 ST Perspective Plan (2011–2015 &) & 2016-2020).
	<i>Vision 2041</i>	The goal is to become upper middle-income country by 2030 and high-income country by 2041. As a strategy, 2nd Perspective Plan (2021-2041) was announced on 25 February 2020.

Figure 1: Government (digital) development agenda in Bangladesh

Recently, the National Economic Council (NEC) has proposed the Second Perspective Plan to be implemented from 2021 to 2041. It aims to eliminate extreme poverty and reach upper middle-income by 2030 and high-income country around 2041 with zero poverty (UNB, 2020).

The NIP was first adopted in October 2002, then modified in 2008 and 2009 respectively. Finally, on 5 August 2015, the government revised and amended it with a significant adjustment introducing several strategic themes and action plans. The NIP is designed and formulated by the ICT division under the Ministry of Posts, Telecommunication and

Information Technology (MoPTIT)³. The ministry has two divisions that facilitate all major ICT initiatives and digital agenda in Bangladesh, the Posts and Telecommunications Division and the ICT Division. The policy is proposed based on the constitutional framework of Bangladesh that emphasised social inclusion and citizen's equal participation in society.

Bangladesh has reached widespread telecommunications coverage through wireless devices. The GSMA (2018) reports that the 3G (third generation) spectrum currently covers about 93% of the Bangladeshi population's mobile internet usage- the figure having been just 21% in 2017-, while 4G (fourth generation) services were launched in February 2018. However, the country still lags behind compared to other South Asian countries in terms of speed and price. The International Telecommunication Union (ITU) annual report shows Bangladesh has the fifth largest offline population in the world (the country has world's eighth largest population), ranked 147th globally and 30th of Asian countries in the ICT Development Index (ITU, 2017). Internet access is eight times lower in rural areas than in urban areas (Alam, 2014). Many people remain unable to access ICT due to unstable electricity, remote locations, and lack of awareness of the potential benefits of ICT (Ullah, 2016). At the same time, online freelancing has gained much popularity over the last couple of years. According to the Oxford Internet Institute (OII), Bangladesh has been ranked as the second largest online labour supplier country after India (Zaman, 2019). Bangladesh has linked around 79,000 km optical fibre with an optic submarine connection network as a part of the 16-country consortium between Southeast Asia,

³ In 2011, the Ministry of ICT was established and later merged with the Ministry of Posts and Telecommunications and re-named as the MoPTIT in February 2014. The ministry works with the Bangladesh Computer Council (BCC) and Bangladesh Telecommunication Regulatory Commission (BTRC) as key agencies for policy implementation.

the Middle East and Western Europe 4 (SEA-ME-WE 4)⁴ in 2005 and SEA-ME-WE-5 in 2017 (ITU, 2018).

Until the early 1990s, the entire telecommunication sector was under strict government control. A substantial change in the ICT environment was observed after the permission of Nationwide Telecommunication Transmission Network (NTTN) license in 2009 (Hasan, 2012). There are several other policies and regulatory frameworks (see, Annex1) that have contributed to ICT market liberation and infrastructure development.

Understanding Digital Inclusion

As ICTs have evolved, policymakers and academics have addressed many ideas and concepts in order to explore the trends and significance of digital connectivity. The terms like digital inclusion, digital divide and digital participation have taken place in scholarly debates and policymaking process and practices over the past two decades (Dezuanni, Foth, Mallan, & Hughes, 2018). However, the idea of digital inclusion is difficult to define as it depends on different socio-economic conditions and types of technology in the context of developed and developing countries (James, 2005). While developed countries focus on high-speed internet access, developing countries only desire physical access. Researchers increasingly argue a change in definition to go beyond the idea of Internet access, instead focus on social, psychological and cultural aspects that inhibit digital inclusion (Dijk, 2006). Addressing these inequalities and gaps, Dijk categorised four consecutive types of access: motivational, physical,

⁴ The system that carries telecommunications between Singapore, Malaysia, Thailand, Bangladesh, India, Sri Lanka, Pakistan, United Arab Emirates, Saudi Arabia, Sudan, Egypt, Italy, Tunisia, Algeria and France.

skills and usage. Likewise, other limitations may include ICT literacy, digital skills (Hargittai, 2002), and psychological or motivational reluctance (Van Dijk & Hacker, 2003).

Selecting suitable ICT tools and indicators to measure digital inclusion requires a comprehensive approach, including several aspects of our everyday lives. Bradbrook and Fisher (2004) propose the ‘5 Cs’ model of digital inclusion; connectivity (access), capability (skill/ability), content, confidence (self-efficacy/motivation), and continuity. Helsper (2008) explains the continuity is related to digital engagement with the Internet and other ICT infrastructure. Likewise, *Digital Economy and Society Index (DESI)*⁵ reviews digital performance in European Union regions based on six main factors: connectivity, human capital, use of the internet services by citizens, integration of digital technology by businesses, digital public services and research and development of ICT (EC, 2018). Thomas et al. (2018) propose three critical aspects of digital inclusion: access, affordability, and digital ability. This study provides an analytical framework with three distinct areas of digital inclusion to evaluate the ICT policy discourse (A) ICT access, (B) ICT use and engagement (the nature and extent of use), and (C) ICT skills.

A. *ICT Access*. Recent policy and theoretical debate on digital inclusion have shifted away from physical ICT access. The idea of digital inclusion focuses mainly on lack of access (Dijk 2005). However, there are arguments in the literature, and it remains ambiguous as which aspects of access, such as quality, infrastructure or speed play a significant role in ICT engagement. Drawing on Helsper’s conceptual framework (2008), this study defines ICT access as related to digital resources, platforms and connectivity.

⁵ European Commission (2018). ‘The Digital Economy and Society Index (DESI)’, <https://ec.europa.eu/digital-single-market/en/desi>

B. *ICT use and engagement*. It is significant to know that there are several ways that an individual may use digital technologies. For example, the Internet and mobile phones are widely seen as crucial indicators of social development and participation. While there is no specific definition for digital engagement, the nature and scope of engagement is directly involved with a choice of activities and technologies. However, many studies define digital engagement as Internet-centred (Helsper, 2008). This study defines ICT use and engagement in the context of delivering different types of facilities and extending the scope of digital technologies into different aspects of everyday life.

C. *ICT Skills*. The term has been used and evolved interchangeably with other concepts such as digital competence (Ala-Mutka, 2011), ICT literacy (Erstad, 2006), digital literacy (Erstad & Gillen, 2019), new literacies (Lankshear & Knobel, 2011), 21st century skills (Binkley et al., 2012), and digital ability (Thomas et al., 2018). All these concepts connote that digital technology (e.g. ICT, Internet or computer) requires certain competencies (such as skill, literacy, and motivation). Helsper (2008) divides ICT skills into four broad categories; technical, social, critical and creative skills. Thus, digital exclusion may take place due to lack of training and hands-on experiences.

From Digital Divide to Digital Inclusion and ICT4D

Early empirical studies on digital divide have addressed a gap in terms of ownership and physical access to the digital devices, which was criticized as being a reductionist approach (Vehovar, Sicherl, Hüsing, & Dolnicar, 2006). The continuous technology gap between developed and developing countries coupled with other inequalities, such as socioeconomic

status, education and gender have broadly been defined as digital divide (James, 2005; Selwyn, 2004).

By the end of the 1990s, a new field known as ICTD or ICT4D (ICT for Development) emerged. The idea of ICT4D is premised that ‘ICT can improve the socio-economic conditions in developing countries’ (Avgerou, 2010, p. 1). In a recent study, Hussain and Brown (2018) developed a comparative framework for ICT4D initiatives in Bangladesh and Rwanda by adopting a critical realist philosophical approach. Exploring the idea of ICT4D, Avgerou (2010) classified different theoretical discourses and conceptual arrangements for Information Systems (IS) Innovation into four discourses. These discourses have been framed along with two axes of comparison (see figure 2). The vertical axis relates to the nature of the ICT transformation while the horizontal axis refers to diffusion and innovation of knowledge, either through an ethnocentric approach or through a socially and culturally embedded knowledge perspective.

Progressive transformation	
Innovation by transfer and diffusion	<i>ICT and development as socioeconomic improvements through transfer and diffusion.</i>
	<i>ICT and development as socioeconomic improvements through locally-situated action</i>
Socially embedded innovation	<i>ICT does not necessarily result in development for all: The transfer and diffusion of ICT leads to uneven development.</i>
	<i>ICT does not necessarily result in development for all: it is subject to the power dynamics of IS innovation action.</i>
Disruptive transformation	

Figure 2: Four Discourses on ICT4D. Source (Avgerou, 2010)

Similarly, Heeks (2010) argues that unless a long-term development strategy and implementation plan is carried out, ICT4D would not bring considerable and sustainable impact. In this context, attention in ICT4D research has begun to shift to a more holistic view of

development, beyond just economic development (Zheng, Hatakka, Sahay, & Andersson, 2018). Many studies (e.g., Avgerou, 2010; Bradbrook & Fisher, 2004; Dijk, 2006) argue that ICT is not a magical solution to complex social problems and may potentially even worsen social inequality (Heeks, 2010). The digital divide escalates social exclusion among low-income families, rural people, and older or disadvantaged groups (Hilbert, 2011). Recently, focusing on the digital transition in the context of contemporary new media and communication inequalities, a study by *Euromedia Research Group* (Trappel, 2019) explores how the digital media create a knowledge gap that transforms into digital divides. It depicts how algorithmic modelling, digital surveillance, big data and the internet of things (IoTs) are shaping new inequalities as well as the power extraction of expensive industrial corporations in the age of digital media.

The attention within digital inclusion debates has moved from digital divides to different stages of inclusion. Research shows that digital inclusion has been related to social inclusion since the early 2000s (Dezuanni et al., 2018). They address a shift from universal access as the central focus of digital inclusion to the importance of digital literacy as well as awareness of economic, social and health benefits of ICT. Similarly, Yu et al., (2018) describe digital inclusion as an ideal condition where regulatory agencies ensure ICT for all citizens in order to ensure equal digital participation and utilisation of available digital resources. Accordingly, Thomas et al. (2018) argue ‘Digital inclusion is based on the premise that everyone should be able to make full use of digital technologies...Social and economic participation lies at the heart of digital inclusion’ (p.05-07). Concerning equitable distribution of ICT initiatives, Notley and Foth (2008) claim that policymakers need to consider social inclusion and social capital.

Finally, to define digital inclusion specifically, it is crucial to recognise the subtle shift from physical access to skills, engagement and participation. In the most developed countries, the divide in physical access appears to be ending, whereas underdeveloped countries yet to overcome. In this study, digital inclusion is viewed as an interrelated concept that indicates actual conditions of digital exclusion and divide. Whenever the issue of the digital divide is solved, digital inclusion is consequently ensured. The digital divide continues and perhaps deepens in different environments; therefore, a more systematic and theoretical analysis is required.

Methodology

A policy is a set of instructions including goals, objectives and other related strategic actions, which often featured as a means-ends relationship. Different objectives or sub goals can be found in a single goal that can be considered as a means or an instrument. The method of goal-means tree analysis is an approach to qualitative document analysis that assesses the relationships among addressed goals, aspirations and actual means in policy text. It is a visualized technique to analyse texts that are often confusedly arranged in an unstructured manner (Vanhaeght & Donders, 2017). The method was emerged in the Dutch Commission for Policy analysis in 1970 and was not fully understood before interpretation in English. The Dutch political scientist Gijsbert Kuypers addressed the foundations for this method as a tool for policy development (Kuypers, 1980, p. 67). However, considering a more contextualised approach, Henk Van de Graaf and Rob Hoppe (1992, see in Vanhaeght, 2019) criticise this method for ignoring the broader policy context, and subsequently, they revised the method and renamed it as ‘goal-means interpretation’.

The central idea of this method is to identify the final relationships between goals and objectives and means; which are always directed toward desired policy outcomes (Kuypers, 1980; Van de Graaf & Hoppe, 1992). This method gives a detailed methodological approach to assess whether the policymakers have a comprehensive policy plan to reach their intended policy goals. It gives an explicit critique of the significant policy features while exposing ignored aspects within the policy framework. It also elucidates the internal rationality and logic within policy documents. Nevertheless, some of the main limitations of this method is paying more attention to policy content, ignoring the normative ideas, legitimacy and nature of policy problems (Vanhaeght, 2019). In addition, all intended goal-means relations in the policy text can never be entirely analysed (Vanhaeght & Donders, 2017).

Following the Van de Graaf and Hoppe's (p. 428) contextualized approach of goal-means interpretation, Vanhaeght (2019) describes the seven steps for construction of a goal-means tree. Accordingly, this study follows a systematic procedure; first, to read the entire policy text to understand the context and identify the relevant texts based on the three criteria (ICT access, use and skills) of digital inclusion analytical framework. Then, to determine which provision of text can be recognised as a means, objective or goal. Afterwards, some of these fragmented goal-means are incorporated with directional arrows using some terms (such as 'in order to', 'with the purpose of', 'with tools such as', 'through', 'by', 'to deliver', 'to ensure' etc.) and citations from the policy texts along with the page numbers are provided within the bracket. The arrows point from means to goal specifying the goal-means oriented relationships towards the desired outcome in policy. It allows readers to visualize how each means is associated with respective goals or objectives. This method is appropriate to analyse the rationality of policy and

examine to what extent the reasoning or argumentation behind the policy is rational and practical.

Results

The National ICT Policy (NIP) strategy is structured in a hierarchical pyramid. It includes a single vision at the top as the ultimate goal while other interlinked parameters (10 objectives, fifty-four strategic themes, and 235 action items) are placed in the subsequent layers. The vision and objectives are aligned with the general national goals, and each objective has several strategic themes⁶ (STs) and actions items⁷ (AIs) (MoPTIT, 2015). There are ten related objectives to achieve policy vision, such as social equity, integrity, universal access, education and research, employment generation strengthening exports, supports to ICTs, healthcare, environment, climate & disaster management, and productivity (MoPTIT, 2015, pp. 7-8). These objectives are covered by a number of STs that presents several AIs in order to accomplish in different terms, such as short-term (2016), mid-term (2018) and long-term (2021). Regarding data analysis, it is important to clarify that the policy objectives are associated with a number of goals. In other words, each objective has several STs that can be seen as sub-goals while each STs has several AIs, which are considered as means to achieve intended objectives and STs of ICT policy.

⁶ Strategic theme is defined in the policy as ‘a broad recommendation to guide the development and implementation of specific action items’ (National ICT Policy, (MoPTIT 2015, p.7)

⁷ Action item is defined in the policy as ‘a particular implementation task under a strategic theme with clearly specified outcomes, time limits and actors’ ((MoPTIT, 2015, p.7)

ICT Access

The NIP defines access to ‘ensure quality telecommunication technology and internet connectivity to all as a public service obligation’ (MoPTIT, 2015, p. 7). ICT access is proposed in one of the policy objectives as ‘universal accesses’. This objective is outlined along with multiple STs and AIs. The STs for universal access reflects the government’s goal of reaching all citizens of the country through extending ICT infrastructure. It offers the Internet Protocol (IP-based) telecommunication systems to ensure wide access with a reasonable cost. To ensure ICT access, some solutions are addressed, including submarine and broadband connectivity. In addition, another objective, social equity seeks greater participation from users, and access for all including people with special needs (MoPTIT, 2015). There are some STs that are placed to achieve this objective that explicitly focus on inclusion of marginalised people through ICT initiatives. Primarily, it aims ‘to bridge the digital divide and minimize economic disparity for lower income groups, ethnic minorities and persons with disabilities and special needs’ (MoPTIT, 2015, p8).

Figure 3: fragmented goal-means tree of ICT access

To ensure ICT access, several means are presented across policy text, such as providing access to critical services and information through affordable and reliable rural connectivity via mobile phone. Regarding digital resources and platform to ICT access, the initiation of citizens’ helpdesk in government institutions, development of software, voice content for disabilities and

setting up community e-centres are also proposed. Moreover, several conceptual claims are mentioned, such as bridging the digital divide, citizens' participation, access to critical service, access to critical information, critical government offices, social safety net programme and rural connectivity. However, these claims are presented in a scattered way without outlining how ICT access can be confirmed through these.

ICT Use and Engagement

Although there is no specific objective addresses ICT use and engagement, different types of ICT practices and resources are identified in different policy themes and actions under policy objectives. ICT practices mainly aim to increase economic growth, health service, and to tackle the environmental crisis. The policy objectives have significantly focused on ICT engagement within agricultural and environmental issues. For example, an objective outlines ICT usage to facilitate economic growth, including agriculture and small, medium, and micro enterprises (SME) (MoPTIT, 2015, p. 8). Several means are suggested including community network development, dissemination of agricultural knowledge, as well as innovations through community radio, telecentre and web-based networks. Similarly, health care is one of the crucial applications that has been presented in the policy to ensure quality health care to all citizens (MoPTIT, 2015, p 8). It offers the development of a national health database system, telemedicine and audio-visual resources as a means to achieve the goal.

Figure 4: fragmented goal-means tree of ICT use and engagement

Another policy objective ('Integrity') promises ICT use to ensure transparency, efficiency and services delivery to all citizens. In addition to setting up a national data resources centre, the promotion of public-private partnerships (PPP), web based and technical mechanism (such as video conferencing, IP telephony, LAN) are also proposed (see figure 4).

ICT Skills

The policy has no specific objective to describe ICT skills. One policy objective may relate to digital skills and literacy. The objective states that in order to 'ensure computer literacy at all levels of education...adoption of ICTs [will be needed] through appropriate research and development' (MoPTIT, 2015, p. 7). It offers some approaches, including ICT skills assessment, adoption of ICT education and professional skills, establishing ICT centre, ICT literacy, and courses in primary and secondary education. Moreover, the government has proposed to assess ICT skills during public service entrance exams, creating an imperative for employees in public job to learn basic ICT literacy. Similarly, policy proposes industrial collaborations with universities for ICT research and development of 'market-oriented' ICT skills. However, it does not ensure effective ICT education for all. These multiple strategies are primarily related to ICT infrastructural development having no specific link to digital skills and literacy improvement.

Figure 5: fragmented goal-means tree of ICT skill

Overall, the findings show that ICT policy mechanism lacks a sound understanding of the interconnected nature of goals-means and their relationship in different levels of the policy process. The major problems related to policy texts are lack of precision, overlapping policy means (such as infrastructural development) and the narrow focus of inclusion (such as access) that made the goals related to digital inclusion inconsistent.

Discussion and conclusion

This study argues that NIP is framed without contextualising socio-economic challenges as mentioned above as well as the local aspects of technical, cultural and human resources. The NIP delivers a general aspiration to ensure access to ICT for all but have no clear reference to poor or socioeconomically disadvantaged groups. First, in relation to ICT access, policy exceedingly focuses on infrastructural development across the country. It aims to make rapid expansion of ICT networks and services accessible to all citizens including socially marginalised groups and communities. Policy suggests several actions to ensure ICT access, such as increasing Internet connectivity and setting up computer laboratories. However, it provides insufficient detail on how this policy will be realised with proposed connectivity and digital resources. Moreover, it frequently focuses on ‘affordable accessibility’ without stating any action plans towards project implementation and network setup in rural areas, which may lead to a mismatch between the policy claims and the realities. Similarly, policy contains vague rhetoric about creating community e-centres for ICT access in rural areas. It is critical to articulate how rural communities will overcome socio economic challenges to utilize these resources.

Secondly, the nature of ICT uses, and engagement offered in the NIP may not reach and involve common people, as the policy and strategy formulation remain itself more confined within the techno-centric approach. ICT scopes and nature of digital engagement reflect on government's authorities and administrative aspects while the citizens' interests and scope of people's ICT engagement remain utterly ignored. Moreover, the policy gives a negligible idea of digital scope. The ICT for citizen involvement in social, cultural, political, and civic participation are explicitly missing in the entire policy text. Therefore, a more comprehensive and user-centred approach (Helsper, 2008) needs to be included within ICT policy strategies.

Thirdly, policy reflects on a market-oriented trend of ICT skills development, which may not have a direct impact on the lives of ordinary and poor people. The inconsistencies are also visible in the ICT policy documents. For example, ICT skills and literacy are addressed with many concepts, like 'applied computer' and 'lifelong learning' which need a proper explanation. In Bangladesh, those who are proficient in English language have more likely to get access to a broader spectrum of ICT content than those who solely know Bangla. Consequently, such linguistic divide turns to the digital divide, especially in a remote area. Although the government has incorporated ICTs into the formal education system, the quality of education varies considerably across the regions due to the centralised administrative system and poor infrastructures. Moreover, lack of social security and resources in remote areas create gender disparity, and thus less access to quality education and study facilities. In this context, the existence of ICT (skills) programs beyond formal education is crucial in reaching out to diverse groups, and those living in remote parts of the country to ensure digital inclusion and participation.

What are the policy challenges?

This analysis argues that ICT policy strategies are formulated without having any specific definition of core concepts to map out the scope and extent of ICT policy. While the definition of basic concepts like ICT is missing, other key issues in ICT and development discourse, such as ‘digital divide’, ‘e-governance’ and ‘inclusion’ are addressed in multiple policy themes. Furthermore, following each policy objectives, STs and AIs are presented in a way that do not give a comprehensive picture for a better understanding of policy goals. Similarly, the policy integrates many topics related to social and economic development in a scattered way. The ambiguity of policy can be related to the language or specific jargon and terms, such as digital divide which are used without appropriate context and explanation. Several means are mentioned with no proper description, like the idea of ‘creating a knowledge-based platform’. The policy has little to set criteria to mention which types of knowledge can be shared through which platform. At the same time, there are many stakeholders, who are involved as primary actors from both public and private sector without any proper clarification of the specific tasks that would be carried out at different levels.

In the context of ICT policy discourse, the government viewed ICT practices as the key catalyst for social change and economic development. This discourse has been incorporated into current ICT policies, which are related to neoliberal and market-driven ideologies (Stevenson, 2009). Such policy trend reflects on Avgerou’s (2010) first discourse of techno-economic approach on development perception of ICT policy process. Avgerou claims that the idea of setting up digital technologies and internet connectivity appeared as a solution for developing countries. Such computer centre or ICT-based learning in policy settings has little impact on digital inclusion. Byrne and Weilbach (2008) argue that this approach is one of the key barriers

to the implementation of ICT projects in developing countries. Besides, the contextual gap between goals, policy design, and outcomes from policy execution is the common limitation of digital policies in developing countries (Palvia et al., 2015). Referring to the previous studies (e.g. Haenssger, 2017; Hanafizadeh, Khosravi, & Badie, 2019), the widespread inactivity and closure of ICT centres show that new technologies not equally benefit everyone. In most cases, it does not change the landscape for creating equal opportunity. In the context of Bangladesh, Ullah (2017) claims that the ICT projects have failed to target the specifically disadvantaged citizen groups, as most of the rural poor did not have access and use the facilities.

Digital inclusion is about social inclusion. The connection between digital and social inclusion was revealed mainly through government programs and policies, and it has gradually shaped through societal contexts and learning environments (Dezuanni, Marshall, Cross, Burgess, & Mitchell, 2019). The Australian Digital Inclusion Index (ADII) asserts, ‘digital inclusion is not just about computers, the internet or even technology. It is about using technology as a channel to improve skills, to enhance the quality of life, to drive education and to promote economic well-being across all elements of society’ (ADII, 2019). Furthermore, inclusion can be defined as freedom to contribute in the social, political, and economic activities in daily lives with the virtue of choices or capabilities available (Sen, 1999) and allowing one to have control over one’s destiny (Warschauer, 2004). Sen’s argument for digital inclusion is to foster ‘the ability to access, adapt, and create new knowledge using new information and communication technology’ (p.9). Similarly, Serrano-Santoyo and Rojas-Mendizabal (2017) suggest that non-technology-centric programs are crucial to achieving sustainable digital inclusion projects, mainly in remote and underserved populations. Thus, the ICT initiatives need

to be socially embedded in order to ensure access and utilisation to digital technologies, which lead to Avgerou's *disruptive transformation*.

In conclusion, this article draws the following points from policy analysis. First, the policy is mainly structured with the narrow digitization frame of reference (access manners). Such techno-centric ICT mechanisms of policy process does not address the comprehensive issues associated with social inclusion, such as inequalities, gender disparity and citizen rights. Next, ICT use and nature of ICT engagement hardly focus on social involvement. The NIP and policy strategy formulations are limited to access rather than reaching out at the local context. Finally, the proposition on ICT skills and literacy are largely ignored. Therefore, the NIP strategies need to rethink in order to ensure digital inclusion in the context of the societal challenges of Bangladesh. Policy also needs to be consistent and relevant to a person's daily life, giving the user a sense of empowerment and skill.

Acknowledging the methodological limitations, the analysis of ICT policy could be incorporated with other government policies, such as health, education in a comparative manner. In addition, it is required to adopt a mixed method approach in an ICT policy context. For example, an empirical study with 'participatory action research for policy analysis approach' (PAR4P, see Donders & Van Audenhove, 2019) combined with experts' interviews, focus groups or stakeholders' consultation would be better comprehended. Similarly, Avgerou's contextualized method would be a useful analytical tool for micro, meso and macro level factors involving different actors and institutions that influence the digital inclusion. However, Avgerou claims, 'research that spans micro-macro analytical domains in the social sciences is notoriously difficult' (2010, p.12). Further study on ICT policy will forward a theoretical framework with a combination of political economy and the sociology of ICT-driven economic models. This study

will contribute to the government's potential initiative of policy reform (New Age, 2018) in future in order to incorporate the idea of digital inclusion. It will offer a significant starting point and new aspect in both ICT policy mechanism and future academic research of Bangladesh.

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Reference:

- A2I. (2009). *Digital Bangladesh concept note*. Prime Minister's Office, Dhaka: Government of Bangladesh and United Nations Development Programme
- Adams, B. (2019). Despite Denials, Bangladesh Stifles Free Expression. Retrieved from Human Rights Watch <https://www.hrw.org/news/2019/04/22/despite-denials-bangladesh-stifles-free-expression>
- ADB. (2018, 29 June 2018). Bangladesh and ADB. Retrieved from <https://www.adb.org/countries/bangladesh/main>
- ADII. (2019). Digital Inclusion in Australia *Australian Digital Inclusion Index* Retrieved from <https://digitalinclusionindex.org.au/about/about-digital-inclusion/>
- Ala-Mutka, K. (2011). Mapping digital competence: Towards a conceptual understanding. *Sevilla: Institute for Prospective Technological Studies*.
- Alam, M. (2014). Efficiency and Effectiveness of Union Information Service Center: A Study on Sylhet Sadar Upazila.
- Asadullah, M. N., & Chakravorty, N. T. (2019). Growth, governance and corruption in Bangladesh: a re-assessment. *Third World Quarterly*, 1-23.
- Avgerou, C. (2010). Discourses on ICT and development. *Information Technologies & International Development*, 6(3), pp. 1-18.
- Aziz, A., & Azhar, S. (2019). Social Exclusion and Official Recognition for Hijra in Bangladesh. *Journal of Research on Women and Gender*, 9, 3-19.
- UNB. (2020). NEC clears Perspective Plan to implement Vision 2041. Retrieved from <https://unb.com.bd/category/Bangladesh/nec-clears-perspective-plan-to-implement-vision-2041/45298>
- BBS. (2017). *Bangladesh Bureau of Statistics Report 2017*. Retrieved from <http://www.bbs.gov.bd/>
- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining twenty-first century skills. In *Assessment and teaching of 21st century skills* (pp. 17-66): Springer.
- Bradbrook, G., & Fisher, J. (2004). Digital Equality: Reviewing digital inclusion activity and mapping the way forwards. *Citizens online*.
- Byrne, E., & Weilbach, L. (2008). *A human environmentalist approach to diffusion in ICT policies*. Paper presented at the IFIP International Conference on Human Choice and Computers.
- Choi, H., Park, M. J., Rho, J. J., & Zo, H. (2016). Rethinking the assessment of e-government implementation in developing countries from the perspective of the design–reality gap: Applications in the Indonesian e-procurement system. *Telecommunications Policy*, 40(7), 644-660.
- Commission, P. (2012). *Perspective Plan of Bangladesh 2010-2021: Making Vision 2021 A Reality*. Retrieved from
- Dabla, A. (2004). The role of information technology policies in promoting social and economic development: The case of the State of Andhra Pradesh, India. *The Electronic Journal of Information Systems in Developing Countries*, 19(1), 1-21.
- Dada, D. (2006). The failure of e-government in developing countries: a literature review. *The Electronic Journal of Information Systems in Developing Countries*, 26(1), 1-10.

- Dezuanni, M., Foth, M., Mallan, K., & Hughes, H. (2018). *Digital participation through social living labs: valuing local knowledge, enhancing engagement*: Chandos Publishing.
- Dezuanni, M., Marshall, A., Cross, A., Burgess, J., & Mitchell, P. (2019). *Digital mentoring in Australian communities: A report prepared for Australia Post*. Retrieved from https://auspost.com.au/content/dam/auspost_corp/media/documents/digital-mentoring-in-australian-communities.pdf
- Dijk, J. A. G. M. v. (2006). Digital divide research, achievements and shortcomings. *Poetics*, 34(4-5), 221-235. doi:10.1016/j.poetic.2006.05.004
- Dijk, J. A. V. (2005). *The deepening divide: Inequality in the information society*: Sage Publications.
- Donders, K., & Van Audenhove, L. (2019). Digitization and media policy research. In *The Palgrave Handbook of Methods for Media Policy Research* (pp. 51-67): Springer.
- Duncan-Howell, J. A., & Lee, K.-T. (2008). Policy catch up: developing nations and developing ICT policy documents.
- EC. (2018). *The Digital Economy and Society Index (DESI)*. European Commission Retrieved from <https://ec.europa.eu/digital-single-market/en/desi>
- Epstein, D., Nisbet, E. C., & Gillespie, T. (2011). Who's Responsible for the Digital Divide? Public Perceptions and Policy Implications. *The Information Society*, 27(2), 92-104. doi:10.1080/01972243.2011.548695
- Erstad, O. (2006). A new direction? *Education and Information Technologies*, 11(3-4), 415-429.
- Erstad, O., & Gillen, J. (2019). Theorizing Digital Literacy Practices in Early Childhood. *The Routledge Handbook of Digital Literacies in Early Childhood*, 31.
- GSMA. (2018). *Country overview: Bangladesh*. Retrieved from <https://www.gsmainelligence.com/research/2018/04/country-overview-bangladesh/664/>
- Haenssger, M. (2017). The struggle for digital inclusion: Phones, healthcare, and marginalisation in rural India. *World Development*, 104, 358-374.
- Hanafizadeh, P., Khosravi, B., & Badie, K. (2019). Global discourse on ICT and the shaping of ICT policy in developing countries. *Telecommunications Policy*, 43(4), 324-338.
- Hargittai, E. (2002). Second-Level Digital Divide: Differences in People's Online Skills. *First Monday*, 7(4).
- Hasan, M. (2012). *Social Equity and Integrity through ICT: A Critical Discourse Analysis of ICT Policies in Bangladesh*. (Master's Thesis), Uppsala University, Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-169139>
- Heeks, R. (2010). Do information and communication technologies (ICTs) contribute to development? *Journal of International Development*, 22(5), 625-640.
- Helsper, E. (2008). *Digital inclusion: an analysis of social disadvantage and the information society* (1409806146). Retrieved from <http://eprints.lse.ac.uk/26938/>
- Hilbert, M. (2011). The end justifies the definition: The manifold outlooks on the digital divide and their practical usefulness for policy-making. *Telecommunications Policy*, 35(8), 715-736. doi:10.1016/j.telpol.2011.06.012
- Hussain, F., & Brown, S. (2018). Developing a comparative framework of ICT4D initiatives in the global South: A critical realist approach. *The Electronic Journal of Information Systems in Developing Countries*, 84(6), e12055.
- Islam, M. N., & Islam, M. S. (2018). Islam, Politics and Secularism in Bangladesh: Contesting the Dominant Narratives. *Social Sciences*, 7(3), 37.

- Islam, M. S., & Grönlund, Å. (2011). *Digital Bangladesh – A Change We Can Believe in?*, Berlin, Heidelberg.
- ITU. (2017). *ITU ICT Facts and Figures 2017*. Retrieved from <https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf>
- ITU. (2018). *Measuring the Information Society Report*. Retrieved from <https://www.itu.int/pub/D-IND-ICTOI>
- James, J. (2005). The global digital divide in the Internet: developed countries constructs and Third World realities. *Journal of Information Science*, 31(2), 114-123.
- Khan, A. A. (2015). *Discovery of Bangladesh: Exploration into dynamics of a hidden nation*. Dhaka: UPL.
- Kim, H., Shin, D.-H., & Lee, D. (2015). A socio-technical analysis of software policy in Korea: Towards a central role for building ICT ecosystems. *Telecommunications Policy*, 39(11), 944-956.
- Kuypers, G. (1980). *Beginnelsen van beleidsontwikkeling*: Coutinho.
- Lankshear, C., & Knobel, M. (2011). *New literacies*: McGraw-Hill Education (UK).
- MoPTIT. (2015). *National ICT Policy (NIP)*. ICT Division, Ministry of Posts, Telecommunications and Information Technology (MoPTIT), Dhaka, Government of the People's Republic of Bangladesh
- New Age (2018, Jun 11). *National ICT Policy 2018 on the cards*. Retrieved from <http://www.newagebd.net/article/43428/national-ict-policy-2018-on-the-cards>
- Notley, T., & Foth, M. (2008). Extending Australia's digital divide policy: an examination of the value of social inclusion and social capital policy frameworks. *Australian Social Policy*, 7, 87-110.
- Palvia, P., Baqir, N., & Nemati, H. (2015). ICT Policies in Developing Countries: An Evaluation with the Extended Design-Actuality Gaps Framework. *The Electronic Journal of Information Systems in Developing Countries*, 71(1), 1-34.
- Selwyn, N. (2004). Reconsidering Political and Popular Understandings of the Digital Divide. *New Media & Society*, 6(3), 341-362. doi:10.1177/1461444804042519
- Sen, A. (1999). The possibility of social choice. *American Economic Review*, 89(3), 349-378.
- Serrano-Santoyo, A., & Rojas-Mendizabal, V. (2017). *Exploring a Complexity Framework for Digital Inclusion Interventions*. Paper presented at the Procedia Computer Science.
- Stevenson, S. (2009). Digital divide: A discursive move away from the real inequities. *The Information Society*, 25(1), 1-22.
- Thomas, J., Barraket, J., Ewing, S., Wilson, C., Rennie, E., & Tucker, J. (2018). *Measuring Australia's digital divide: the Australian digital inclusion index 2018*. Retrieved from <https://digitalinclusionindex.org.au/about/australian-digital-inclusion-index-report/>
- Trappel, J. (Ed.) (2019). *Digital Media Inequalities: Policies against divides, distrust and discrimination*. Sweden: Nordicom, University of Gothenburg.
- Ullah, M. S. (2016). Empowering rural communities through telecentre connectivity: experience of the Union Information and Service Centres in Bangladesh. *Media Asia*, 43(2), 112-125.
- Ullah, M. S. (2017). Empowerment of the Rural Poor through Access to ICT: A Case Study of the Union Information and Service Centre Initiative in Bangladesh. *Journal of Creative Communications*, 12(2), 81-97. doi:10.1177/0973258617708366

- UNB. (2020). NEC clears Perspective Plan to implement Vision 2041. Retrieved from <https://unb.com.bd/category/Bangladesh/nec-clears-perspective-plan-to-implement-vision-2041/45298>
- UNCTAD. (2014). A Framework for Information and Communications Technology Policy Reviews: Helping Countries Leverage ICT for Development. Retrieved from <https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=880>
- UNCTAD. (2018). ICT Policy Review Programme. *The Information Economy Report 2008*. Retrieved from https://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Policies.aspx
- Van de Graaf, H., & Hoppe, R. (1992). *Een inleiding tot de beleidswetenschap en de beleidskunde*. Bussum: Coutinho: Bussum: Coutinho.
- Van Dijk, J., & Hacker, K. (2003). The digital divide as a complex and dynamic phenomenon. *The Information Society*, 19(4), 315-326.
- Vanhaeght, A.-S. (2019). Assessing Policy IV: Goal-Means Tree Analysis. In *The Palgrave Handbook of Methods for Media Policy Research* (pp. 595-608): Springer.
- Vanhaeght, A.-S., & Donders, K. (2017). Interaction, Co-creation and Participation in PSM Literature, Policy and Strategy: A Comparative Case Study Analysis of Flanders, the Netherlands, France and the UK. *Medijske studije*, 6(12).
- Vehovar, V., Sicherl, P., Hüsing, T., & Dolnicar, V. (2006). Methodological challenges of digital divide measurements. *The Information Society*, 22(5), 279-290.
- Warschauer, M. (2004). *Technology and social inclusion: Rethinking the digital divide*: MIT press.
- Williams, S. K. (2018). *Troubled lives: vulnerability, livelihoods and capabilities of homeless women living in a train station in Dhaka, Bangladesh*. (Doctoral dissertation), University of Adelaide, Retrieved from <http://hdl.handle.net/2440/113382>
- World Bank (2016). *'Digital Dividends' World Development Report 2016*. Washington, DC: World Bank.
- World Bank (2019). The World Bank In Bangladesh: Overview. Retrieved from <https://www.worldbank.org/en/country/bangladesh/overview>
- World Bank (2018, 26 June 2018). Bangladesh Disaster Risk and Climate Change Program. Retrieved from <http://www.worldbank.org/en/country/bangladesh/brief/bangladesh-disaster-risk-climate-change-program>
- Yu, B., Ndumu, A., Mon, L. M., & Fan, Z. (2018). E-inclusion or digital divide: an integrated model of digital inequality. *Journal of Documentation*. doi:10.1108/jd-10-2017-0148
- Zaman, A. (2019). How the digital economy is shaping a new Bangladesh. Retrieved from <https://www.weforum.org/agenda/2019/06/how-the-digital-economy-is-shaping-a-new-bangladesh/>
- Zheng, Y., Hatakka, M., Sahay, S., & Andersson, A. (2018). Conceptualizing development in information and communication technology for development (ICT4D). In: Taylor & Francis.