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Exploring the Role of Union Digital Center to Managing Information Services in Rural Development of Bangladesh

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ABSTRACT

The information services are multidimensional and socially acts as the building block of communication among diverse groups in rural society. Rural development mostly relies on the effective use of information services in the day-to-day activities of rural people and rural administrations. In rural areas of Bangladesh, Union Digital Centre comprised of every prospect of delivering the advantages of new communication technologies towards the agricultural community who lagged behind the access to technology in their workplace, household social living, or at the institution. Prior studies revealed that the rural people of Bangladesh mostly suffer because of low productivity; the deterioration of social and economic conditions originated from the unavailability of adequate information. This article attempted to explore an overview of the roles of Union Digital Centre among various socio-politico-economic components in developing rural areas of Bangladesh. A convenience sampling technique was used to collect data through a structured questionnaire and a total of 100 respondents were selected from three old rural regions of Bangladesh. Besides, case study, focus group discussion, informal interviews, and content analyses were made. At the end, this paper discusses some findings on the importance of free access to technology for rural society, challenges, and recommendations that may guide policymakers and stakeholders.

Keywords: Rural Development, Information Services, Digital Bangladesh, Union Digital Center (UDC), Access to Information (a2i) Project.

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1. INTRODUCTION

Now a day's, information acts as prime components of development for both urban and rural communities. The ability of nations to attain produces, access, and use pertinent information leads towards prosperity, progress, and construction (Nahar, 2016). Researches have advocated that access to information technology is also a complicated matter to disseminating beneficiary people to know their rights to obtain benefits and identify the sources of backing to stunning social elimination (Harande, 2009). More emphasis on rural development, Okiy (2003) opined it as a strong basis for economic progress and where information is considered a significant element in the development process. Likewise, people in a rural area, either literate or else, should have smooth entrance to every kind of information service that may enable them to be capable and reasonably productive to render socio-Econo-politico obligations and an informed citizen of the nation. A previous study on the same Diso (1994) advocated that information plays a crucial role in making and implementing a policy that leads towards national development. That development would be more effective if the robust structures are established for utilization and access, capturing, coordination of information, processing and delivering, relay, and communicating to ensure governance (Rahman, 2016). Every government intends to provide a strong focus on rural development in developing countries due to the lack of national development due to the negligence of rural development. As a result of improper attention to the agricultural development many types of social problem such as rate of unemployment, anti-social activities, lack of security, prostitution, kidnapping, money laundering, child and forced labor, bribery, scanty of right living areas, the influx of diseases, (Harande, 2009). So, the aggregate development of the nation can only be active if rural society people have access to digital information. Effective information services in the rural community lead toward development. To keep pace with the right direction of growing the scope of the information services is a must that may outweigh the cost at the initial stage. Thus, the role of government and non-government stakeholders is a strong steer to give importance to the matter in the context of Bangladesh. Positively the government has taken massive efforts in this field through technology and process innovation activities with the assistance of digitalization in Bangladesh.

Bangladesh has an area of 147570 square km and filled with 163.7 million people (Ministry of Finance, 2019). And, about 80% of the total population are live in villages. India borders most of the regions. The majority of the total population lives in rural areas. The country is known as the least developed country and low-income group nations of the world. People have been running to meet basic needs such as food, clothing, shelter, health, education, and to increase living patterns. Population growth, natural disasters, unemployment, malnutrition,

illiteracy, polluted environment, etc. are problems that affect the country's socio-economic situation. Information is an essential basic need in addition to all other basic needs. But in reality, the people of rural areas are far from being a part of modern information technology that made them distant from acquiring their informational needs. To develop people's capability to participate in an evolving knowledge-based society, the rural library or Union Digital Centre (UDC) may be a reliable way of providing agricultural information services. It is one of the most effective means of disseminating information services to the people of the rural community and promotes rural economy wheel. UDC's prime objective is to accelerate, facilitate, and provide essential information to the people of an agrarian society. UDC may serve as a hub of information, points of community to advance the living conditions, and the quality of life. Despite having manifold complexities in the states of the rural dwellers' societal living, the question may arise in what ways the information service contributes to the development of the rural communities in Bangladesh, and so then how? This paper's central argument is to examine the current environment of information services and attempts to answer of the question. Besides, the research is attempts to measure the role of UDC in the socio-economic development of rural areas' of Bangladesh's state.

2. OBJECTIVES OF THE STUDY

The research has designed to attain following objectives:

- To identify the extent of information services provided by UDC to the rural people.
- To measure the users' satisfaction with UDC services.
- To determine the possible ways and means that UDC can play as a partner of changing rural life and development.

3. LITERATURE REVIEW

UDC is a government initiative to promote technology exploration across the country. Empirical researches literature in this specific field has not evident exclusively other than a few limited areas; thus, the scope of literature covers some developing countries of South Asia regions. For example, the e-governance system made a remarkable pathway of changing the mass digitalization system in the urban and rural areas of Bangladesh through government schemes (Hoque & Sorwar, 2015). Similarly, Habib et al. (2013) claimed that technology in rural areas of Bangladesh has got some satisfactory changes but still suffering a lot of limitations to be addressed immediately. Whereas due to the unavailability of information and communication technology (ICT) is created the digital divide to provide proper facilities (Lim, 2017), merely appearing the tasks for the arrangement of ICT offices, isn't sufficient to limit the significant digital division,

principally pastoral territories in developing nations.

For this reason,(Hoq, 2014; Kumar & Kim, 2017), argued that developing nations should underscore the uses and exploration of ICT for rural development as a part of their contemporary sustainable development priority. A similar study of Chowdhury, S. (2018) contended that the rural administration is the lowest segment of the service to the villagers, which is still providing available services, make accessibility of information and added values but still lagged behind priority and concentration. In the latest study of Faroqi et al. (2019) examined the factors affecting the sustainability of UDC (telecenters) and revealed that engagement of private entrepreneurs' commitment is the most critical factor backed by the elements of governmental patronage for sustainable operations. But Hoque, R. (2020) claimed that prior knowledge and financial inability is critical hindrances of UDC success in rural areas. Previous research came with an argument in favor and progress of ICT based library system in rural areas compared to radical exploration in urban areas. In this connection, Islam & Uddin (2005) have demonstrated the data and administration arrangement of Dhaka, Comilla, and Bogra areas in Bangladesh. And, the authors have opinioned the circumstance of the country's rural improvement libraries because of the unrest and progression of information communication technology in their study. The study further recommended that the tools and methods utilized in various useful units of these libraries to satisfy the interest of the developing information needs of the rural individuals of Bangladesh. Essentially, connecting citizens, acquiring workforce, and GoB's 'Digital Bangladesh initiates digitizing governmental functions.' UDCs are improving the procedure by which public administrations are given by changing to digital or electronic services toachieve these objectives. Notwithstanding e-administrations, economic opportunities are differentiated, and scopes for new employment have been expanded (a2i, 2013; GoB, 2009).

The nations of South Asian territory have also advocated a good number of insights. At Pondicherry, India (2002-2005), a study on Village Information center found that India explored approaches to utilize ICT for the advancement of the more derelict district. The primary beneficiaries of this project are low-pay families, minor farmers, and fishermen. Additionally, this information center focus could ready to make the general government assistance of these individuals of India. In India ,the e-government projects provided most of the information services to the public mass that removes the barriers (Bhatnagar., 2004). In another study of Centre for Electronic Governance (CEG) and Indian Institute of Management, Ahmedabad (IIMA) (2004) on *Gyandoot* has advocated some remarkable advantages may be ascertained such as lessening hassle, saved time, the priority of getting supports, quickest access, removed the incidents of corruption by government officials and so on. Later on, Drljaca and Latinovic (2012) revealed a study on e-Governance at the UP level and advocated it as a

base for an effective combination of knowledge-based economy and furtherance of citizens' lives in rural areas. So, the benefits of e-Governance at the UP level may not only control but also eradicate corruption and build a transparent UP management system. "Rural transformation by the establishment of community information centers in the rural areas of Nepal: a pilot project (Aryal, 2007) is another study. The primary objective of this project, to raise awareness of rural community people, how Information and Communication innovation can make their better life. The project has indicated how the advantages of data and correspondence innovation can be reached even o the ranchers. The main point of this project is how Nepal can contend with the present world regarding Information and Communication innovation. There is another study titled multipurpose community Telecenters for rural improvement in Pakistan (Mahmood, 2005). Here the has seemed about the difficulties and chances of building up Multipurpose Community Telecenters (MCTs) in rural regions of Pakistan. The author has additionally shown the proposition to create MCTs in Pakistan as far as strategy detailing, arranging, the board, financing, building, hardware, innovation, administrations, target gatherings, showcasing, and manageability. Heeks (2001) found that e-Governance carries advantages to developing nations by making administration increasingly feasible and dexterous. He examined contextual studies from four countries, for example, Chile, the Philippines, Honduras, and South Korea. The study plots e administration (improving government task), e-citizens and e-services (connecting citizens), and external community cooperations (e-society) as vital contributions. E-governance can play an essential part in poverty elimination, reduce corruption, and low-cost service delivery to the citizens (Bertot et al., 2010). Monga (2008) studied e-governance at the local, state, and national arena of government. The research further explored that e-governance has carried a significant transformation in the delivery of service quality, such as ensuring transparency, easy proceedings, time-saving methods, decreasing corruption, improving office, and record management.

Information services are the lifeblood of cross-communication in rural areas of Bangladesh. That is why the role of ICT in stimulating economic activity of Bangladesh also been revealed in a few studies, including the development project of the government. There are a few compositions and reports on the site of Access to Information Project (A2I) under the Prime Minister's office and Bangladesh Computer Council (BCC). These two associations manage to give and organizing the ICT offices all through the nation though the lowest and grassroots level of administrative setup. It is worth notable that the facility of information and service delivery structure in Bangladesh is centralized with branches of organizational units such as sub-district as called *Upazila* and the district. But the majority portion of service recipients located in the extreme and distant rural

territory. They require to travel to and from the places, visit public information offices in person to receiving general information services on collecting public records, benefits, and welfare, livelihood services called shelter medicine, education, health, and agriculture or prices of the commodity (Sarker, 2013; Faroqi and Siddiquee, 2011). Likewise, because of scanty information and communication technology (ICT) penetration in rural and remote areas, rural people are deprived of ICT led or internet-based services (U.N., 2014). Researchers found that for photocopying, computer composes, or printing, sometimes rural people have no way but the too-long way, such as offices of sub-district headquarters or nearby locations of semi-urban business places (Jabbar, 2009). In reality, many rural areas are not ware enough about the potentials of ICT, which may change their jacket of traditional life and thus is a must to educate on e-services (Sarker, 2013; Rowley, 2006).From a comprehensive perspective, extension ICTs can add to the improvement of rural in developing nations. In any case, for this, exact instruments should be outfitted to understand the maximum capacity by joining ICT projects with the more extensive improvement plans and ensuring that nobody is abandoned, including women and unprivileged individuals in the general public. The outcomes of the study recommend that few focused on ICT extends fundamentally developed the condition of women by giving them access to various socio-economic opportunities in Bangladesh (Ashraf et al., 2011).

The role of UDC has gradually recognized while the state efforts look forwards to facilitate the basic wants of rural communities. About 72 % of the population lives in the rural areas of Bangladesh (World Bank, 2012). The BBS report (BBS, 2014) stated that UDCs is consist of a one-stop information service delivery center owned by the government and privately run to serve the rural communities such as reducing long-distance, minimizing dependency on market mediators to collect information and services as its located to the Union Parishad (UP) UP is a very closest place to the rural community. It is blended scope to reduce time, cost, removing distance, mitigating barriers of intermediaries, improving the magnitude of unresponsiveness, and absence of transparency to deliver information or services (Sarker, 2013).Thus, the service delivery system at UP can be enhanced radically by the infusion of ICT based e-government services and optimize the cost (Iqbal and Seo, 2008; Ahmed, 2015; Bhuiyan, 2011).

Thus, regardless of various socio-segment imperatives, different rural information centers or digital centers are performing a significant role in bringing the advantages of ICTs to rural people in rural areas by giving valuable information and services including health, education, cultivating, and so forth and acting to bringing detached and significant zones under inclusion in just in Bangladesh yet also in numerous other developing nations (Akther and Georgsen, 2005). Concerning rural Bangladesh, Islam and Hoq (2010) revealed the effect of

internet-based assistance arrangement to the rural population where UDC contributed a considerable job. Since access to knowledge and information is a vital aspect for progressing agricultural society, it is held that ICTs can fundamentally bolster the improvement of rural areas by giving access to data and digital services. We need to connect with progressively developed areas inside a developing nation precisely and get opportunities in general (Heeks & Bhatnagar, 1999).

Based on the above literature review, it is evident that the UDC may play a prime role in developing the rural economy, accelerate the governance system, and optimize the cost of services and supports with many more benefits. Though thisconcept is comparatively new and in the development stage in Bangladesh as well as other developing neighboring countries in South Asia, so this study will be shed light in the context of Bangladesh.

4. RESEARCH GAP AND CONTRIBUTIONS

Information services are the lifeline of today's living. The advent of technology has leverage the expansion of information flows from capital to the remotest part of the country. The research in this field is continuously exploring and opening the avenue of scholarly knowledge in both academic and practical areas. Previous research has designed on qualitative analysis, factors affecting, causes of being unsuccessful UDC, demographic hindrances, urban vs. rural focus and concentrated into specific fields namely agriculture, e-library, e-governance, addressing the problems (Islam & Hoq, 2010; Faroqi et al., 2019; Hoque & Sorwar, 2015; Chowdhury, S. 2018; Hoq, 2014; Habib et al., 2013; Hoque, R.2020; Kumar & Kim, 2017). The current study mitigates the resulting significant gap. Firstly, the current research has come out with mixed methods of analysis to validate and strengthen the research findings. Secondly, the satisfaction of the users on the UDC service surveyed in this research is a new addition in the theoretical knowledge in the same fields. Thirdly, demographically the socio-economic condition is not the same in all areas in Bangladesh. The populations, as well as beneficiaries of old districts, are comparatively more significant than others. And, the findings of the current study are based on the old region that may be able to generalize a practical contextual preview. Fourthly, technological development is making a divide in the urban-rural areas. As reflected in previous studies, urban areas are quite equipped though the population is less. Conversely, the current research has exclusively addressed the impact of information services in rural development as a reliable driver of economic growth. Fifthly, the emergence of technology in the context of Bangladesh is a new area of research. Additionally, the contribution of the research has following specific implications:

- Considering the domain of the research the outcome will promote the understanding on the role of UDC among the countrywide beneficiaries. And, the challenges of UDC unleashed in the outcome will disseminate the knowledge, social awareness into mass level.
- The study will encourage the national policymakers to adopt appropriate policy or review existing policies on new HRM practices which will accelerate the services and support of UDC.
- It will helpful for the government or local government legislative body to facilitate the technology adoption in rural areas. This will in turn reduce the technological divide between urban and rural.
- The research may be able to broaden the knowledge of society leaders, the private practitioners and consultants, NGOs, rural economy researcher, academic discipline about the digital services.
- Finally, the outcome of the research will be an effort to leverage the state initiative of socio economic development of the country.

5. WORK FLOW OF INFORMATION SERVICES AND DEVELOPMENT

The information system and level of people's knowledge are critical elements of rural development. A society only enriched with information and learning if there is a regular transfer of information and communication among the stakeholders. A British professor, Richard Heeks, opined that information is a critical resource for any kind of development. Knowledge acts as the connector between individuals to control the resources and external-organizations to manage it. So, If there is no information system, there would be no linkage, and consequently, supplies could not be handled or maintained correctly. In turn, relationships with organizations and individuals paralyzed, which blocks the socio-economic development as a whole.

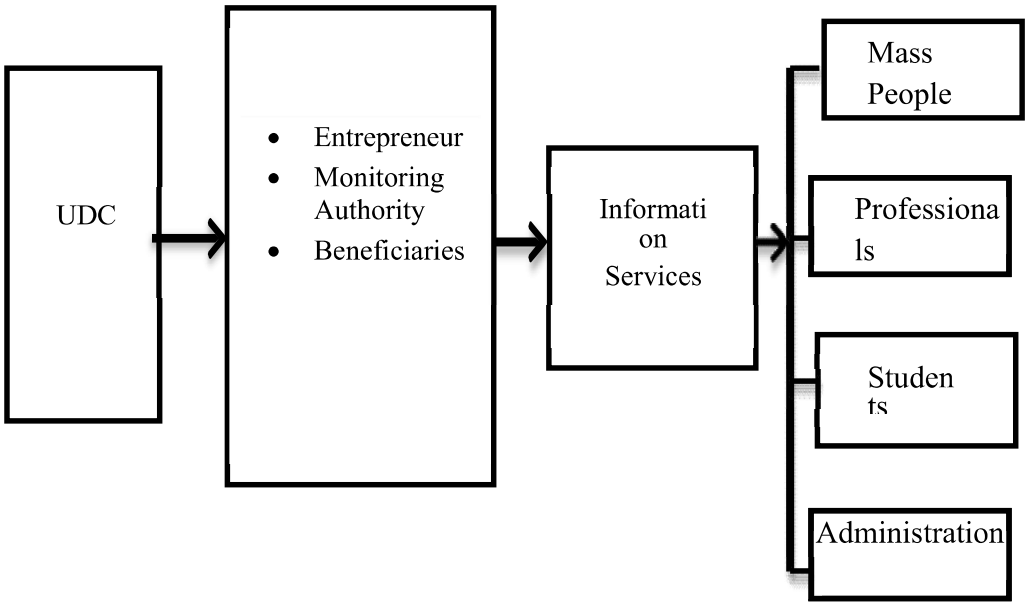

Figure 1: Workflow model of UDC developed by Authors

ICT can rigorously support the process of rural development through facilitating and providing rural communities to underscore local and regional development (Heeks and Bhatnagar, 1999).Bangladesh has been continuously trying to implement ICT projects in rural areas with the assistance of local and international aid agencies. The key priority of all projects should be to implement ICT in a rural area rather than understanding their impacts at the community level. In a study (James 2005;2004) revealed that the gap is increasing between people who have access and who doesn't.

6. RESEARCHMETHODOLOGY

The research is primarily based on a qualitative and quantitative approach. Qualitative data were analyzed using interpretative methods. The interpretive approach used in descriptive content analysis and social science research in an object to explore the issues and facts pertinent to questioning 'why' and 'how' (Orlikowski & Lacono 2001; Macome 2002). This research was intended to assess and apprehend the ICT implementation, prospects critically, and challenges as this is a national charter of the government of the people republic of Bangladesh. Following this lead, the current research has targeted agriculture-based rural areas and initially considered three Upazilas, including Burichang, Brahmanpara, and Debidwarj Upazillas, in the old division of Bangladesh. Table-1 shows the typical characteristics of three Upazilas.

Table 1: Contextual data on three Upazilas (Study sites)

Study sites (Upazila)	**Area**	**Population**	**Density**	**Major occupation**	**Literacy Rate**	**Geographical condition**
Burichang	163.76 km2	259,564	1,583/km2	Agriculture	55.3%	Traditional
Brahmanpara	128.9 km2	181,477	1408/km2	Agriculture	48.59%	Traditional
Dabidwar	238.36 km2	378,401	3239/km2	Agriculture	59.83%	Traditional
Source- ("Brahmanpara Upazila - Banglapedia," n.d.; "Burichang Upazila - Banglapedia," n.d.; "Debidwar Upazila - Banglapedia," n.d.)						

On site-observation, interviews with users, and informal conversations with focus groups using a self-administered structured questionnaire based on Likert five-point scales were executed for primary data collection such as 1=Strongly Disagree, 5=Strongly Agree, 3=Neutral. Primary data collected from a total of hundred (n=100) interviews that were carried out with users in the center, supported by an interview guide. The number of respondents is selected based on convenience sampling techniques. Compared to the number of total populations of the area there is no factual data on the real number of UDC users. Conveyance sampling is helpful to attain relevant data on time, collect information from the knowledgeable respondent, make the process easier that allowed the researcher to best bit with research objective (Sousa, 2004; Saumure & Lisa, 2008).And, it is suggested that the simplest case for large samples should be at least 30 (Gupta & Gupta, 2010; Saumure & Lisa, 2008). Based on the justification, the researcher has chosen non probabilistic convenience sampling and the sample size is 100. The UDC operator also helped to choose potential users of service to act as the respondent of the research. Prior research attested that the story sharing of participants is a recognized tool of capturing the changes information as it is interpreted by the participants in light of people's intelligence, relationships, continuity of events, cause and effect (Davies & Dart, 2005; Willetts, 2007). Following the prescription, this research conducted the story and case sharing; group interviews were made to collect data from the village users who regularly receive UDC services. Physical observations at the centers also took place to gather additional data, background knowledge. The six items of the questionnaire are extracted to determine users' satisfaction, from the literature studies of previous research (Hoque & Sorwar, 2015; Faroqi et al.,2019; Chowdhury, S. 2018; Rahman et al., 2019; Kumar & Kim, 2017).Secondary data has been

searched to clear the understanding and insights of the project of the government, official websites, and e-services. The period of data collection was from January 2018 to June 2018.Statistical Package for Social Science (SPSS) version 22.0 was used analyses descriptive statistics.

7. ABOUT UNION DIGITAL CENTRE (UDC) AND RURAL PEOPLE INBANGLADESH

Bangladesh's government has declared a vision of Digital Bangladesh by 2021 to ensure digital services at the doorsteps of ordinary people (Kashem, Akhtar, & Rahman, 2014).The total number of 4,554 UDC has been established at all Union Councils, to accomplish this vision. Most of the UDCs have been operative since November 2010. To bridge the gap between government services and mass population, to decentralize the delivery of public services and to take them to the doorsteps of millions of underserved citizens, the access to information (a2i) program under the office of the prime minister has launched with the technical support from UNDP and USAID. Under these projects, the UDC has established among all union councils of Bangladesh (a2i, 2014). The UDC was established as a joint venture under access to Information (a2i) project and the Local Government Division (LGD) with support and collaborations from the United Nations Development Program. The principal objective of UDC is to creating and promoting a knowledge-based society through facilitating local service delivery points. It will able to bring and cater to different government and commercial social services to the doorways of the urban community. Thus, UDC will be able to lessen the time, cost, suffering of services, hassle and will be able to ensure the involvement of a poor section of people, men, and women, to obtain, use information services to connect them to the information gateways (a2i, 2012). The UDC is an ICT driven one-stop service center operated the public-private partnership (PPP) model, where rural people can gather multiple types of information services through numerous service provider agencies. Mainly there are three parties (Entrepreneurs, Beneficiaries, Monitoring Authority) in the entire process. (Ahmed, 2015) There are prescribed fees for the delivery of the different levels of services, not including access to government, commercial, and local government types. To make the service more vibrant, ease, and economically friendly, the government has associated efforts with cellular phone companies, banks, insurance, and other non-governmental organizations (a2i, 2011a). It is quite optimistic that UDC is composed of two essential elements: e-government and m-government services(Faroqi, 2015). Accordingly, both former and latter one is capable of serving through information/services of various stages such as 'emerging presence' and 'enhanced presence,' 'interactive,' 'transactional' and 'integrated' levels (a2i, 2011a; U.N. 2012). The core components of UDC is ICT enabled one-stop service provided from union councils at union level. There are

about 123, 41 young entrepreneurs serving at 4,554 UDCs, and fifty percent are women. All the entrepreneurs are freelance or self-employed, not paid by the government. To the long term survival of UDCs,the aid from government agencies, privately-owned organizations have been mobilized through collaborative partnerships. In line with that partnership from private banks such as Dutch-Bangla, Mercantile, Trust, BRAC bank, One Bank facilitating online banking facilities and insurance agencies such as Jibonbima Corporation, mobile telecommunication companies such as Robi, Banglalink, non-govt. Organizations such as the British Council, Practical Action, Ankur ICT Development Foundation, troubleshooting support firms such as BCS, Cyber Cafe Association of Bangladesh, and many government agencies such as Bangladesh Computer Council, Cabinet Division are worth mentionable in this regards.

Providing rural information services, UISC plays a significant role. The core objective of UISC is to offer the necessary information to rural people. To reduce the difference between urban and rural, information Center offers information and commercial services at a low cost.

UDCs have three vital services to offer, and those are information services, government services, and commercial services. Government services include online birth registration, a supply of government forms, circulating government notices, public university admission process, and results, recruitment of government offices, data of population census, nationality certificate, citizen charter in the local government office,etc. Information services include manifold of information to the general mass in the areas of health, safety, agriculture, education, law & human rights, tourism, environment & disaster management, science & technology, industry & commerce, and employment delivered by national e-Tathyakosh (National e-Content Repository). Commercial services include mobile banking, insurance, photocopy, English language learning, computer training, internet browsing, email, printing, scanning, compose, laminating, data entry, photography, phone call, Flexiload, mobile ringtone download, video show, video conference, projector rent, passport & visa processing, height & weight measurement, blood pressure measurement, mobile ringtone download, video calling, video show, soil test, arsenic test, etc.(a2i, 2013).

A study by a2i has evaluated the impact of the UDCs (see table 1) on the service level of each defined category. It revealed that service processing time has remarkably reduced and optimized; for example, previously, it took 7 to 8 days to obtain a birth registration, but this service becomes available within less than 8 hours at UDCs. Similarly, the receipt of death registration certificates becomes possible within 5 hours instead of nearly two days.

Table 2: Service-wise reduction in TCV

Services	Before UDC			After UDC		
	Time (in HRS)	Cost (USD)	Visit	Time (in HRS)	Cost (USD)	Visit
Birth Registration	211.52	1.6	2.19	7.58	0.9	1.23
Citizen Certificate	24.9	0.7	1.71	2.97	0.5	1.07
Exam Registration	6.27	1.2	1.07	2.30	0.2	1.03
Death Registration	39.39	1.9	2.5	4.52	0.6	1.09
Photocopy	5.55	0.9	1.14	0.49	0.2	1.01
Computer Compose	16.84	1.5	1.44	0.63	0.5	1.02
Photography	39.7	1.6	1.82	1.36	0.4	1.04
Internet Browsing	3.02	1.7	1.28	0.53	0.4	1.02
ElectricityBill Payment	4.31	0.9	1.21	0.343	0.2	1
Job Search	12.47	2.6	1.5	0.75	0.7	1
Source- https://a2i.gov.bd/publication/union-digital-centre/						

Based on census 2013, it was found that a total of 4,492 UDC were functional out of a total of 4,547, and the remaining 41 was found inoperative. Comparatively, female entrepreneurs were found to be more proactive than males. Major ICT items at UDC, such as photocopy machines, laptop computers, internet modems, and multimedia projectors, were jointly shared by government and private owners. Individual owners owned the mobile phone. The similar finding shows that there are more than sixty different services delivered at every rural union and among those electric bill payment facilities, registration of land, birth and death registration, life insurance, different types of government forms, the result of admission and public examinations, university admissions, agriculture, and health-related services, vocational computer training and many other ways of internet services and supports (Bangladesh Shongbad Shongstha, 2014). Table 4 exhibits the top ten UDC services by private entrepreneurs. The census also revealed that nearly 3.91 million urban populations are covered under these

services of UDC, and among them, 949,120 are women.

Table 3: Top 10 services provided in UDCs

Types of Services	Total no of UDCs	Percentage of UDCs
Registration of Birth	3, 368	75
Composing facility	2, 926	65
Citizenship certificate	1, 885	42
Snapshot	1, 602	36
Photocopy services	1, 715	38
Death certificate	1, 462	33
internet and email	1, 427	32
Result of Examination	1, 211	27
Scanning	932	21
Job-related information	645	14

Source: UDC Census 2013 (BBS, 2014)

One of the essential features of UDCs is the public-private proprietorship. The centers are owned by the local government and administered by two individual owners where one is a woman. A2I Bulletin (2013) has reported that including 4516 women, 9,032 entrepreneurs earned BDT 1.3 billion (USD 16 million) till January 2013. According to the Bangladesh Bureau of statistics, the UDCs have received a gross amount of profit BDT. 24.30 million from each center where the monthly making was 5,410.26. Thus UDCs have proved to be a financially tight profit margin (BBS, 2014). The services of UDC gradually widen in a dramatic form of doorstep services exploration among the rural areas of Bangladesh (Karim et al., 2011). The digital connectivity among rural people becomes a high center of exchange, and services are faster, smoother, and cost-effective. The emerging role of UDCs is now recognized as a center for information hub and towards the local community of rural areas. The government of Bangladesh has put cordial attention and took newer steps to generate the level of services and make the project more reliable and people-friendly. UDC has the following aims:

- To infuse awareness among rural people of the sources of information and encourage them to make use of data available in the information centers.
- To look after the educational, economic, cultural, and social information needs for the rural community.
- To transform uneducated/illiterate and neo-literate into potential users.
- To facilitate information on all aspects such as agriculture, financial,

public hygiene, family planning, legal matters etc.

8. ANALYSIS OF DATA

8.1 Demographic presentation of data

The demographic outcome of data shown in the below table:

Table 4: Demographic data

Characteristics of Respondent	Numbers	Percentage
Age		
20-30	50	50%
31-40	35	35%
41-50	15	15%
Education		
Primary School Passed	25	25%
High School Passed	35	35%
College Study/Passed	40	40%
Gender		
Male	80	80%
Female	20	20%

8.2 Descriptive statistics on response

The responses of the beneficiary of UDC have been extracted through a designed questionnaire keeping a specific focus on the services received. The outcome of the data exhibits below in descriptive statistical methods.

Table 5: Response of the Beneficiary

Descriptive Statistics (on service response)					
	N	Min	Max	Mean	SD
UDC provides important information whatever I need	100	1	5	3.96	1.317
UDC helps us to know quick information services	100	1	5	3.72	1.464
UDC enhance knowledge in many different fields	100	1	5	3.95	1.266
UDC is easy to access and easy to	100	1	5	3.96	1.317

use					
I can easily absorb the fee of various services of UDC	100	1	5	3.90	1.382
The assistance of UDC benefits me	100	1	5	3.87	1.290
Valid N (listwise)	100				

Source: Data analysis

9. RESULT

Based on the sampled data collected the analysis has been made. In the demographic analysis, we found half of the respondents' age (n=5) is 20-30, and 35% (n=35) are at the age range of 31-40, whereas 15% (n=15) belongs to the age of 41-50. In the case of education level, we have reported that 25% (n=25) are primary school passed, and 35% (n=35) are high school passed. But, college studies or passed are 40% (n-40). In term of gender there are 80% (n=80) is male and 20% (n=20) is female. According to table 5, young people are quite often visiting the UDC for securing the service compared to the others. It is may be because of their attitude and interest to use technology for attaining relevant information on their academic, vocational training, government, and non-government job searching and submitting the job applications.

Additionally, people at the age of 31-40 are also searched for much type information of their foreign visa, passport, and job opportunities in the non-government sector. The lower number at the age of 41-50 revealed the people are usually having information on doctors, medical health checkups and similar purposes. In line with the above explanations, we have evidence the same result from the educations class as well, where most of the respondents visited UDC are from college study or passed. And, this finding supported earlier statements of interpretations. Interestingly, people at the age of primary school are 25% show their visit only out of curiosity, sometime to get education board result, Facebook browsing, or passing their idle time. The gender-wise participation shows a remarkable insight where the highest (80%) is male, and the lowest is female (20%). Considering the socio-economic condition of the village of Bangladesh, the freedom of participation, encouragement from family, society norms could be one of the essential reasons for this percentage. Table 6 is the reflection of the satisfaction level of respondents. We have found that the extent of satisfaction with UDC is a moderately high percentage (mean value is more significant than 3.72) of the respondents is reasonably satisfied with receiving different types of services from UDC. The highest level explored in respect of securing information service from UDC and ease of use (Mean =3.96). This finding is quite relevant to the objectives of the UDC to explore the information services among the general

mass of urban areas.

Similarly, the role of UDC in knowledge acceleration (Mean=3.95) and the reasonable fees (Mean=3.90) is quite encouraging for urban people to be connected with digital technology. However, the quick information revealed is comparatively lower. Still,the acceptable result (mean=3.72), which may be because of the interruption of services, network unavailability, the irregular power supply of power, may hamper the seamless service and supports.

10. FINDINGS (CASES)

The significant findings of this study discussed under the section in showcasing some cases taken among the beneficiaries of UDC. The impact of UDC has been examined and articulated from the perspective of its recipients. The following instances depict how UDC changes livelihood through the means of digital culture. The analysis has evident that the UDC project has lessened the time and distance barrier of nominal earning people to cater and obtain information in the twinkling of an eye compared to the previous stands. The following cases may reveal the lead discussion of findings.

> *Mr. Kamal is a 20 years' farmer who did not know the scientific techniques of farming. He did a challenging job with very low productivity the whole day by using his bulls in his lands. Suddenly he heard about UDC by one of his neighbors. He made a visit to UDC and collects a piece of printed information on the scientific method of cultivation. He had a school going daughter who helped him reading the techniques and teach how to go about it. Following that, he started his new way of cultivation. His earning, performance-, enhanced, and he expressed sincere thanks to the UDC.*

Table 6: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes In Behavior**	**Broader development Impact**
Absence of knowledge	I am attaining new skills.	More confidence about output.	The buildup of the efficient and knowledgeable farmer.

Besides, this UDC project also acts as a reliable aid for rural students in obtaining advanced skill and professional knowledge. The UDC has become a vital source of prospective students to ascertain information about the foreign scholarship, admission information, scholarship IELTS, SAT, etc.

> *Mr. Mostafizur Rahman is a higher secondary student who also earned from private tutorship at the village. He has a dream to*

study in the USA under the scholarship program. For the admission, he was looking for information. One of his friends informs him about the UDC and available. He immediately went there and browse through internet facilities. Within a short time, he educates himself on admission requirements, means to attain IELTS, SAT score. UDC services helped him to download the IELTS guideline, SAT process vocabulary list, and the same he printed from UDC. He already started him to be prepared for USA admission for higher study.

Table 7: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Dearth of awareness	I am gaining new skills.	It has enhanced the level of confidence about the future.	The buildup of the efficient and knowledgeable student.

From the analysis, it has found that the UDC project has also helped rural students to interact with urban students and to share information.

Mr. Sharif Hossain is a friend of Mr. Mostafizur Rahman. He is a regular visitor and user of UDC internet services. Sharif has opened an account on Facebook and LinkedIn to make social connections among his friends and rural students. He interacts with different people through Facebook and LinkedIn every week and exchange views, knowledge among relatives.

Table 8: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Internet browsing	Acquisition of online social skills.	More confidence about the future.	The buildup of efficient and knowledgeable students.

The UDC project assists village people by providing information and

application assistance to go abroad.

Mr. Abdullah has planned to go aboard for a job. He was trying in many ways for a long time even gets a connection with middleman brokers. After paying money to the broker has become cheated. His family was also suffering from financial loss though a small amount been recovered by the village leaders. A day he came to know that UDC is providing information about employment facilities of foreign countries at a reasonable cost. He was planning to go to Malaysia, and accordingly, he knew the government recruiting process from Malaysia.Mr. Abdullah applied for employment in Malaysia through UDC services.

Table 9: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Lack Consciousness	Aware of	More confidence about his dream.	The buildup an efficient and knowledgeable workforce.

At present, rural people can excel in their professional and vocational skills by training at UDC and get a job, which reduces the unemployment problem in rural areas.

Mr. Sumon Debnath had no job though he passed B.A. from a college. His family decides hi to get enrolled in the UDC computer training course to learn basic of the computer. The training includes typing, composing, etc. He became experienced in computer typing, forming after three months of training at UDC. The UDC also provided him with a certificate of training. After finishing the course, he went to Dhaka and got a job as a computer typist.

Table 10: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes In Behavior**	**Broader development Impact**
Vocal training in computer	Gathering of the new skill of the job	Enhanced Higher self-belief	The buildup of an efficient and knowledgeable workforce.

UDC helped rural people to get regular health checkups and also to solve health-related problems.

Mr. Shahin Bashar is the owner of a grocery shop at his village. His mother is 65 years old who frequently got sick for high blood pressure, blood sugar. To Medicare, his mother, Mr. Shahin, regularly moves her to meet local clinics at the expense of money, effort, and doctors' fees. Recently he started to visit UDC for checking blood pressure, blood sugar, and he visits the expert doctor once the level is severe. The UDC service helped him in less time, money, and efforts but excellent service.

Table 11: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Health service	I am finding an alternative and quicker source.	More time for work	Better use of time by productive people

The passport and ancillary services also provided by the UDC

Mr. Sazzad Hossain wants to make a passport to go to Malaysia. He came to UDC to learn all the processes about the application for a Passport. After gathering all the information, he took a passport application form from UDC and applied for it securely.

Table 12: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Absence of information	Proper knowledge of the passport processing	Higher confid ence andsecurity	People will be more secured from the mischief of a conman.

UDC is a center for facilitating land mutation, registration, and related services

Mrs. Saleha is a housewife of a joint family who lost her husband ten years before. She wanted to get the hairy land of his husband from a joint family. Once she claimed for the property, she got a non-cooperative reply from the brother of his husband. The brother

did not want to settle her claim on the owner of hairy land. A day, Mrs. Saleha discussed the same with a neighbor who helped her visit UDC to get advice on land law, division, etc. knowing from the UDC about that process of a hairy property, she again claimed and. Got the possessions of the land.

Table 13: Case Findings

Context	**Changes in Behavioral Precursors**	**Changes**	**Broader development Impact**
Dearth of information	Proper awareness about the law	Higher confid ence andsecurity	Women empowerment

11. CHALLENGES OF UDC

A. Gender Discrimination; In a study (TIB Report 2017) found that most of the UDC's based entrepreneur who receives training are male. The fundamental training on computer, 91.1% male entrepreneurs where the percentage of female entrepreneurs are 86.1%.
B. Logistic supports: Providing equipment, logistics, and financial support are significant challenges for conducting this project smoothly.
C. Selection of entrepreneur; UP chairman and secretaries attempted to choose entrepreneurs from their family members and individual associations without concentrating on their insight and aptitudes on PC and other ICT knowledge. Furthermore, in the more significant part of the UDCs, finding talented and capable female business visionaries is a considerable challenge. Now and again, families don't urge female entrepreneurs to go to UDCs for social barriers and hindrances, particularly for working with an obscure male entrepreneur. Along these lines, in certain spots, female entrepreneurs are found as relatives or family members of male entrepreneurs.
D. Internet access and power supplies; Inadequate internet connectivity is a common problem in UDC. Most of the UDC depends on the SIM modem for internet connectivity. For this reason, slow internet is caused by delays and insufficient service deliveries.
E. Lack of awareness; most people know about UDCs by name, but they don't know about the available services UDCs provide because of a lack of publicity inthe local area(Sahid Ullah, 2016).
F. Coordination gap; Sometimes, there is a coordination gap between union parishod stakeholders and UDC entrepreneurs.

12. CONCLUSION AND RECOMMENDATION

The influx of technology in Bangladesh is like a new engine of the old trains that speedup the services to the passengers. This research finds that UDC is an excellent means to develop the rural community of Bangladesh, focusing on information services with the help of technology. The beneficiaries are from different social classes that build and create a new world of hope and prosperity to contribute to the nations. No information is worthy unless it is communicated for serving a purpose. We have found that people in rural areas are getting significant benefits from UDC. Thus, the UDC does the job among students, women, educated unemployed persons, farmers, teachers, journalists, employees - government or private, doctors, people in business, residential/non-residential Bangladeshi people, and many other classes of people can get benefits from UDC as per their requirements. Females should be encouraged to use the services of UDC, and on the contrary, the use of school-goers should be controlled within the purpose only. To enhance the project, total infrastructure should be developed. More skilled and educated employees should be hired to operate UDCs. They should be given proper training for operation, and motivation to help the UDC users whole-heartedly. Besides, more awareness about the functions of UDC should be developed through different promotional strategies. Existing equipment used in UDC should be maintained appropriately, and more and sophisticated equipment should be supplied. Apart from those some remarkable supports such as human resources development, strong financial supports, affordable connectivity, reliable internet connection, efficient and trained people, active monitoring, true relation among the parties and partners should be ensured.

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REFERENCES:

Ahmed, SS, (2015), 'Public Service Delivery- Role of Union Digital Center (UDC) and Impact on Improving Governance and Development: A Case Study of Narayanganj District, Bangladesh' BRAC Institute of Governance and Development (BIGD), BRAC University Access to Information (a2i) Programme. 2013. 'Digital Bangladesh: E-services for everyone. Dhaka,': Prime Minister's Office, Government of Bangladesh.

Access to Information (A2I) Program (2011a), 'Sustainability and Business Plan for Union Information and Service Centre (UISC)': Dhaka: Prime Minister's Office.

Access to Information and Service Centre (A2I). (2012) 'Union Information and Service Centre (UISC): Bringing Services to Citizen's Doorsteps.' Dhaka: Prime Minister's Office.

Access to Information (A2I) Program, (2014), 'Initiatives: Union Information and Service Centers (UISC), Dhaka: Prime Minister's Office. Retrieved on 04/04/14 from http://a2i.pmo.gov.bd/content/unioninformation- and-service-centres-UISC

A2I (2013). *Access to Information Programme (A2I) Evaluation Report*, Prime Minister's
Office, Dhaka, Bangladesh

Akther, F., & Georgsen, M. (2012). Telecentres: One-Stop Learning Hubs in Rural Bangladesh. *Department of Communication, Aalborg University, Denmark*.

Ashraf, M., & Malik, B. T. (2011). Gonokendra model: a response to "information poverty" in rural areas of Bangladesh. *Information Technology for development*, *17*(2), 153-161.

BBS. (2014). 'Census Report on Union Information and Service Centres (UISCs). Bangladesh Bureau of Statistics (BBS),' Statistics and Informatics Division (SID), Ministry of Planning, Government of the People's Republic of Bangladesh And Access to Information (A2I) Programme, Prime Minister's Office (PMO), Government of the People's Republic of Bangladesh.

Brahmanpara Upazila - Banglapedia [WWW Document], n.d. URL http://en.banglapedia.org/index.php?title=Brahmanpara_Upazila [Accessed 10 Jan. 2019].

Burichang Upazila - Banglapedia [WWW Document], n.d. URL http://en.banglapedia.org/index.php?title=Burichang_Upazila [Accessed 10 Jan. 2019].

Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, *27*(3), 264-271.

Bhatnagar, S. (2004), 'E-Government: From Vision to Implementation – A Practical Guide with Case Studies,'NewDelhi. SAGE Publications India Pvt. Ltd.

Bhuiyan, S. H. (2011),' Modernizing Bangladesh public administration through e-governance: Benefits and challenges. *Government Information Quarterly*, vol . *28*, no. 1, pp. 54–65. https://doi.org/10.1016/j.giq.2010.04.006

Chowdhury, S. (2018). Do government web portals matter for citizen engagement in governance? A study of rural local government digital centres in Bangladesh. *Asia Pacific Journal of Public Administration*, *40*(2), 132-141.https://doi.org/10.1080/23276665.2018.1483051

Debidwar Upazila - Banglapedia [WWW Document], n.d.URLhttp://en.banglapedia.org/index.php?title=Debidwar_Upazila [Accessed 10 Jan.2019].

Diso, LI, (1994), 'Information policies and government guidance in Nigeria: What hope for communities?'*Resource Sharing and Information Networks*, vol. 9, no. 2, pp.141–151.

Drljača, D. & Latinović, B, (2012), 'E-Governance in Republic of Srpska-Challengesand Prospects,'*Quality of Life (Banja Luka)-APEIRON*, vol. 5, pp. 32-40.

Dart, J. & Davies, R. (2003) A Dialogical, Story-Based Evaluation Tool: The Most Significant Change. *American Journal of Evaluation,* 24, 2, 137-155.

Faroqi, MG. & Siddiquee, NA, (2011). 'Limping into the Information Age; Challenges of E-Government in Bangladesh', *Journal of Comparative Asian Development,* vol. 10, no. 1, pp. 33- 61.

Faroqi, M. G., Siddiquee, N. A., & Ullah, S. (2019). Sustainability of telecentres in developing countries: Lessons from Union Digital Centre in Bangladesh. *Telematics and Informatics*, *37*, 113-127.https://doi.org/10.1016/j.tele.2018.05.006

Faroqi, M. G. (2015), ' *An assessment of e-government: a case study on union digital centers (UDC) in Bangladesh*.

GOB, (2009), 'Digital Bangladesh Concept Note' Access to Information Programme Dhaka: Prime MinisterOffice.

Gupta, S. P., & Gupta, M. P. (2010). *Business statistics*. Sultan Chand & Sons.

Harande, YI, (2009), 'Information Services for Rural Community Development in Nigeria,' *Library Philosophy and Practice 2009***.** ISSN 1522-0222.

Heeks, R. (2001). Understanding E-governance for Development, I-Government Working Paper Series, Institute for Development Policy and Management, University of Manchester, the UK.

Heeks, R, (2003), 'Success and Failure Rates of e-Government in Developing/Transitional Countries: Overview,'the University of Manchester [Retrieved from www.egov4dev.org/sfoverview.htm]

Heeks, R, (2009), 'the ICT4D 2.0 Manifesto: Where Next for ICTs and International Development?'*Development Informatics, Working Paper No.42.*

Habib, A., Chowdhury, D. & Bhattacharjee, M.K. (2013) ICT for Development and UISC: A Step to Alleviate Poverty in Rural Areas of Bangladesh. In *Proceedings of the 7th International Conference on Theory and Practice of Electronic Governance* (342-343) ACM

Hoq, K.M.G. (2014) Rural Library and Information Services, their Success, Failure and Sustainability: A Literature Review. *Information Development*, 31, 3, 294-310.

Hoque, M. R., & Sorwar, G. (2015). ICT Based e-Government Services for Rural Development: A Study of Union Information and Service Center (UISC) in Bangladesh. *The Electronic Journal of Information Systems in Developing Countries*, *71*(1), 1-19.

Hoque, R. (2020). The impact of the ICT4D project on sustainable rural development using a capability approach: Evidence from Bangladesh. *Technology in Society*, 101254.

Heeks, R., & Bhatnagar, SC, (1999), 'Understanding success and failure in information age reform. In R. Heeks (Ed.),'*Reinventing government in the information age: International practice in IT-enabled public sector reform*. London:Routledge.

Iqbal, M.S. & Seo, JW, (2008), 'E-Governance as an Anti-Corruption Tool: Korean Cases.' http://www.karis21.or.kr/karis21admin/adaction/down/03Iqbal_Seo.pdf

Islam, M. S., & Uddin, M. H. (2005). Information support services of the rural development libraries in Bangladesh. *Malaysian Journal of Library & Information Science*, *10*(1), 105-116.

Islam, M. A., & Hoq, K. M. G. (2017). Community Internet access in rural areas: A study on community information centres in Bangladesh. *Malaysian Journal of Library & Information Science*, *15*(2), 109-124.

Jabbar, M., (2009), '*Digital Bangladesh.* Dhaka, Bangladesh. Ananda Publishers.

Jatiyo e-tothyokosh. (2014). *Home*, A2I, Dhaka, Bangladesh. Retrieved on 20/02/2014 from http://www.infokosh.bangladesh.gov.bd/

James, G, (2000), 'Empowering Bureaucrats,'*MC Technology Marketing Intelligence*, vol. 20, no. 12, pp. 62-68.

Jeremy, Millard. Beep Knowledge System and case owners, (2002-2005): Social Inclusion Cases Village Information Centres, Pondicherry (India) Case study 119.Available at http:// www.beep-eu.org/(dt.27.10.2019) The Best eEurope Practices (BEEP).

Karim, H. N., Mina, Q&Samdani, G. (2011). 'Going Digital: Realising the Dreams of a Digital Bangladesh for All.' Dhaka, Bangladesh. The University Press Limited.

Kashem, M. A., Akhtar, N., & Rahman, A. (2014). *An Information System Model for e-Government of Digital Bangladesh*.

Kumar, A. S., & Kim, Y. S. (2017). Key Factors to be Considered for Making Union Digital Centers (UDCs) Sustainable in Bangladesh. *Asia Pacific Journal of Business Review*, *1*(2), 89-105. http://dx.doi.org/10.20522/APJBR.2016.1.2.89

Lim, L. K. (2017). Exploring Rwanda's Continuing Education Capacity for Information
Communications Technology (ICT) Skills.

Lu, J. & Zhang, G., (2003), 'Cost-benefit factor analysis in e-services.'*International Journal of Service Industry Management,* Vol.14, no. 5, pp. 570-595. MCB UP Ltd Publisher.

Mahmood, K. (2005). Multipurpose community telecenters for rural development in Pakistan. *The Electronic Library*.

Monga, A. (2008). E-government in India: Opportunities and challenges. *JOAAG*, *3*(2),
56.

Ministry of Finance. (2019). Bangladesh economic review 2019. Finance Division, Ministry of Finance, and Government of the People's Republic of Bangladesh.
https://mof.portal.gov.bd/sites/default/files/files/mof.portal.gov.bd/page/f2d8fabb_29c1_423a_9d37_cdb500260002/Ch-11%20%20%28English-2019%29.pdf[Last accessed march 31, 2020].

Nahar, N, (2016), 'NGO, Poverty and Development in Bangladesh: An Overview,'*Bangladesh Journal of Public Administration*. vol.24, no.2, pp.153-171.

Okiy, RB, (2003), 'Information for rural development: Challenge for Nigerian rural public libraries,'*Library Review.* Vol .52, no. 3, pp.126-131.

Orlikowski, W. J., & Iacono, CS, (2001), 'Research commentary: Desperately seeking the "I.T." in I.T. research—A call to theorizing the I.T. artifact.'*Information systems research*, vol. 12, no. 2, pp.121-134.

Rowley, J. (2006), 'An analysis of the e-service literature: towards a research agenda. *Journal of Internet Research.*vol. 16, no. 3, pp. 340-360.

Rahman, ML, (2016), 'E-Governance and Bangladesh,' The Daily Star, Dhaka. Available at: https://www.thedailystar.net/25th-anniversary-special-part-1/e-governance-and-bangladesh-210577[Accessed 22 May. 2019].

Rahman, M. S., Barau, A. A., & Noman, M. R. A. F. (2019). Service delivery effectiveness of Farmers' Information and Advice Centres in Dinajpur Sadar Upazila of Bangladesh. Information Processing in Agriculture, 6(4), 462-470. https://doi.org/10.1016/j.inpa.2019.03.002

Sarker, A.K., (2013). 'Digital Bangladesh: Swapna Puroner Ovijatra (A Journey to fulfill Dreams). Lalmatia, Dhaka. Tothyoseba Barta Songstha (TSB) Publisher.

Sousa, V. D., Zauszniewski, J. A., & Musil, C. M. (2004). How to determine whether a convenience sample represents the population. *Applied Nursing Research*, *17*(2), 130-133.

Saunders, C.S., & Jones, J.W. (1992), 'Measuring the performance of the information systems function,'*Journal of Management Information Systems*, vol. 8, no. 4, pp.63-82.

Saumure, K., and Lisa M. G (2008). Convenience Sample. The SAGE Encyclopedia of Qualitative Research Methods. Thousand Oaks, CA: Sage. https://dx.doi.org/10.4135/9781412963909.n68

Sahid Ullah, M. (2016). Empowering rural communities through telecentre connectivity: experience of the Union Information and Service Centres in Bangladesh. *Media Asia*, *43*(2), 112-125.

Siddiquee, NA. & Faroqi, MG. 2013 'A Road Far Too Long? E-government and the State of Service Delivery in Bangladesh' in Halpin et al.' *Digital Public Administration and E-government in Developing Nations: Policy and Practice'*IGI GlobalSPSS Inc. (2012) IBM SPSS Statistics (Version 21.0), Somers, NY: IBM Corporation.

Sudip, A. (2007). Rural transformation by the establishment of community information centers in the rural areas of Nepal: a pilot project. In *Nepal Rural Information Technology Development Society, NRIDS, Nepal. Submitted to United Nations Economic Commission for Asia and the Pacific, ESCAP, Bangkok, Thailand. Available at telecentresap. org/meeting/cmap2007/Nepal_Paper_NRIDS. pdf,(dt. 26.09. 2007)*.

TIB. (2017). *Union Digital Centers (UDCs) in Delivering Services: Roles, Potentials and Challenges*.

United Nations (U.N.) 2012. 'United Nations E-government survey- E-government for the People.' New York. Economic and Social Affairs.

United Nations (U.N.) 2014, 'E-government Survey- E-Government for the Future We Want.' New York: Economic and Social Affairs.

U.N. (2012). E-Government for the People. Department of Economic & Social Affairs Division for Public Administration and Development Management, United Nations, New York.

Union Digital Centre – a2i, n.d. URL https://a2i.gov.bd/publication/union-digital-centre [Accessed 10 Mar. 2019]

Wei, K.K., Teo, H.H., Chan, H.C. & Tan, B.C.Y. (2011), 'Conceptualizing and Testing a
Social Cognitive Model of the Digital Divide,'*Information Systems Research*, vol. 22, no.1,pp. 170-187.

Willetts, J. & Crawford, P. (2007) The Most Significant Lessons about the Most Significant Change Technique. *Development in Practice*. 17, 3, 367-379.