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Implementation Challenges of ICT in the Public Sector in Upazila Region of Bangladesh: An Empirical Study

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Abstract

Information and Communication Technology (ICT) plays a pivotal role in achieving Digital Bangladesh's vision of making the government accountable, transparent and effective in providing services to the citizens. The ICT-based governance (e-governance) in service delivery mechanism has become essential and time worthy. However, the implementation of e-governance is not up to the mark and the government is not getting the full benefits of e-governance due to the structural, organizational, and behavioral barriers. The dilemma between the service providers (agent) with numerous problems and the recipients' viewpoints (principal) has been analyzed how the problem lies and the principal faces problem to get services. The objective of this study is to analyze the current situation of ICT-enabled Public Service Delivery; implementation challenges of ICT at the Upazila level of Bangladesh and come up with an evidence-based solution. To achieve the objectives, both qualitative and quantitative approaches were employed. Purposive random sampling was used to collect data through offline and online questionnaire surveys. Besides, interview and observation methods were also employed for strengthening the study findings. The study found that strong policy supports of the government i.e. ICT policy, and digital Bangladesh vision enable the e-government services to benefit the citizen. However, it is evident that the dearth of IT physical infrastructure, unstable internet connection, shortage of skilled manpower, and technology fear of public employees create obstacles to provide ITC-enabled services. Sometimes people's unawareness also serves as barrier to receive e-

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government services. The study recommends improvement of internet speed, supply of continuous electricity supply, training of public employees, providing upgraded technology, and developing user-friendly softwares to address those problems and enhance ICT-induced public service delivery system.

Keywords: *Barriers, E-governance, Public Service Delivery, Readiness, Way forward*

Introduction

The implementation of digital technologies refers to the use of ICT in providing public services because it is one of the government's aspirations (Karim, 2010). Numerous digital technology-related projects that the Bangladeshi government has implemented are in progress. The National ICT Policy-2009 was developed and aligned to enhance the public administration system and total development process of the country; particularly linked to the government e-governance process. The government has aligned a broader vision 'Digital Bangladesh by 2021' (Kashem at al., 2011) and 'Developed Nation by 2041' where e-governance serves as one of the important tools to achieve accountability and transparency. Moreover, the government has set a 'smart Bangladesh vision 2041' to emphasize the enhancement of digital governance. It indicates the government's priority in ICT-induced services to the people.

ICT-based governance is essential for improving service delivery, increasing efficiency, and increasing accountability in government operations (Rana et al, 2012). The Bangladesh government initiated e-governance in 2008, however, the initiative's execution fell short of expectations, and as a result, the government is not reaping the full benefits of e-governance due to some bottlenecks such as structural, organizational, and behavioral hurdles (Bhuiyan, 2011a).

In order to fulfil Vision 2021, often referred to as Digital Bangladesh, the main focus was placed on the deployment of digital technology (Karim, 2010). Further, the country envisions becoming a middle-income country with peace, prosperity, and dignity by 2024 and a developed nation by 2041. These visions are thought to be propelled by the extensive and effective use of ICT. The ultimate purpose of using ICT is to enhance people's prosperity by assuring democracy, rights, accountability, transparency, creating justice, and ensuring the delivery of government services to citizens' doorsteps.

Connecting to the four pillars of Digital Bangladesh such as human resource development, digital government, connecting citizen and IT industry promotion, both the ICT service providers and the ICT service seekers needed to have a basic understanding of ICT to provide ICT-enabled services (BCC, 2019). If these services were not provided, both service providers and service seekers would be unable to guarantee each other's happiness while seeking services online. Thus, this study intends to identify major obstacles and probable solutions to the implementation procedures of ICT-induced services at the field level of offices in Bangladesh.

Problem Statement

The government has set 'Smart Bangladesh Vision 2041' which is about bridging the digital divide by innovating and scaling sustainable digital solutions from which all citizens can be benefitted (GED, 2020). In order to materialize this vision, policy support is a must. This vision is inextricably interlinked with the concepts of Digital Bangladesh, the ICT Act, Election Manifesto 2018, and SDG-2030 because of the transformation of the governance system (Bangladesh Awami League, 2018; Rahman, 2021). These policy supports should provide the scope of developing IT infrastructure, engaging IT personnel and financial support. However, it is found that e-service providing public organization lack of expert human resources, ICT devices, up-to-date softwares, updated information on services, and fully-automated service mechanisms. As a result, service providers are unable to provide services to the citizen which makes them dissatisfied too. It is noted that technology is constantly changing. Several new technologies have emerged recently, including artificial intelligence (AI), the Internet of Things (IoT), 5G telecommunications, collaborative robots/co-bots, quantum computing, nanotechnology, biotechnology, Big Data, advanced robotics, augmented/virtual reality, and three-dimensional printing, caused unprecedented changes in the world economy (Mukherjee & Satija, 2020). This new generation of technology has changed the entire system and public offices at Upazila[1] level cannot cope with these and eventually fail to provide better e-services.

With the ultimate goal of improving people's livelihood, ICT contributes to strengthening democracy, rights, accountability, and transparency, creating justice, and ensuring the delivery of government services to citizens at doorsteps

[1] There are three tiers of local government systems, such as a) Union Parishad, b) Upzila Parishad, and c)) Zila Parishad. Upazila is a subdistrict, which is the second tier of the local government system in Bangladesh. Upazila is the hub of most of the service providing windows of the government.

(Uddin, 2012). Research findings evidence that the legal and regulatory environment (27%) is the biggest barrier to e-government creation for government personnel (Tennakoon, 2020). It is found that 25% of respondents cited rigid administrative procedures as the next most challenging part of the transfer process (Karim, 2015; Tennakoon, 2020). Other common challenges faced by the government include the unequal distribution of internet access, citizens' lower computer knowledge, security issues, and financial constraints. It is also evident that political influence has not been widely identified as an issue with e-governance. However, the e-governance projects of many developing nations including Bangladesh are frequently driven by the political economy and policy leaders rather than the prospects for service quality improvement in the public sector (Tennakoon, 2020). Due to the mismatch between expectations and actual results, demand from the people and supply from public offices such interventions seldom yield the desired results. Therefore, it is crucial to identify potential obstacles pertaining to e-governance and opportunities at the e-strategy development stage. Thus, this study aims at analyzing the current situation of ICT-enabled Public Service Delivery (PSD) and come up with an evidence-based solution considering the perspective of providers and service seekers.

Research Objectives

The major objective of this study is to analyze the present situation of ICT-enabled public service delivery, and major challenges and recommend pragmatic solutions. To support the major objective, set specific objectives of the research are:

a. to assess the ICT-enabled services provided at the lower tier of local government system i.e. Upazila level;
b. to analyze the policy support to provide ICT services to the citizen;
c. to analyze structural, organizational, and behavioral barriers in terms of both service provider and service seeker; and
d. to recommend probable solutions to the major problems from the perspective of providers and service seekers.

Research Questions

The research questions of this study are as follows:

a. What are ICT enabled services provided at Upazila level;
b. What are mechanism and strategies followed to provide ICT-enabled services at Upazila level;
c. What are structural, organizational, and behavioral barriers to the implementation of ICT-related services of the government?

d. What types of solutions do the service recipients suggest to solve the problems of ICT-related services?

Literature Review

The use of information and communication technologies (ICTs) at various levels of the public sector and the enhancement of governance is known as 'e-governance', or 'electronic governance'. Seo & Mehedi (2016) describes that "E-government refers to the government's use of ICTs to work more effectively, share information and deliver better services to the public. The grade of governmental services is acknowledged to be improved through e-governance (Tennakoon, 2020). It alerts the entire public sector, which has historically come under scrutiny for being inefficient and less productive, particularly when it comes to the adoption of policy strategies in developing countries. Realizing the demand for e-governance, the Bangladesh government aligns policies and realizes the readiness.

E-governance readiness

E-governance readiness is crucial to understand the present status of e-governance activities, requirements and future projections (Bhuiyan, 2011b). The preparedness of e-government is centred on six aspects namely a) organizational readiness, b) governance and leadership readiness, c) customer readiness, d) competency readiness, e) technology readiness, and f) legal readiness (Al-Omari & Al-Omari, 2006) which are necessarily linked to legal bindings for the service recipients (the principal) as well as the service providers (the agent). These are related to the legal necessities of e-governance. It is found that citizen's involvement into account determines whether an area was ready for e-government (Elsheikh et al., 2008). This process also discovers inefficiency in the e-government process, along with a lack of accountability, transparency, and citizen involvement (Elsheikh, et al., 2008). Shalini (2009) focused on the challenges facing the readiness of the e-government and discovered resistance to change, stagnant websites, and a lack of knowledge and confidence. For determining e-readiness, the author took into account citizen awareness as e-government readiness is based on an evaluation methodology that takes into account factors relating to citizens, technology, processes, and strategic planning (Azab et al. 2009). The assessment focuses on the connections and interactions between these elements in a developing e-government environment and also took into account the evaluation of electronic management (Azab et al., 2009). The readiness for e-government, according to

Almarabeh and Ali (2010), is centred on three key elements connected to what, why, and how e-government works. These key elements help in understanding e-government maturity, addressing problems and chances for development, and realizing various variables for achieving e-government. A study by Almarabeh and Adwan (2-13) examines the readiness of the e-government with a focus on United Nations metrics, such as cost and efficiency for electronic services provided to the public. Regarding e-readiness, social context is also important as this counts the cost of electronic services through technical, political, legal, and socio-economic issues (Höchtl, et al., 2011). The study of Karunasena et al. (2011) depicts the readiness of e-government based on the protection of public data, the development of public values, and the accessibility of communication technology. In this study, the production of public value for citizens was emphasized. Further, Alghamdi et al. (2011) state that technical components such as ICT strategy, user access, e-government program, ICT architecture, business processes, ICT infrastructure, and human resources are prioritized when assessing the preparedness of e-government. The authors discussed the matter while considering an organizational perspective's technical components and how these contribute to e-readiness. Potnis and Pardo (2011) used a range of metrics, such as risk-to-reward, adoption, and satisfaction, to assess the readiness of e-government. It has been discussed that citizen satisfaction with electronic services is a key element in e-government readiness. In a developing country environment, Waheduzzaman & Miah (2015) investigates the collaborative requirements for operating successful governance at the ground level of PSD and described an assessment methodology of e-government readiness. This article empirically examines a claim about local government situations' readiness e-government for at the Upazila level as this is the main window of connecting the citizen and the government's services. However, the literature finds that Bangladesh lacks comprehensive integration. It is also found that neither elected officials nor other government representatives are prepared to employ modern governance mechanisms to contribute to provide better services.

The policy supports to e-governance

Election Manifesto and Digital Bangladesh

Since public policy, by definition, controls the behavior of people, government formulates these under the broader perspective. As a democratic practice, the government before came to power in 2008 developed the manifest to value people as the key service recipients. 'My village, my town' was a slogan set in

the manifest and later included in as policy agenda to benefit rural people with modern facilities, ICT-enabled services in particular. The 'Digital Bangladesh' that the government adopted in 2008 philosophizes to ensuring people's democracy and rights, transparency, accountability, establishing justice and ensuring delivery of government services (Karim, 2010) to people through maximum use of technology with the ultimate goal to improve the daily lifestyle of general people (Mazumdar & Alharahsheh, 2020). It includes all social strata in the government's initiative, without any technological boundaries. As a result, the government placed a strong emphasis on the four pillars: civil services, human resource development, participation of the people, and information technology application in business (BCC, 2019). People as principal are highly emphasized in this vision. To make Bangladesh digital, the current revolutions in the digital sphere need to be updated and utilized with a special emphasis on the young generation and newer invention of technologies and wider use of e-services to empower citizens (Sarkar, et al., 2013). Through 5,737 digital centres and 8,200 e-post offices, the citizens of the nation can access 200 different sorts of digital services. The largest web portal in the world with 25 000 websites, "Information Window," which has received plaudits and awards abroad, was launched in the nation to enable citizens. Bangladesh is being branded as a digital nation using Smart Cards, Machine Readable Passports, Bangabandhu Satellite-1, Learning-Earning, E-power, Hi-tech Parks, BCC, BITM, and LICT which are the enabling IT infrastructure to assist service providers, the agent of the theory. Researchers question whether combined efforts work well to benefit both the principal and agent.

Sustainable Development Goals 2030 and E-government services

Agenda 2030 is an inclusive agenda workable for the total development which is a strong policy support to enhance digital governance too. The Ministry of Planning of Bangladesh formed numerous committees to materialize the SDGs pertaining to ICT, especially the targets 9.c and 17.8 as key targets and 9.b as associated targets. This emphasize posits a strong basis to emphasize ICT in achieving the targets of SDGs. Following the ICT directives, the mobile phone network is extended across the country. It is found that almost 80% of the population is taken under coverage of the network. Target 9.b emphasizes the high- and medium-tech industries' contributions to GDP. The ICT division has been fostering the growth of an economy based on recognition. General people have the scope to get e-services through mobile operators as the majority of the population uses mobile phones. As the world including Bangladesh is advancing faster, all sectors of the economy, including government services,

transportation, energy, education, health, finance and banking, manufacturing industry sectors, trade and investment have also been enabled with the ICT. Again, the question is whether service recipients are benefited from this enabling environment and whether this policy supports are enough to achieve expected digital services.

Vision 2041, smart Bangladesh concept and ICT-enabled services

The government-set vision of becoming a developed nation by 2041 denotes assurance of better services to people as expected without hazards where ICT-enabled mechanism plays a vital role. Moreover, Bangladesh's Vision 2041 is renamed as the Smart Bangladesh which emphasizes the enhancement of digital governance. Although Bangladesh is marching on the way to prosperous development by achieving different milestones such as middle-income country by 2026, technological development is still a concern. Approximately 500,000 regularly employed independent contractors are active, compared to 650000 who are registered. They are the beneficiaries of government-provided ICT facilities working as freelancers. The size of the Bangladesh IT and ITES market reached US$ 57 million and showed a rise of 54 per cent over the identical year (Tholons, 2015). To achieve the developed country vision, utilizing the current demographic dividend (58.2 per cent) is crucial which can be achieved through ICT-enable interventions (Farid, 2019). It is high time to identify the main challenges of ICT-driven areas where the government can intervene and align with these broader visions.

Implementation of E-government and People's Benefits

Satisfaction of service recipients is dependent on the use of ICTs across the world as ICT-enabled services are people (Hoque et al., 2011; Hamnera & Al-Qahtanib, 2009; Schuppan, 2009). It is also claimed that e-governance presents chances to alter both the workings of government and the core nature of governance. Based on disruptive innovation, discontinuities, and abrupt and seditious change, a new, complex, and fast-evolving socio-economic order has arisen. Because it frequently falls behind in the adoption of new technologies and commercial innovations, the public sector has been marginalized. According to Bhuiyan (2011b), the rapid advancement of information and communication technology (ICT) opens up a wide range of possibilities for the efficient and economical provision of public services. Even while the majority of industrialized countries have long-standing electronic services, the great majority of emerging nations have lately begun. Increasing mobile phone use and public-private partnerships (PPP) were mentioned as opportunities for

public e-Service delivery in Bangladesh (Bhuiyan, 2011a). On the other hand, inadequate legal requirements, a lack of power supply, a lack of top-level management initiative, service integrity, and interoperability were mentioned as obstacles to the development and sustainability of public e-Services (Bhuiyan, 2011a). Linking to the performance of public servants, Seo and Mehedi (2016) provided an assessment of Bangladesh's e-government initiatives to combat corruption based on the connection between e-government and anticorruption initiatives more broadly. E-government improves the efficiency of government services and processes and significantly reduces corruption. Ahmed et al. (2018) claim that Bangladesh has started integrating ICT into its public sector organizations to improve service delivery through improved governance. The ICT-based governance process presents opportunities and challenges for governments. The complexity of the public sector makes it challenging for e-government to spread, which could have a negative impact on the outcome. According to their study, the current e-government capacity-building strategy, which attempts to increase the knowledge and abilities of pertinent employees involved with e-government programmes, is deemed to be insufficient (Ahmed, et al., 2018). However, re-engineering the process and its important transformation to good governance are hardly mentioned. Tennakoon (2020) highlighted potential challenges and opportunities for e-governance in the context of developing countries (based on Sri Lanka). The biggest barriers to e-governance, according to his research, are a lack of computer literacy, particularly in rural and estate sectors, legal and regulatory constraints, insufficient network bandwidth, uneven internet access distribution across the country, security, stringent administrative procedures, and excessive political influence (Tennakoon, 2020). The supportive attitudes of significant stakeholders, rising levels of digital literacy, access to technological know-how, international cooperation, increased value addition, and policy reforms were further potentials.

ICT-induced Services Provided at the Upazila level in Bangladesh

ICT-based services are growing chosen and distinctive in every sphere of the country's service sector ultimately linking to achieving the Digital Bangladesh vision. The entire issue has been a necessity and dramatic transformation during the pandemic. Therefore, it is crucial to follow approaches and strategies to offer ICT-Induced services at the Upazila level which is a vital unit for nation-building departments to implement government policies, projects, and programs while dealing with public or official operations (Hoque & Sorwar, 2015; Farid, 2019).

Mechanisms:

There are direct and indirect connections to ICT at every office in the Upazila. ICT-based services are offered in a variety of methods, including citizens' visits to the office and ICT people's visits to the citizens meaning the service to the doorsteps (Farid, 2019). This mechanism enhances services remotely through either in-person or virtual connectivity. Therefore, there are often two different kinds of mechanisms, such as a) virtual and b) physical.

Strategies:

Some techniques are used in accordance with the service delivery mechanism to provide services. Since the principal is the citizen, general people in particular who mostly live in rural areas (Hoque and Sorwar, 2015), they are required to provide better services which can be possible through ICT-enabled strategies that include:

a) **Doorstep Services:** Through ICT, the government is attempting to provide services at the citizen's doorstep. To address these issues, the government officially opened the helpline '333', which accepts complaints about social issues like child marriage and sexual harassment and provides information on its services. ICT officials promote these services to the public through seminars or online awareness campaigns.

b) **Phone Call:** ICT officials are offering a variety of services via phone calls. Some services, including those related to the internet, social media, zoom, birth registration, software issues with union digital centers, etc., are offered over the phone.

c) **Video Conference System:** Video conferences have been used for numerous programs at the Upazila level. But in actual situations, many of them in Upazila are unaware of how to use the video conferencing technology, which is why many Upazila-level officials ask us to assist with communication with the system.

d) **Training:** ICT employees are quite experienced with the duty of providing many types of training, including web portals, e-nothi, and video conferencing systems. To make the web portal training as simple as possible for trainees, we are concentrating on how to update officers' profiles, build up broken links, create pages, and post notices. Regarding e-nothi training, ICT personnel are assisting all offices at the Upazila level to go paperless, which is essential given the current pandemic situation.

e) **Network System:** Digital services are impossible to envisage without a network. To provide digital services to the rural areas, the government has already installed network server stations at the Upazila and union levels. The

server stations' essential upkeep and repairs are continuously assisted by ICT officers.

f) **ICT-Related Purchase:** ICT employees are typically involved in the purchase because they work as ICT specialists in the Upazila. ICT employees assist with the creation of technical specifications, the technical evaluation of tenders, and other tasks as a member of the procurement committee. They assist in inspecting or testing the received goods after delivery.

g) **e-nothi:** A2i developed the online platform known as "e-filing" to establish a paperless workplace. ICT personnel provide e-filing assistance to all Upazila government agencies. On the E-filing system, ICT employees occasionally organize 2- or 3-day training sessions, to which they invite all Upazila offices.

h) **Cybersecurity Awareness:** In today's world, everyone dreads the phrase "cyber harassment." For instance, ICT staff raise awareness among officers with the support of the Upazila administration and occasionally organize different types of seminars to do so.

i) **ICT Committee:** The Upazila Committee on ICT was established to improve ICT at the district and Upazila levels and create a digital Bangladesh. To progress and promote ICT, the committee will lead and participate in activities linked to these. The group will also offer suggestions and an education program to the populace and students to establish a digital Bangladesh.

j) **Sheikh Russel Digital Labs:** The Sheikh Russel Digital Labs (SDRL) were set up at educational institutions to help students learn foreign languages and information technology (IT). In addition to learning about ICT, the institution's students are also learning about other subjects. Assistant programmers at the Upazilla level keep an eye on the SDRL lab to make sure it is operating properly and to see if there are any hardware or software-related issues.

k) **Union Digital Center (UDC):** To bring information services to the doorsteps of the general populace, the government established Union Digital Centers (UDC) in each Union in Bangladesh. The Upazila Nirbahi Officer receives a report from the assistant programmers who visit each Union Digital Center (UDC) once a month.

l) **Innovation:** ICT executives constantly strive to consider a user-friendly environment from the standpoint of clients and service providers. Thus, ICT employees may support others in the workplace as they innovate or deal with new issues.

m) **Web portal:** The National Portal is a web portal that aims to provide details on all of Bangladesh's national unions, Upazilas, districts, and divisions. A web gateway with 25,043 web pages from various tiers of government was developed on March 7, 2015. There are around 30 plus offices with web portals at the Upazila level, and assistant programmers provide technical assistance or guidance to keep the web portals up-to-date and useful.

n) **Email:** Setting up paperless office administration with email, also known as electronic mail, is incredibly convenient. ICT employees are expected to assist officials with email-related problems by offering advice or technical support.

o) **Social Media:** Social media is now widely used by the general public. The majority of offices have pages or groups on Facebook, Twitter, and WhatsApp where ICT employees share information about their services or activities. ICT staff members assist other offices in setting up and running these platforms.

Theoretical Framework

The purpose of this study is to analyse the PSD through using ICT to the citizen. Forasmuch, the principal-agent problem (agency theory) is significantly relevant to this study (Eisenhardt, 1989). Here, the citizen as a service recipient is the principal and the ICT personnel as a service provider is the agent. The conflict becomes worsens when one exercises others' actions due to the conflict of interest. Traditionally, people used to visit public offices and get their services which means the agent (public employees) was fixed and principle was less emphasized. After the introduction of e-services, principal (people) is much emphasized as they get better services even from their house by using ICTs. Moreover, there is a paradigm shift in the public administration system as citizen-centrism is much emphasized. Principal–agent theory advocates an understanding of the interaction between these two parties where agents are responsible for the principle and strive to do better for the principal without considering their self-interest.

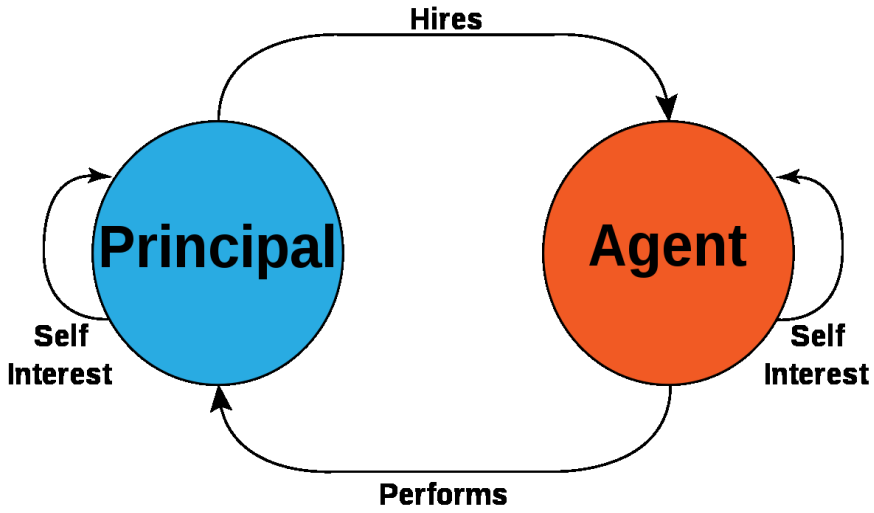


Figure 1: Principal-Agent Problem/Agent Dilemma (Chelniciuc, 2014)

However, agency conflict is the challenge of persuading one person, the "agent," to behave in the best interests of another, the "principal," as opposed to his or her own (Chelniciuc, 2014).

Methodology

A combination of the qualitative and quantitative approaches is used to attain the objectives of this study. In this study, primarily the questionnaire survey method is used for data collection. The online survey through Google Forms was administered to collect primary data due to the COVID-19 pandemic. However, a total of 218 respondents participated in the data collection of this study (Table-1. There are two Stata, one is the service providers and another is the service recipients. In this study, purposive sampling on specific strata was used for collecting very relevant data. The respondents included the field level employees working at the various department and offices (Upazila Offices of various districts) who provide ICT-related services as part of e-governance implementation. Key variables of the study include barriers (organizational, structural and bahavour), implementation challenges, and plausible solutions pertaining to views of both strata.

Table 1: Respondents' Distribution

Study area	Study population	Number of respondents
Structural, organizational and behavioral barriers in terms of both service provider and service seeker	Service providers (39)	70
	Service seekers (31)	
Major obstacles in implementing ICT-Related services	Computer operators, assistant programmers, programmers, or service-related people	15
Probable solutions to problems of ICT-related services from the views of service recipients	Head of the office (50)	69
	Office Assistant (19)	
Observation on overall issues	Programmer, Assistant Programmer	64

Table 1 demonstrates the area of study, types of population and number of respondents who participated in data collection.

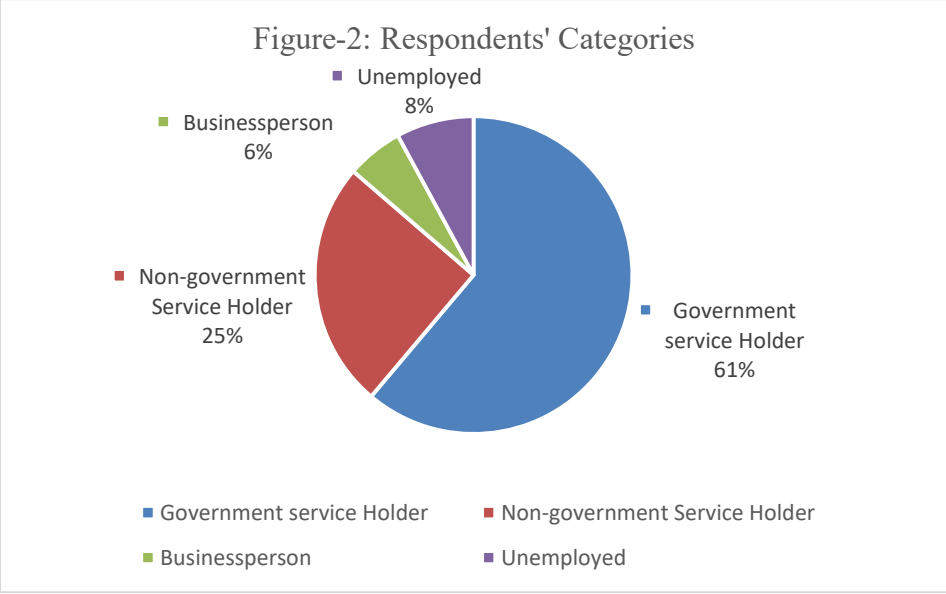
Findings and Analysis

In order to achieve the objectives of the study, some themes were categorized based on the data from the interview and questionnaire. The collected data were processed and analyzed using statistical techniques and instruments, particularly SPSS and Microsoft Excel. A total of 218 respondents participated in this study. They are from the service provider and service recipients of government e-services. The service providers are entry-level to top management officials of the government. Their experience in e-government services ranges from 1 year to 20 years approximately.

Barriers to Implementing ICT

This was designed to identify potential barriers that inhibit proving better services through ICT. These obstacles are categorized as structural, organizational and behavioral. In doing so, a total of 139 respondents were asked to opine on these issues. Most of the respondents (service recipients) (61.4%) are government servants while about 38% of respondents characterize other professions (Figure 2). The figure indicates that government servants who

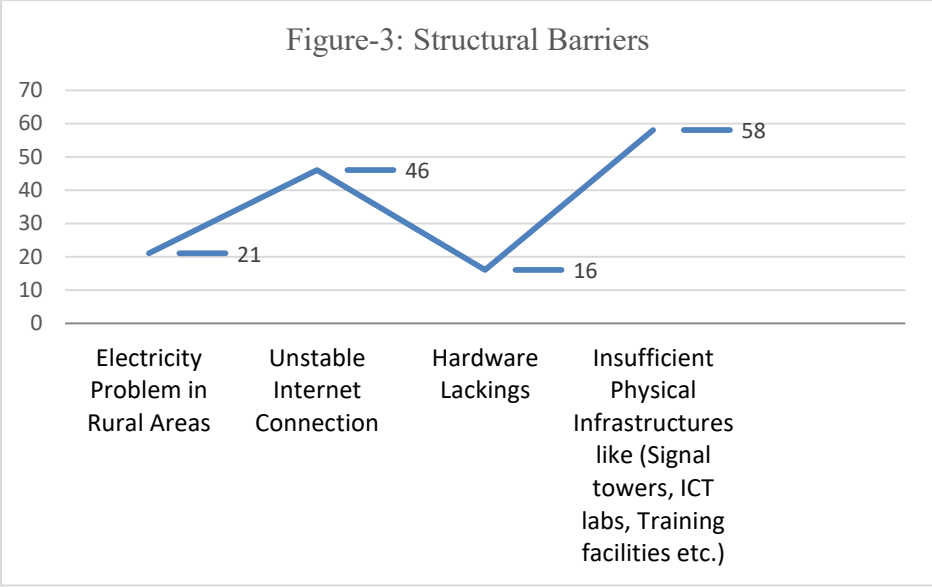
are implementers, find the structural barriers to implement ICT-enable services. Respondents are quite diverse as this covers public employees, businesspeople and also the unemployed to get a strong opinion.



Source: Primary data

Structural Barrier

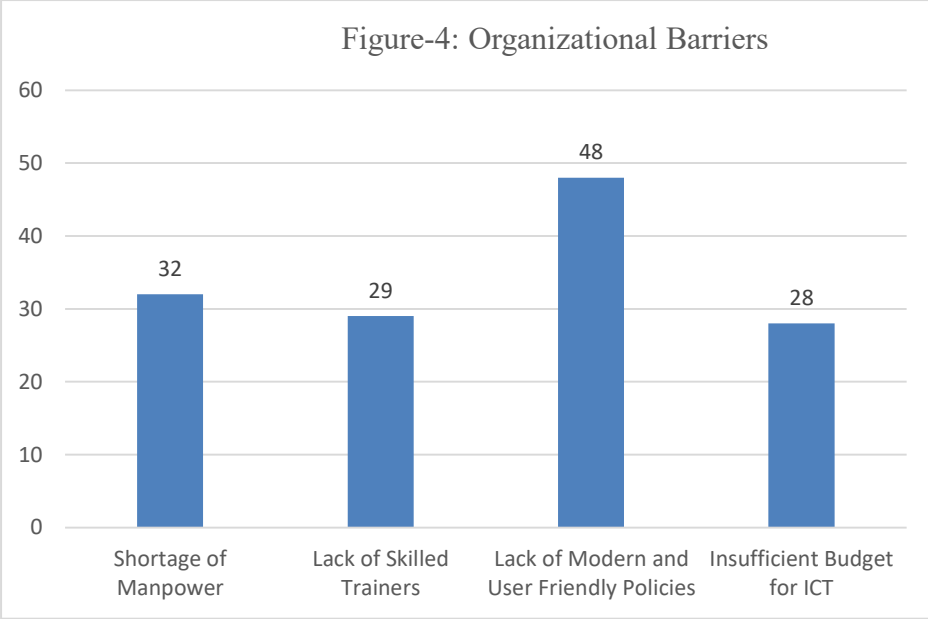
From the primary data, it is found that most of the respondents (around 60%) talked about the dearth of physical ICT infrastructures, which has maxed out the structural barrier. About 46% of participants (Agents) show that an unstable internet connection is the other type of structural barrier to implementing ICT services. These structural barriers are mainly the integration of various forms of both hardware and software as researchers identified that integration of heterogeneous databases inhibits the government to reach a certain stage (Layne & Lee, 2001).



Source: Primary data

Organizational Barrier

The bar diagram depicts that most of the respondents (Agents) said the lack of modern and user-friendly policies is the significant organizational barrier to access to ICT services. However, they have also identified manpower crisis, lack of skilled trainers and insufficient budget as important organizational setbacks. These are both vertical and horizontal integration as policy decision is top-down and non-coordination among the Upazila level public offices (Layne & Lee, 2001).

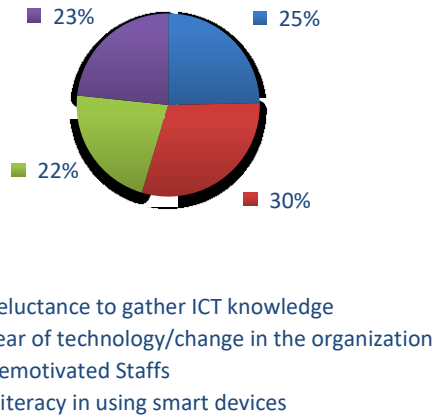


Source: Primary data

Behavioral Barrier

The pie chart demonstrates that 30% of the behavioral barrier belongs to the fear of technology or change in the organization. Besides, 25% of the respondents (Principals) are reluctant to gather ICT-related knowledge. However, demotivated staff and illiteracy in using smart devices are also important behavioral barriers. This happens because of skilled manpower at Upazila offices. On the other hand, lack of trustworthiness regarding the use of personal data of the citizen also creates obstacles to expedite e-services (Layne & Lee, 2001).

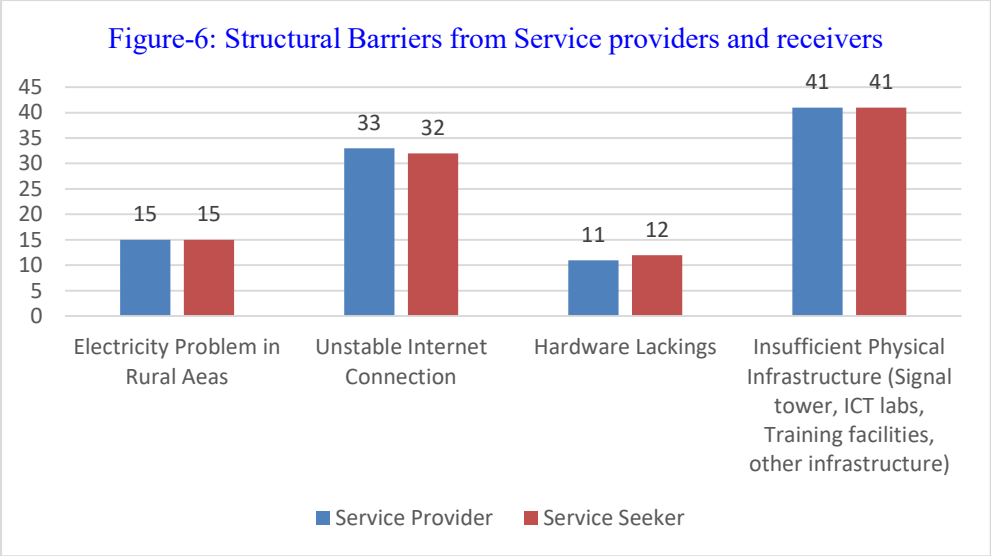
Figure-5: Behavioral Barriers



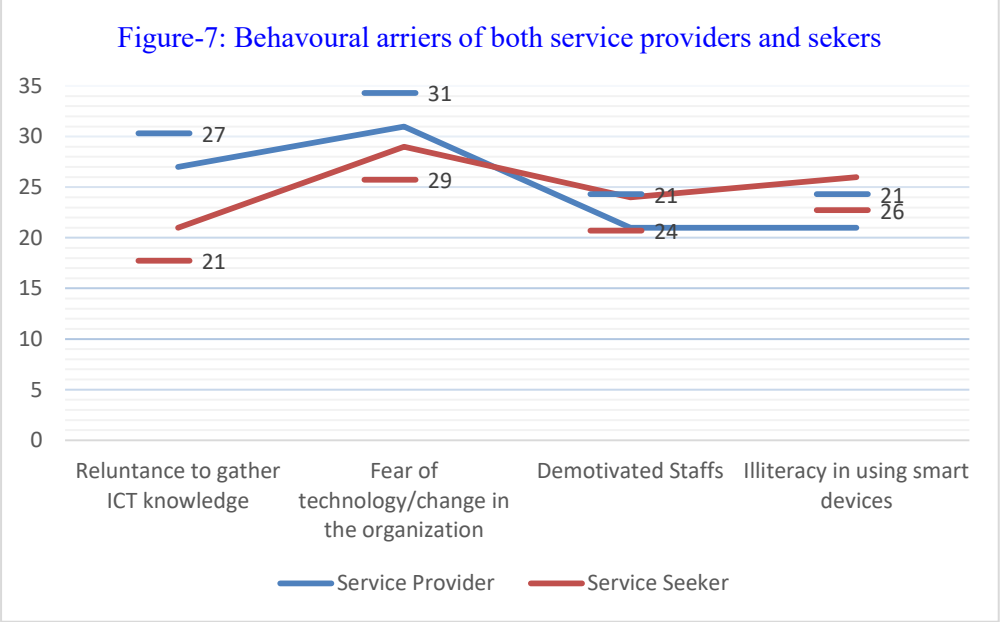
Source: Primary data

Barriers: Service Providers vs Service Seekers

Figures 6-8 provide a comparative analysis of structural, organizational and behavioral barriers to ICT in terms of service providers and service seekers. Electricity is the main structural barrier according to both service providers and service seekers. Shortage of manpower and lack of skilled trainers are the main organizational barriers according to service providers and service seekers. Fear of technology/change is the main behavioral barrier according to both service providers and service seekers. With the blessings of technology, people are getting all government facilities 24/7 without physically waiting in lines at government brick-bound offices. So, the term e-Governance is the effective and efficient use of modern ICT technologies such as the Internet, LANs and smartphones to improve the activities of public sector organizations to establish good and transparent governance.

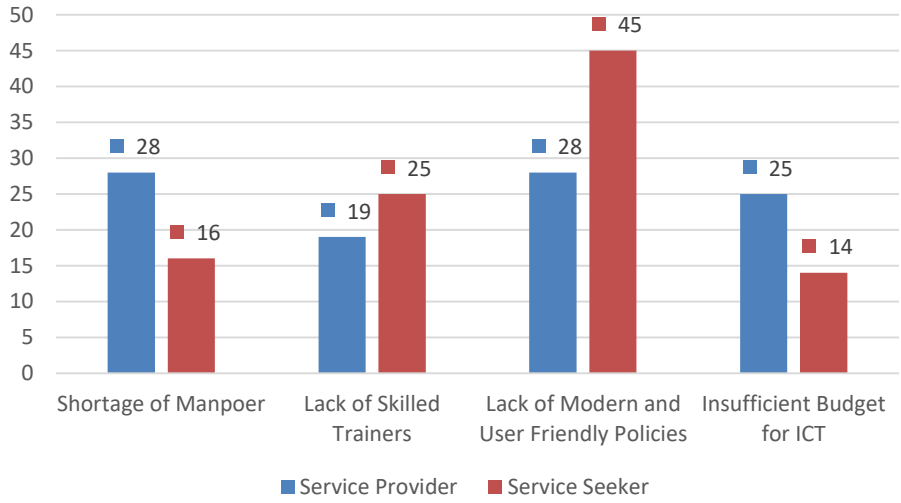


Source: Primary data



Source: Primary data

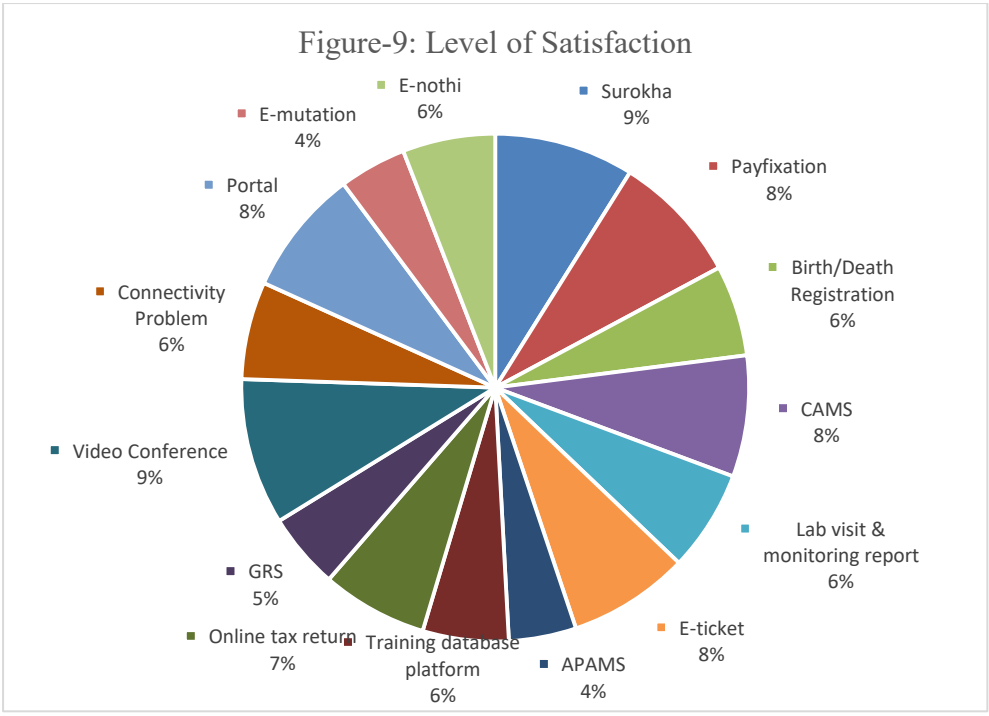
Figure-8: Organizational Barriers faced by service providers and receivers



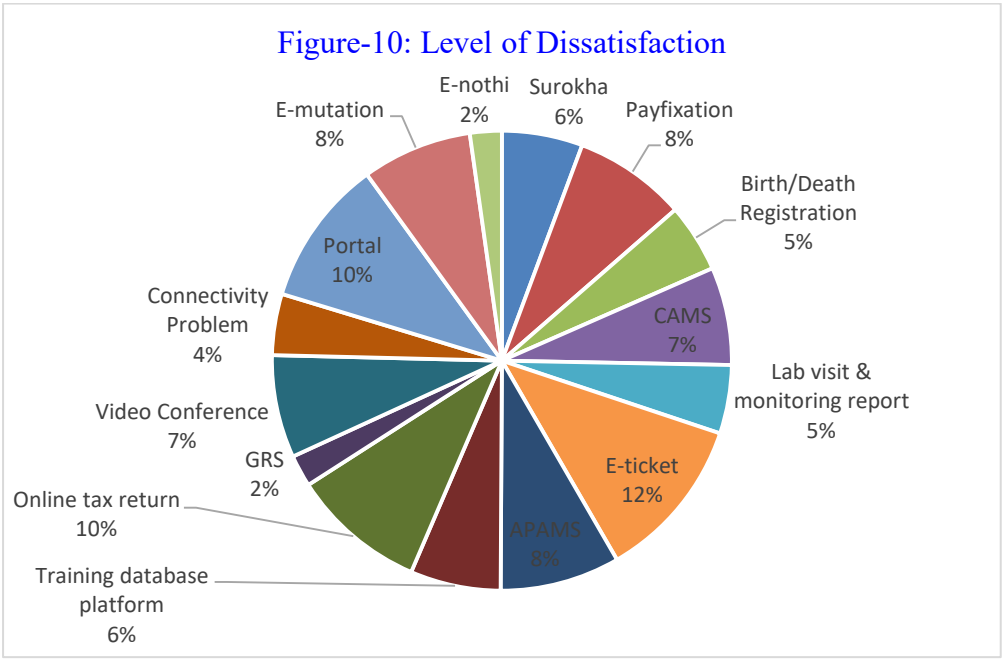
Source: Primary data

Probable Solutions for Implementing ICT-Related Services

There are almost 600+ e-services in Bangladesh. However, 15 e-services (Table 9) were selected which are usually provided at the Upazila level. Moreover, these 15 services are the most sought services by the local people. Data has been collected from a service provider like a computer operator, assistant programmer, programmer, or service-related people who are responsible to service providers and those who are receiving e-service. It is found that about 61% of service recipients are satisfied with the 15 services they get while 39% of them are not satisfied. Here satisfaction indicates whether they receive any of those selected services from the service providers at the Upazila level. The level of satisfaction and dissatisfaction varies across different services.



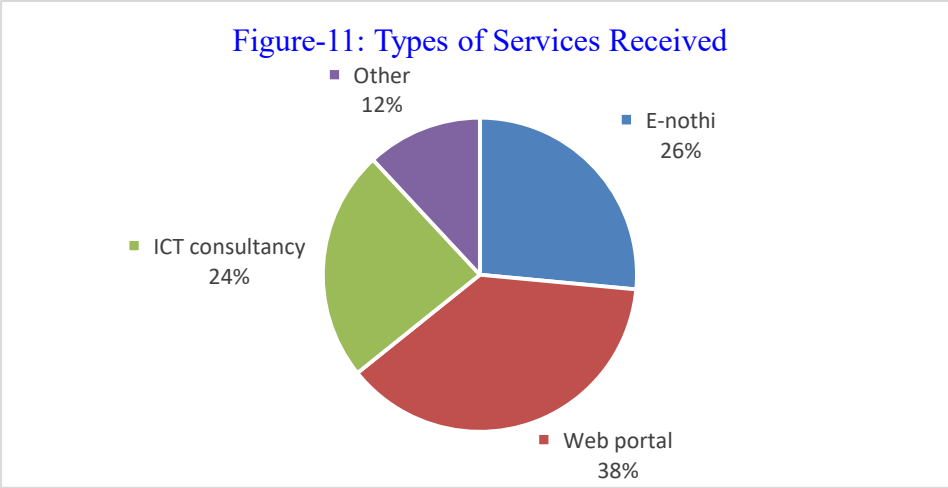
Source: Primary data



Source: Primary data

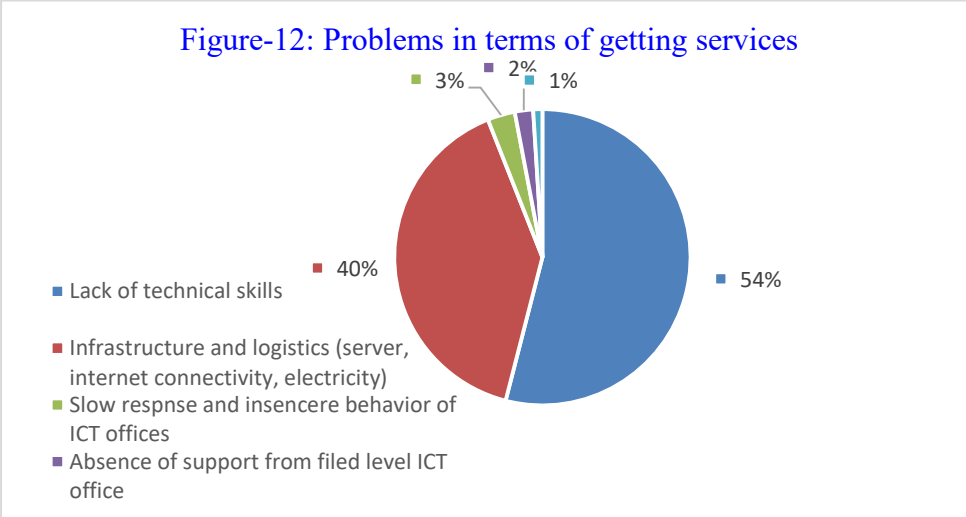
Probable Solutions based on the Views of Service Recipients

In e-governance implementation and execution, recipients are facing a variety of problems during receiving services. A total of 70 respondents were chosen from the respondents mentioned above for the questionnaire survey.



Source: Primary data

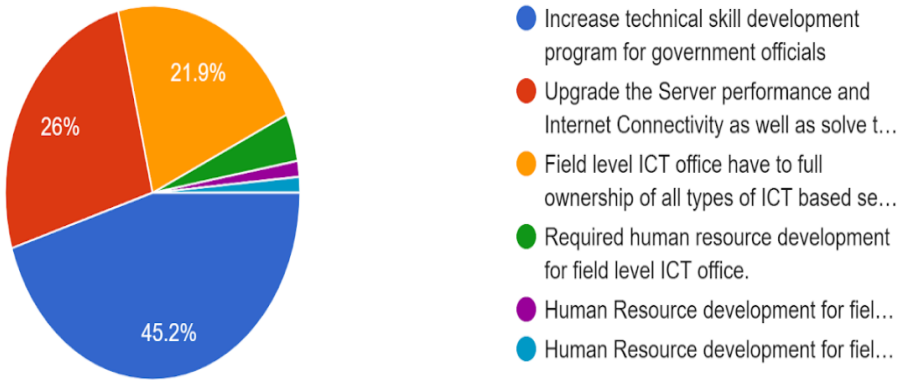
Figure 11 above shows that 26% of offices receive E-nothi-related services, 38% receive web portal-related services, and 24% receive other ICT-related services.



Source: Primary data

Pie chart 12 shows the problems faced by service recipients. A maximum of them agreed about their lack of technical skills and Infrastructure and logistic limitations. Less ICT knowledge makes them afraid of working with ICT-related services. They don't have enough logistics to practice ICT-related matters as well. In the last chart, the service recipient suggested some solutions.

Figure 13: Suggestions to Solve ICT-Related Problems



Source: Primary data

In Figure 13, recipients suggested some solutions to make ICT-related services more efficient. Recipients want to grow their technical skills through efficient training programs, and they have asked for good server performance as well, they also felt that field-level ICT officials should have ownership of all the services they provide.

Discussion

Strategies to Implement Different Policies

The ICT division is essential to establish a "Digital Bangladesh." The Info Sarker-3 initiative by the ICT division ensures internet connectivity at the ground level. The birth and death registration information system (BDRIS) guarantees birth and death registration at the Upazila level are directly tied to the SDG 169 indicators and implementing the 2018 election platform and achieving SDG Goal 9 28 high-tech parks were established across the nation by the ICT division. The 7880 SRDL & 2 Data Center has been established to

achieve SDG objective 4. While UDC offers more than 297 e-services (such as e-mutation, e-porcha, mobile banking, etc.) to the general public, the ICT division builds 7712 Digital Centers. The ICT division is implementing a project named 'SHE POWER' to empower more than 71000 women, and by 2026 and 2041, respectively, women will participate 25% and 50% more in online commerce. Complain about and receive help for a variety of social problems, such as eve teasing, early marriage, dowry, drug peddling, gambling, environmental degradation, and food adulteration. For emergency assistance, the government launches the 333 and 999 numbers. Numerous digitization initiatives have already been completed, and many more are in various stages of development.

Views of respondents in offering services at the Upazila level

While providing ICT-related services, respondent-1 noted that

> *"I discovered most of the clients suffer common problems, again and again, for example, people tend to forget their domain id and password. That may occur due to reluctance or a lack of awareness of the significance. I've seen that relatively few people attempt to solve their difficulties independently by searching Google, watching YouTube videos, or consulting physical instructions. That might occur due to a lack of curiosity or fear of technology. We must organize seminars, workshops, and training to inspire individuals and advance their technology literacy to address these issues".*

Referring to the attraction and motivation of young professionals at the implementation level, and respondent-2 expressed her views:

> *"The young officers are very fond of accepting and learning new technologies. But sometimes we face little problems with those officers who are used to traditionally doing things".*

Respondent-3 emphasized acquiring thorough knowledge and technical skills in utilizing ICT for better service delivery. Respondent-3 said:

> *"People suffer a lot owing to lack of good knowledge. They visit us for tasks that can be completed online from their location. We need to offer some workshops and seminars to address this issue".*

Although a better understanding of the use of ICT produces better service, lack of staff depletes performance, respondent-4 noted,

> *"I have some difficulties serving the people as there is no office staff. Everything gets more challenging to keep up with as the workload grows. When I can't assist someone directly, I try to resolve the issue remotely".*

Remedies to Barriers to Implement ICT-related Services of the Government

The Bangladeshi government took the initiative to establish e-governance in 2008; however, the execution of e-governance is not up to the mark, and the government is not benefiting fully from e-governance due to things like structural, organizational, and behavioral impediments.

Encountering Structural Barriers

Electricity Problem in Rural Areas: Electricity has been unavailable in many places in Bangladesh for a very long time. In the modern era of technology, we can't imagine a moment without internet access, power, or any other form of modern convenience. Regarding the modern technology period, that is a major issue. When there is no assurance of a consistent supply of electricity, it is impossible to consider building ICT infrastructure in that location.

Hardware Lacking: Another significant obstacle to ICT-based services is the lack of hardware in government offices. It is impossible to operate correctly and efficiently without the newest hardware and software. Another barrier to launching an ICT service is a lack of appropriate expertise in hardware and software.

Unstable Internet Connection: The most essential element for setting up ICT everywhere is an internet connection. A large number of government offices do not have internet access or only have slow internet. As a result, due to a lack of internet connectivity, the majority of government employees are unable to access the internet or any of the government's several websites.

Insufficient ICT Infrastructure: To implement ICT services a good infrastructure is crucial. Thus, the computer lab strives to provide basic functional computer services for customers who may not have access to such technology at home or elsewhere. The primary motivation for establishing these labs would be defeated without these resources.

Addressing Organizational Barriers

Generation Gap: The majority of government workers have been accustomed to analogue technology, and they currently fear embracing new technology. The

implementation of ICT-related services becomes highly challenging since they lack current knowledge of new technology and a lack of enthusiasm for acquiring it.

Lack of Integration: The same services, education, programs, and software are utilized across ministries and can be conveniently obtained from a single source. Therefore, a lack of integration can make the processes for providing services more difficult.

Absence of User-Friendly Policy: The lack of user-friendly guidelines is a common problem that makes it difficult to deploy ICT-related services in the public sector.

Shortage of manpower: There are many job vacancies in the government ICT industry, however, due to the system's complexity, hiring is still ongoing, depriving the public of speedy services. There is a deficiency of skilled trainers with pure ICT backgrounds.

Improper Planning: For poor planning from higher authority is also a barrier to implementing ICT-related services.

Limited Budget: Government must devote more funds to many sectors, such as training, workshops, research and development, infrastructure development, etc., to implement ICT-related services.

Limited Research: It is essential to do additional research on the subject to upgrade service. However, the ICT sectors have a restricted research scope, and the absence of infrastructure specifically for R&D also puts up impediments.

Handling Behavioral Barriers

Reluctance to ICT Knowledge: The majority of government workers prefer to service clients face-to-face rather than online. As a result, prompt ICT service is frequently unavailable. Additionally, Bangladesh's residents are reluctant to use online services.

Technology Adoption: Many government employees and regular citizens lack basic ICT knowledge and are hesitant to embrace new technological challenges.

De-motivated Employees: Even if we are in a technological age, there is still no appropriate organizational structure (organogram for ICT), and most employees have high expectations for the ICT cadre, which demotivates some workers.

***Illiteracy in using smart devices*:** Since many citizens lack computer literacy, they are unable to apply for services online.

Analysis of Views of Service Recipients

To understand the successful implementation of e-government services in Bangladesh, it is necessary to know the opinions, perceptions, attitudes, impressions, and beliefs of all government officers. The plan is that the interviews and the literature review will reveal the answers. Numerous examined researches appear to have neglected to concentrate on the distinctive factors, as was previously indicated in the study's introduction. To fill that knowledge vacuum, this study is being conducted.

According to the interviewees' findings, obstacles, issues, and challenges may need to be dissolved for Bangladesh to successfully adopt e-government. Participants were questioned regarding their attitudes, beliefs, and awareness of e-government services in Bangladesh as well as the obstacles that prevent the use of new technologies, such as a lack of technical expertise, failure to receive adequate support from the ICT office, cultural norms, and the logistical (server, internet connectivity, electricity) and infrastructure aspects of e-Government services.

The findings of this study, which were based on the replies of Bangladeshi IT and e-government personnel in public organizations and agencies, discovered and uncovered numerous significant elements that have a direct impact on the spread and adoption of e-government in Bangladesh. Numerous significant common variables must be dealt with professionally. A brief set of recommendations have been made in the study's final section in light of the findings to help the government organizations better the outcomes of their e-Government services and fulfil the aspirations of Bangladeshi citizens as well as their satisfaction with electronic services.

The interviews more strongly support the difficulties noted in the literature review and in the problem definition, such as the need for ICT/e-government transformation, awareness and participation, culture, and training, as well as areas that require attention to effectively implement e-government services in Bangladesh and developing nations. The findings of the researchers also match the findings of this research. Such as lack of knowledge and confidence regarding e-government, ICT strategy, e-government program, ICT infrastructure, human resources, satisfaction, inefficiency in the e-government process, and lack of citizen involvement are significantly connected with this study (Shalini, 2009; Alghamdi et al., 2011; Potnis & Pardo, 2011; Elsheikh, et al., 2008).

Conclusion and Recommendations

The study was designed to assess the implementation challenges that public employees face in providing ICT-enabled services to citizens at the Upazila level of Bangladesh. A number of e-government services are designed by the government to provide its citizen aligning with the vision of the government. However, citizens are not satisfied with the service that is provided. There some obstacles are found on both ends. From the agent side, public employees claim that the IT infrastructure is not well-designed and well-coordinated. Although the government has extended the service up to the lower-tier of the local government system, uninterrupted electricity supply, high-speed internet, and skilled public employees serve as the barrier to implement the e-services. Again, behavior of public employees, especially who are not much skilled and Luddite to technological adoption are the potential obstacles. Behavior pattern of service recipient is an issue of the smooth function of e-government services which connects to awareness of general people and well-acquaintance with the technology.

In spite of having those obstacles, it is a demand of the time that citizens, the principal must be served with the ICT-enabled system and continue with the pace of technological development and advancement of the country. The demand for ICT services is rising as a result of people's desire to receive services quickly and affordably at home. Despite the public interest, it cannot take off because of inadequate infrastructure, slow internet, a lack of ICT expertise, etc. As e-government services have the potential of transforming the traditional mode of governance, therefore, infrastructure for ICT-based service delivery needs to ensure and develop first. The government may develop the IT infrastructure at the Upazila level, can train the public employees and also sensitize general people in order to get a mutual benefit. Ensuring ICT-enabled services is necessary to advance the effectiveness and accountability of government (Rana et al., 2012). These above recommendations might be taken to overcome the structural, behavioral and organizational barriers to implement government e-services at the Upazila level nation-building offices in Bangladesh.

Policy Suggestion

This study was conducted to examine the barriers to providing digital services at Upazila levels. Based on the respondents' views, IT infrastructure is not sufficient enough to provide the expected services that the ICT division of the government should take measures to develop the ICT establishment. Moreover, employees can be trained on every specific service that is available at the Upazila area, therefore ICT division should take training initiatives to develop skilled manpower. ICT services can also be made user-friendly for the general people; thus ICT campaigns should be ensured by the Information and Communication Technology Ministry.

Future Research Direction

This study is among the ground-breaking investigations of Bangladesh's readiness for and adoption of e-government. Future scholars looking at e-government services may find it useful. Different ministries and divisions were not considered in this study. However, this study left up the possibility of exploring this subject from more angles including different ministries.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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