

Promoting Inclusive E-Governance: Role of Union Digital Centers in Bangladesh

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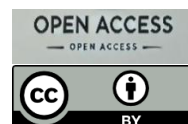
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Abstract

This research examines the impact of UDCs on the accessibility of public e-services in rural Bangladesh. The study followed a qualitative research approach to collect primary data. A total of 20 in-depth interviews were conducted with service users, and 6 key informant interviews were conducted with UDC representatives involved in service delivery. The study revealed that service users were confronted with a range of ongoing issues, including bureaucratic incompetence, unreported additional fees, bias in service provision, and inadequate grievance and monitoring procedures. Findings reveal improvement in Bangladesh, particularly in enhanced accessibility, service delivery and user empowerment. However, Bangladesh has physical access barriers for marginalized groups and the influence of unofficial middlemen and personal networks challenges less prominent in other contexts. The results also indicate that UDCs do not have a positive impact on effective emergency or crisis service delivery. It highlights the need for transparency, accountability mechanisms, and effective complaint redressal. The study has potential contributions in making the evidence that UDC creates positive impacts, but there are barriers to accessibility for marginalized communities. Expanding local digital training hubs, improve broadband and helpdesks, enforcing service logs and audits, strengthening data security, and simplifying procedures to ensure faster, transparent, citizen-centred digital services.



Received:
02 July 2025

Revised:
29 October 2025

Accepted:
06 December 2025

Published:
24 December 2025

Keywords: Bangladesh, E-Governance, E-services, Union Digital Centre, Public Service.

Introduction

Public service delivery has changed worldwide due to rapid advancements in technology, and Governments worldwide use e-government to improve public service delivery and promote inclusivity. E-government refers to using innovative information and communication technologies, such as web-based applications, to enable citizens and businesses to access government information and services more easily, thereby improving service quality (Dawes, 2008; Fang, 2002; Wirtz and Daier, 2018). Public sector in developing nations has not improved service delivery or public perception due to challenges like inefficiency, bureaucratic processes, limited accountability, inflexibility, and corruption (Godbole, 1997). E-government offers opportunities for improving government quality, making services simple, inexpensive, and customer-focused. It is especially crucial in developing countries in helping eliminate poverty, growing the economy, reducing graft, and establishing good governance (Faroqi and Siddiquee, 2011).

Ma and Zheng (2019) found that satisfaction with e-government systems is primarily linked to e-service and participation and recommend promoting e-government and citizen engagement. In Estonia, Nielsen (2017) shows how E-government, utilizing ICT, has improved service delivery and public involvement, which is gaining popularity in underdeveloped nations. Hartanto et al. (2021) reveal the significance of strong governance practices in Indonesian local government, emphasizing the need for e-governance strategies for timely information delivery and public trust cultivation. In the Indian context, Bala and Verma (2018) explore the role of e-governance in India's governance, including initiatives like FRIENDS, e-Mitra, e-Seva, and Khajane have improved citizens' access to government services and promoted operational effectiveness. The Andhra Pradesh government has effectively utilized information technology to improve service delivery, notably through the introduction of the comprehensive land information website, Mee-Kosam (Prakash and Kethan, 2018).

Though these three e-government success stories from Estonia, Indonesia, and India illustrate the potential of e-government to improve and enhance governance and service provision, the specific context in Bangladesh raises separate but equally important considerations. Bangladesh is a populous developing country where a lot of people are deprived of access to government services and information at the right time and at the right level (Hoq, 2012). Public services are supposed to be within the reach of the citizens, and digital Bangladesh, the dream of the country, is considered to be one of the mediums

through ICT for implementing that public service to the doorsteps of the citizens of Bangladesh (Saleheen, 2020).

The government, in collaboration with the UNDP, has successfully established the Union Digital Center (UDC) in 4,509 unions, which represents the lowest level of the local administration system in Bangladesh (Amin and Selim, 2022; Amin and Shumshunnahar, 2023). Since 2010, UDCs have served as one-stop information and service delivery centers in the Union Parishad (Sharmin, 2020).

According to Minges et al. (2011), UDC can reduce services' time, cost and challenge and guarantee that underprivileged individuals may access and utilize information services. UDCs play crucial roles in bridging the digital gap, providing rural populations with the advantages of ICTs and promoting sustainable development (Rahman, 2019). It provides comprehensive services to rural residents, exemplifying the government's Digital Bangladesh vision, reducing the gap between central government and grassroots people (Hasanuzzaman, 2019). Its purpose was to develop an e-government that was more improved and effective. Even with the excellent services, Studies emphasize the challenges faced by UDCs, including a lack of guidelines, technical proficiency requirements, profit distribution, agreement tenure, and the public officials' reluctance to take ownership of and support these projects (Khatun, 2020; TIB, 2017). Amin and Shamsunnahar (2023) highlighted several key issues, including low ICT knowledge and skills, high service charges, and prolonged service delivery delays. Moreover, Insufficient electronic resources and unfriendly behavior by UDC staff are some major challenges too (Hoque and Sorwar, 2014).

Union Digital Centers (UDCs) were established by the government of Bangladesh to improve public service accessibility, particularly for marginalized groups such as rural women, men, the elderly, and people with disabilities. However, there is a lack of empirical research on assessing the impact of local governments' e-services on service quality, accessibility, and citizen satisfaction in rural Bangladesh, as well as the challenges faced by the marginalized people in availing e-services. This study explores the role of Union Digital Centres (UDCs) in Bangladesh. It provides empirical insights aimed at enhancing e-governance and rural service delivery, which can offer transferable lessons across South Asia.

Although previous studies have discussed the promise of e-governance worldwide and in Bangladesh, there is limited understanding of how UDCs function in rural areas for marginalized people. This study aims to assess the

effectiveness of UDCs in delivering and ensuring access to timely and affordable public e-government services, with particular emphasis on rural settings. The study also aims to clarify the practical factors that shape UDC performance by exploring citizens' experiences alongside the institutional and service-related challenges. However, studies on citizen satisfaction, inclusion, and the risks created by digital divides are still wanting. The current study seeks to address that gap by exploring the nature of e-government experiences in Bangladesh, focusing specifically on the experiences of grassroots communities. These findings contribute to the academic and policy debates by identifying Bangladesh-specific challenges related to e-government and deriving recommendations for making it more inclusive and effective. The research contributes to offering a more grounded, analytical insight into service quality, digital inclusion, and governance barriers in areas that previous studies have not addressed comprehensively.

Theoretical Framework

Union Digital Centers (UDCs) in Bangladesh are a major initiative of the Local Government, which largely helps reduce the digital divide, especially in rural areas, providing better access to public services through government e-services. (Abedin et al., 2021; Biswas and Roy, 2020). Primarily, these centers aim to increase awareness and provide key information that facilitates accessing various government services more easily, with reduced in-person visit requirements. Consequently, UDCs mitigated the common difficulties faced by the citizens in the traditional service delivery and decreased the frequency of visits to the administrative offices (Akhter, 2022; Prakash and Kethan, 2018). One of the essential aspects in assessing the success of UDCs is evaluating the effectiveness and efficiency of service delivery to the people.

This research uses Technology Acceptance Model (TAM) to describe user adoption of technology and Service Quality, which focuses on citizens' perceptions of e-government service efficiency and dependability (Davis and Granić, 2024). According to TAM, users form attitudes toward digital services through two critical perceptions: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Ajibade et al., 2017). PU guided the analysis of interview data in which citizens reported time savings, reduced travel, easier access to services, and overall gains from UDCs. Similarly, PEOU was employed to examine specific items related to the ease of the processes, clarity of instructions, and the guidance offered by entrepreneurs when interacting with the service.

Elements of Institutional Theory are also used to imagine how organizational and policy environments could influence implementation.

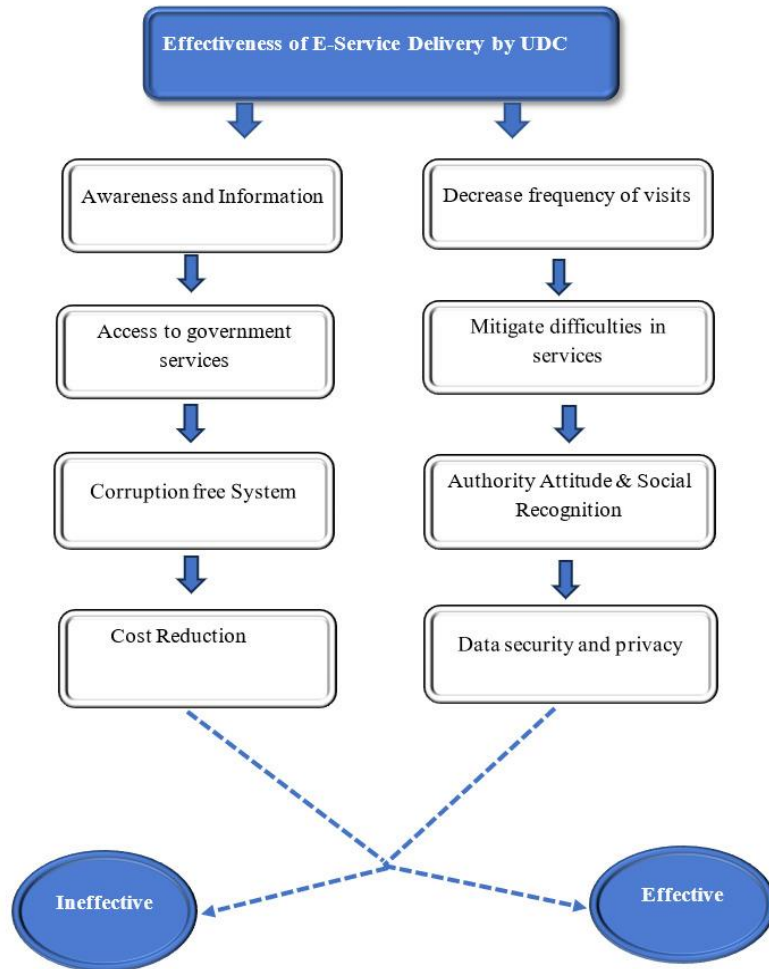
Institutional Theory offers a distinct yet significant viewpoint by highlighting the wider administrative and social context that influences the operations of UDC. According to David et al., (2019) , the functioning of public services in practice is influenced by both formal rules and informal norms. The interviews clearly highlighted experiences related to bureaucratic delays, local power dynamics, informal payments, political influence, and noticeable gaps in accountability. These frameworks, taken together, serve as the foundation for the conceptual model.

One key area to consider when measuring the success of UDCs is how well and efficiently service provider systems deliver services to the people. In order for this commitment to be fully met, there should be no corruption involved, and it will ensure public trust & satisfaction while increasing the credibility & adoption of digital platforms among rural populations (Ahmed, 2017). Expanding user experiences to include diverse voices can be achieved through improved access in both the physical and digital spaces. A good, reliable internet access and a well-developed infrastructure are very crucial factors that influence the ways people can engage with and benefit from e-services (Hoque et al., 2019; Ovi et al., 2024; Rahman et al., 2020).

Furthermore, the sustainability and efficiency of these centers are dependent on social acceptability, as well as the government's continuous policy direction and allocation of assets throughout time. As a result, it enables robust systems for increased monitoring and assessment capability, as well as improved service (Hartanto et al., 2021; Huque and Ferdous, 2024). A comprehensive intervention addressing these interrelated causes will considerably improve the quality and accessibility of UDC services in rural Bangladesh.

Figure 1

Theoretical framework



Note: Author's compilation

Study Methods

This study followed a qualitative exploratory approach to exploring the role of Union Digital Centers in providing public e-services to Khulna's rural areas. This study chose the Batiaghata and Jalma Union Parishads of Khulna as

its study area. The Batiaghata and Jalma unions were purposefully chosen for their accessibility, current e-government projects, and representation of both rural and semi-rural communities. The acknowledged challenges with digital service delivery at these sites made them ideal for gathering diverse opinions from users and providers.

Primary data was collected utilizing qualitative approaches such as in-depth interviews and key informant interviews researcher conducted 20 IDIs and 6 KIIs. Non-probability purposive sampling was used to select participants. IDI respondents were selected based on how frequently they visited the UDC, and responses were collected until similar experiences appeared. KII respondents were chosen for their direct roles in delivering or maintaining UDC services, allowing us to understand their perspectives, identify systemic barriers, and explore potential opportunities for improvement.

The secondary data were collected from books, journals, reports, and other prior studies related to e-service accessibility. Main data were collected in face-to-face interviews, with a duration of about 35–40 minutes each. The interviews were audio-recorded with the participants' consent and later transcribed for the analysis. The follow-up questions were sought for further detailed elaboration and explanation. Then we use verbatim transcriptions and manual color coding to identify themes. During coding we focused on the theoretical framework. The thematic analysis method was employed to identify, categorize, and interpret patterns within the data.

Ethical approval was obtained, participants were briefed, confidentiality assured, verbal consent taken, and withdrawal rights guaranteed.

Demographic profile of the respondents

In this section, the gender, age, occupation, and union of the 1 to 6 UDC service providers are illustrated, and respondents 7 to 28 are the service receivers from both Batiaghata and 1 No. Jalma Union.

Table 1*The demographic information of the respondents*

Respondent (1-6)	KII Respondents
Age	28-39 Years
Gender	3 men and 3 women
Occupation	UP Secretary, UP Assistant Secretary, and UDC Entrepreneurs
Union	Batiaghata Union and 1 No. Jalma Union
Respondent (7-26)	IDI Respondents
Age	22-51 Years
Gender	4 women and 16 men
Occupation	People from different occupational sectors of that region
Union	Batiaghata Union and 1 No. Jalma Union

Result Analysis

UDC: Essential Services

Bangladesh's Union Digital Center is a local government initiative for e-services that work well in rural places. It is an important service place that supports people in rural areas in using digital tools for various government tasks, such as online birth and death registration (filling out forms). Additionally, it provides access to many types of government notices and circulars, citizenship certificates, land registration forms, and more. These centers close the digital gap between cities and rural areas by providing access to basic government services, teaching people how to use technology, and enabling online access.

Awareness and Information Accessibility

The integration of UDCs in Union Parishad has significantly heightened community awareness. People now possess greater knowledge about UDCs and

are effectively utilizing their services. This enhanced accessibility empowered individuals to use the Union Digital Center efficiently. One of the beneficiaries stated that,

“I think people know enough about the Union Digital Center now because getting the service from the UDC is easy.” [Respondent 7, Age 22, Male]

Most of the beneficiaries agree that awareness has grown dramatically, particularly among younger people with easier social media access. Disparities do occur, though, especially among older and rural communities that appear to know less about UDC programs. The inclusion of the Union Digital Center significantly raised local awareness and access to these initiatives, increasing local participation. Most are fairly well-informed, especially among younger people, who have better access to social media. Still, there are large gaps among older people and in rural areas that would benefit from outreach.

Access to Government Services

UDC Services have improved by making the use of various facilities easier. By digitizing processes and providing services quickly, the UDCs have changed how services are delivered. One beneficiary pointed out that UDCs are a digitalized system now, which has changed the way people can receive public e-services. This shows a positive experience in which UDC staff responded quickly and addressed problems effectively. The study's findings suggest that UDC makes accessing public services easier. Even though most of them had a good experience, some responses indicated the scene was not the same for everyone. One of the beneficiaries stated that,

“I’ve gone there to correct the name for the birth certificate. They told me to fill in the form and took 3000 taka for the correction of the birth registration of my four children, and I had to wait for one year for this paper.” [Respondent 14, Age 31, Female]

Union Digital Centers (UDCs) have significantly improved access to government services, making processes more efficient and providing users with quick solutions. Although the experiences were good, the challenges with delays and charges indicate that there are areas that require attention for more equitable and efficient service delivery.

Corruption-Free System

Before UDCs, accessing services required bribes or unofficial fees paid through intermediaries. Digital processes increased efficiency with the advent of UDCs, rendering these types of deals unnecessary. An improvement is evident in users themselves, who find it easier to access services through digital platforms that reduce bureaucracy and corruption. One respondent explained,

“The digitalized system has helped reduce corruption as this has been less compared to the past, when people were required to pay several different people to obtain a service, compared to now, which is less with the computer system.” [Respondent 10, Age 38, Male]

Meanwhile, one UP official noted a persistent problem, even after digitalization took root. These difficulties are mostly caused by factors outside the UDCs’ direct control.

“The amount of corruption has decreased in UDC, but has increased outside because it is seen that there are some people in the Union Parishad, other than UDC or entrepreneurs, who want to provide services with some extra money, but outsiders may think that you are the one doing it.” [Respondent 3, Age 39, Male]

Additionally, one UDC official highlighted the issue of being transferred from “table to table” within the UDCs, resulting in prolonged pain and service delays. Government services are now online, allowing individuals to access them instantly with a single click using their name. However, the current process still involves multiple manual steps and approvals, similar to before. Even as digital platforms seek to eliminate corruption, the presence of intermediaries indicates deep systemic roadblocks, including low digital literacy, bureaucratic inertia, and information asymmetries between rural and urban areas.

Financial Implications

UDC has improved service accessibility and ensures timely and affordable delivery. UP officials noticed that UDC provides better and more advanced services than the traditional system. The response from them was like getting services is now quicker and cheaper. Even though the officials are emphasizing the positive aspects, the beneficiaries spoke about different scenarios with challenges related to this issue. According to the beneficiaries, as one stated,

“.....when I go to the Tahsil office or calculate the Khajna, a day’s work takes me a week. Many times, instead of 100 taka, they demand 1000 taka” [Respondent 20, Age 32, Male]

This demonstrates that introducing UDCs has improved service accessibility and cost-effective delivery, yet contrasting perspectives exist regarding increased expenses associated with technological infrastructure, raising concerns about potential financial implications and extra charges.

Factors Influencing Service Delivery

UDC officials and beneficiaries offer similar viewpoints on the physical locations and accessibility issues of Union digital centers. The findings reveal that, despite most people reporting fewer visits, issues such as multiple visits persist, hindering the effective use of UDC services. It is stated that association or connection with higher authorities, for instance, the chairman or members, lends support for better and efficient service delivery. As one service receiver pointed out,

"If you are a relative of the chairman or a member, or if you can give a bit more money, then it will help you get good service." [Respondent 21, Age 40, Male]

Many people believed that UDC staff provided better services in exchange for extra payment. This practice suggests a potential issue of favouritism or preferential treatment. The impact of unofficial middlemen and entrepreneurs is also evident in UDC, particularly in accessing services. The UDC system incorporates the function of entrepreneurs and unofficial intermediaries, as mentioned in both the UDC officials’ and beneficiaries’ responses. Such people were cashing in by providing superior or speedy services for an additional charge, thus creating a parallel route to bypass government procedures. As a KII comment on this topic points out, these entrepreneurs act as middlemen. This complicates matters when it comes to unofficial middlemen, payments, and personal ties, all of which influence how fair, effective, and equitable service delivery bureaus are at UDCs. This reliance on informal methods suggests that digital platforms will not facilitate easy accountability, and without institutional improvements, service inequity will persist. Payment discontinuance illustrates the apparent difference in service provision across UDCs, raising the disturbing prospect of varying quality of care being delivered based on social connection and money.

Data Security and Privacy

Union Parishad officials and service recipients have reportedly expressed confidence in the security of data in the Union Digital Centre. Interviews demonstrate enthusiasm and a belief that UDC contributes to effective data security, providing reassurance to stakeholders regarding the protection of sensitive data. One of the UP officials said,

"In this case, the entire data security is ensured because we send an OTP to their mobile, they tell us that OTP, and we use that OTP to verify their NID card or birth registration card to get access." [Respondent 5, Age 33, Male]

This approach adds a layer of security by utilizing mobile evidence and employing one-time passwords (OTPs) to verify user identity. While most respondents agree that UDC improves data security, few are concerned about the potential threats posed by exchanging personal information. The UDC excels in security and privacy, even if few users are willing to share their personal information. Communicating well and transparently about the security mechanisms in place, where they exist, will also be important to give users confidence and trust in UDCs' data security policies.

Feedback and Complaint Mechanism

The feedback and complaint system of Union Digital Center (UDC) varies, depending on the opinions expressed through contacting the chairman, members, or complaint boxes, with different levels of success. For its part, UDC officials say people can use the complaint boxes, talk directly to the chairman or members, or even reach a higher authority like the UNO on a higher level, but time is no longer relevant for complaints. One UP official stated that,

"I think they are satisfied. If they are not satisfied, they can inform us directly. They can also take help from the chairman and members." [Respondent 1, Age 35, Male]

Nonetheless, there were criticisms regarding this system's efficacy, like another beneficiary's remark as below,

"As far as I know, there is no such facility, and if there is, people don't complain here because of the fear of the people in power....." [Respondent 24, Age 30, Male]

Generally, there is a mixed response to the functionality, responsiveness, and availability of existing channels, such as Complaint Boxes and contact with the Chairman & members. The system appears to rely on individual connections or proximity to elite bureaucrats in order to function properly, potentially putting those not on par with those in power on the losing side of a competition. The fact that people feel differently may suggest that feedback or complaints may not be appropriate. It may affect the quality of e-services and accessibility through UDCs, especially for citizens with minimal links to the administrative system.

Emergency Response and Crisis Management

The Union Parishad representative points out that at their office, people are seen on a first-come, first-served basis. This illustrates an idealistic and rational approach to catering to people in the order of arrival; however, it is not a recipe for effective emergency or crisis service delivery. Rather, it indicates that people are to be served in a specific order. One UP official stated,

“Those people should maintain a line in front of our office. For those who come first, we provide them with our first service. In this way, we prioritize those people.” [Respondent 6, Age 28, Female]

While most service receivers felt the system wasn't doing enough during emergencies and complained that UDC officials take advantage of the emergencies, others expressed confidence in the UDCs' ability to manage issues effectively. One of the beneficiaries complained that,

“No, they didn't respond well. they sent us to different tables to get those services in case of emergency or Critical Services. And if we pay them, they serve us quickly.” [Respondent 14, Age 31, Female]

Since UDC personnel rely on arrival orders, they cannot respond to emergencies or handle crises effectively. The inability of the established service sequence to handle emergency events draws attention to a systemic weakness. Additionally, UDC representatives demand payment from service recipients to give emergency assistance.

Time, Visit, Quality Services

All this transformation has drastically improved the service provision efficiency for the community. It shows how the unnecessary steps were eliminated and the waiting time reduced. The establishment of Union Digital Centers has not only reduced red tape but also provided a one-stop access to services efficiently

and effectively, thereby significantly limiting the amount of paperwork and helping beneficiaries save time. One of the beneficiaries stated that,

“People now visit more to get services from UDC as they are giving Services within time, and I think that it saves time now because previously it was too much paperwork, and now we can get it within one application.” [Respondent 7, Age 22, Male]

Unlike the conventional system, where people need to visit numerous times for a particular service, service delivery in Union Digital Center is digitalized. This efficiency enables people to access services through a simplified process, made possible by the use of digital technology embedded in the UDC. One beneficiary mentioned,

“UDC is not so far from the people’s door, but the people from the grassroots area don’t know, and they do fewer visits, but it’s not so far to reach.” [Respondent 16, Age 37, Male]

The process of digitization achieved through the Union Digital Center reduces the need to visit physical spaces, thereby increasing accessibility for users who are more aware of and enrolled in online services or platforms from the grassroots level.

Union Digital Centers offer a step-up in service quality compared to conventional methods. Stakeholders report greater satisfaction with the services provided under UDCs as they have become more efficient and effective. Such a change is an affirmative answer from the community to the provision of enhanced service standards offered by UDCs as compared to the traditional set-up system. The time taken and multiple payments required in the conventional system have been substantially reduced, and thus, services through UDCs have become efficient and cost-effective. However, a handful of those who have benefited pointed to issues in this regard. The best implementation of efficiency and cost reductions through UDCs led to increased satisfaction. However, for some beneficiaries, red tape remains an ongoing challenge, affecting their overall experience with the quality of service.

Table 2

Matrix of Findings of E-services from UDC

Result Analysis and Findings Matrix	
Theme	Major Findings
Awareness and Information Accessibility	In the study, the researcher found that widespread awareness and use of UDC programs among the public were acknowledged. However, disparities persist among older and rural communities, indicating a need for targeted outreach to ensure inclusive awareness.
Access to Government Services	The study reveals that UDCs have significantly improved access to government services, simplifying procedures and reducing bureaucratic burdens. However, some respondents still face difficulties due to technical issues, service delivery delays, and cost disparities.
Data Security and Privacy	The present study demonstrates that despite some individuals expressing concerns about their personal information, UDCs effectively manage data security and privacy.
Corruption Free System	Unofficial mediators, payments, and personal connections often hinder fair and equitable service delivery. The prevalent structure appears susceptible to favoritism based on relationships and financial incentives.
Feedback and Complaint Mechanism	The study reveals varied opinions on current channels like complaint boxes and officials, highlighting a dependency on personal connections, potentially hindering fair access to services and affecting feedback mechanisms.
Benefits of UDC	The present study found that the UDC has vastly improved the quickness and simplicity with which people in the union can access e-services, saving a lot of time for everyone. This has minimized the need for time-consuming in-person visits and bureaucratic procedures that were previously required to obtain services. Implementing UDCs garnered increased satisfaction due to improved efficiency and reduced costs. However, challenges like red tape persist for some beneficiaries, impacting their overall satisfaction with service quality.

Discussion

The present study investigated the involvement of UDCs in implementing e-Governance via ensuring public e-services among rural citizens in Bangladesh. Cross-country evidence shows that Estonia, Indonesia, and India achieved improved service delivery, stronger public engagement, and greater operational efficiency through digital centers. Our findings reveal similar gains in Bangladesh, particularly in enhanced accessibility and user empowerment. However, Bangladesh differs in persistent physical access barriers for marginalized groups, and the influence of unofficial middlemen and personal networks is less prominent in other contexts. It also complements Rahman and Ali (2020), who argue that more provision for access to information is made by Union Parishad (UP) officials through social media, community meetings, and posters to unleash the services offered by UDC, which were mainly confined to online platforms. Nonetheless, inequities persist for older cohorts and digitally fewer literate groups. Therefore, strategies targeted to bridge the digital divide are essential for achieving equitable access (Hoque et al., 2019; Ullah, 2021). It advocates that comprehensive digital literacy initiatives should be a priority in scaling up e-government services in low-income nations.

This study reaffirms the findings of Sharmin (2020). UDCs overcome bureaucratic burdens and delays by offering faster and more efficient digital service options than traditional, paperwork-based government services. This study's results confirm that UDCs have greatly diminished the footprint of in-person visits for government service delivery. Still, technical problems remain a top problem, with users facing system outages, slow response times, and little support from providers, signifying an urgent need for more technology investment and workforce training (Akhter, 2022; Bhuiyan and Abrar, 2023). The finding underscores that a reliable internet connection, well-developed digital infrastructure, and regular skill training for the service provider are vital to maintaining e-governance functionality in developing nations.

One of the very crucial insights provided by this study is how UDCs contribute to reducing of systemic corruption. In line with the above observation, the results align with Bakshi and Rahman's (2016) assertion that digitalization reduces corruption by eliminating excessive human involvement in the procedural aspects of administration. The results showed that UDCs reduced face-to-face contacts between service seekers and government officials, which is consistent with the study's expectations. Corruption, however, persists outside the centers, with some respondents having to deal with middlemen and unofficial intermediaries.

The findings further highlight the importance of Institutional Theory, as factors such as bureaucratic delays, informal payments, and local power dynamics played a significant role in shaping both the delivery and perception of UDC services. The limitations imposed by these institutions frequently compromised the quality of services and diminished users' confidence in digital governance. To ensure that UDCs operate effectively, it is crucial to enhance accountability and reduce informal practices.

This is consistent with Bhatnagar's (2004) findings that digital governance does not always eradicate informal influence networks. To combat corruption, developing countries must enforce anti-corruption measures strictly, implement real-time monitoring systems, and provide whistleblower protection procedures.

The study showed partiality and unequal service treatment in UDCs, where people with personal connections, financial influence, or social prestige are given preferential treatment. Some significant recent studies along these lines show that informal power dynamics are still at work, with specific social and political hierarchies influencing equitable access to a wide range of digital services (Abdul, 2014; Hartanto et al., 2021; Prakash and Kethan, 2018). Policymakers should use automated service allocation processes, anonymous feedback channels, and independent audits to ensure impartial and equitable service delivery in UDCs, supporting inclusive digital governance.

The findings also raise issues about how personal information is handled and secured, highlighting a problem with data security and privacy. This is consistent with Ahmed (2017) and Dipon (2015), who both stated that personal data privacy is a critical predictor of public trust in digital governance systems. Uncertainty regarding the security of e-government services may restrict their impact, thus developing countries should prioritize ensuring user confidence by implementing cybersecurity regulations, privacy policies, and data protection laws.

The results of this study indicate that the service user TCV was dramatically lower with UDCs. This aligns with findings from a2i (2017) and Bhuiyan & Abrar (2023), who reported that digital government services have helped save time, save costs, and lessen the pain of bureaucratic procedures. The results indicate that citizens' willingness to embrace UDC services aligns closely with the fundamental principles of the Technology Acceptance Model. Users tend to adopt e-services more readily when they believe these services are truly beneficial and user-friendly. The positive experiences related to time savings and the encouragement from fellow entrepreneurs enhanced both perceived

usefulness and perceived ease of use, ultimately influencing their overall satisfaction. This indicates that enhancing usability and perceived value is crucial for maintaining citizen involvement with UDCs.

To strengthen e-governance, digital literacy programs should be scaled through Union Parishad-level training hubs, integrating community volunteers and school-based ICT labs to provide continuous, low-cost digital skill support (Bhuiyan and Abrar, 2023). Technical infrastructure must be improved by expanding broadband coverage and establishing UDC helpdesks for real-time troubleshooting to enhance service quality (Amin and Shumshunnahar, 2023). Accountability can be reinforced through mandatory service logs, citizen feedback dashboards, and periodic audits monitored by UP standing committees, reducing informal gatekeeping (Chowdhury and Panday, 2018). Robust data protection protocols and clear digital conduct guidelines are essential to safeguard privacy and build user trust (Mohapatra, 2016). Finally, simplifying administrative procedures and standardizing workflows can promote faster, more transparent, citizen-centered service delivery.

The study focuses on informal practices in Bangladesh's grassroots communities, emphasizing the importance of institutional transformation, trust building, and citizen-centered design in e-governance. It indicates that developing countries might adopt Bangladesh's UDC model to promote inclusivity, transparency, and effectiveness. However, concerns like as partiality, technological flaws, bureaucratic bottlenecks, and corruption must be addressed. Future research could compare Bangladesh's UDC model to e-governance programs in other countries.

Conclusion

In Bangladesh, the Union Digital Center offered new opportunities for rural people by bringing government services to citizens' doorsteps, lowering costs and time required to obtain services while increasing service delivery efficiency. However, the ability to overcome regulatory barriers, differential pricing, technical problems, and intermediated delivery ensures that service delivery remains patchwork. The most essential goal is to establish effective monitoring and grievance-redressal systems, as well as measures to strengthen institutional responsibility. To prevent exacerbating inequalities and reliance on informal practices, additional investments in digital literacy and community engagement are essential. The Union Digital Center in Bangladesh is an excellent example of local innovation in improving digital services for rural areas. This paper emphasizes the potential for local e-governance while also identifying

ongoing informal and structural factors that facilitate or impede progress, and may provide useful lessons for other developing countries seeking to develop inclusive, efficient, and sustainable e-governance.

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