

===== Journal of Social Science =====	©Journal of Social Science Vol. 7 No. 7 July 2024 pp. 118- 141 Faculty of Social Sciences Begum Rokeya University, Rangpur ISSN 2305-1035 http://doi.org/-----
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Assessing the Sustainability of Union Digital Centers (UDCs) in Northern Region of Bangladesh: A Study on Nilphamari District

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Abstract

This study aims to reveal the scenario of the sustainable status of Union Digital Center (UDC) in the Nilphamari district of Rangpur division. Both quantitative and qualitative methods have been used in the study following the Five Capital Model as conceptual framework. The total sample size is 360 comprising service providers, service receivers and managerial staff of the UDCs covering through survey method, observation method and in-depth interviews. The results show that UDC has already become a significant phenomenon for rural people for positive social impact. It significantly impacts the socio-economic environment in the study area by serving as a medium for ICT-based service exchange. However, other prospects like economic, natural, manufactured and human are not gained as per the expectation level. That's why; the sustainability of the centers is still far away. Proper human resource management, ICT accessibility, monetary allocation and MEAL could be integrated for establishing and strengthening the sustainability of the centers.

Keywords: *ICT, sustainability, Union Digital Center (UDC), service receiver, service provider etc.*

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Introduction:

Information and Communication Technologies (ICTs) have already become a significant phenomenon for socio-economic development in the world (UNESCO, 2004). It allows people to search for authentic information and communicate with others ensuring guaranteed benefits and 24 hours 7 days services (Bosamia, 2013). It has made the world a global village. It is now considered a driving force of sustainable growth all over the world (Farhadi, Ismail & Fooladi, 2012). Besides, it is now mitigating the digital divide and empowering the underprivileged community effectively through open accessibility, low cost and quality services. As ICT is the main driving force in today's world and development without covering rural community is questionable, the Government of the People's Republic of Bangladesh undertook a project to alter Bangladesh into a 'Digital Bangladesh' by the year 2021 to provide government services at the doorsteps of the rural grassroots people (Rahman, Islam & Ali, 2020). For this purpose, from November 11, 2009, Union Information and Service Centers (UISCs) currently known as Union Digital Centers (UDCs) were inaugurated in all unions across the country to provide information and convey government services to all citizens and ultimately to fulfill the desire of 'Digital Bangladesh'. These service centers were established by the Local Government Division of the Government with the help of the Access to Information (A2I) program, which is directly operated and controlled by the Prime Minister's office (Islam & Islam, 2018).

On the whole, the UDCs are serving successfully by delivering services to citizens' doorsteps and performing as a breakthrough towards achieving the goals of 'Digital and Smart Bangladesh'. The UDCs have enabled rural people access to needed information and essential services in rapid, cost effective and simple ways. Simply these are playing important roles in bridging the digital divide and giving the benefits of ICTs within the capacities of rural communities. As the final source of information and service delivery station, the UDCs' performance as a facilitator contrivance for ensuring sustainable development would be unparalleled (Rahman, 2016). Thus, identifying the factors affecting its sustainability is essential for the long-term sustainability and effective functioning of UDCs. This is what this research endeavors to do.

Statement of the Problem:

UDC is a place where all sorts of online government and commercial services are available for the grassroots people. It is based on ICT and the wider use of ICT in service delivery has improved

the quality of service delivery and its access to the grassroots level. It also minimizes the gap arising from the digital divide. UDC reduces the distance between the people and the government by providing e-services to the public. Additionally, it is crucial to the establishment of the e-government framework, which would eventually accelerate excellent governance in Bangladesh. Thus, UDC was a strong and important initiative to implement Digital Bangladesh and which could confirm Smart Bangladesh Vision 2041. The centers provide more than 100 services to marginal people through ICT-based mechanisms at a very low cost ensuring a development-friendly environment. It has become a center of e-service delivery of various GO-NGOs across the country (Mahmud, 2022). The centers are operating through private-public partnerships with the help of UNDP. So, UDCs have enough potential to transform Bangladesh into a 'Digital and further Smart Bangladesh'. But till now UDCs have been supported by the A2I project of the Government and so the question arises what will be the future of UDCs on completion of project duration? That is why this research intends to find out whether UDCs have roots to sustain in the long run. As understanding the sustainability of the UDCs is the significant focus, this study has tried to identify the potential of sustainability of the centers in the area considering social acceptance, financial viability, manufactured quality, natural structure and human resources.

Objectives of the Study:

The overall objective of the study is to find out the sustainable status of the UDC in the research area. Other specific objectives are as follows:

1. To evaluate the current operational status and functionality of the UDCs in the study area.
2. To identify the influential factors of sustainability of the centers in the long run.
3. To provide recommendations and policy implications for improving the sustainability and effectiveness of the centers in the respective areas of Bangladesh.

Research Methodology:

Both qualitative and quantitative methods have been followed in this research. Quantitative study like survey has allowed for taking information from service receivers and service providers and a qualitative approach has been taken to utilize the opportunities for discussions with managerial

staff like ADC (ICT), UNO, AC (ICT) and UP Chairman capturing the insightful views of the respondents compatible with the purpose of the study. The researchers have selected the Nilphamri district under Rangpur division as the study area. The researchers have selected 30 UDCs purposively of the area due to the proximity, significance and effectiveness assessment considering the monthly performance report of a2i. The duration of data collection is May-September 2023. The total sample is 360. Among the respondents, 300 service receivers, 30 service providers and 30 managerial staff were selected using simple random sampling and purposive sampling respectively (10 service receivers, 1 service provider and 1 managerial staff from each center). Service receivers have been covered under the questionnaire survey; managerial staff and service providers have been covered under both questionnaire surveys with interviews and three in-depth interviews have been conducted with purposively selected responders for a qualitative picture of the issue.

Moreover, content analysis and participatory observation methods have also been used to watch the overall facts. The combination of the stated methods is intended to be used in this research to take advantage of their respective strengths and overcome the limitations of others. It also helps to reduce the bias of any single method. The combination of these methods is expected to be a reliable tool for the research because combined method enables us to explore, unravel and understand problems, issues and relationships (Aminuzzaman, 1991). Data has been processed and analyzed statistically with the tools of MS Excel 2007.

Literature Review:

Bangladesh is an overpopulous country and they are mostly concentrated in rural settings and urban slum areas, making it a developing nation. Union Digital Centers (UDCs) have been set up across the nation to provide access to both public and private e-services. It has gained popularity in effective service delivery at moderate quality, but service functionality is very low. It needs to ensure the provision of creative services for the improvement of the centers (Ovi et al., 2023). UDC is considered as One Stop Shop (OSS) in Bangladesh. It has established to bridge between the community and government through ICT mechanism. However, it has not been able to make significant progress and innovations in e-service delivery due to manpower shortage, poor connection of electricity-internet and shortage of budget. Application-based services with proper power arrangement should be ensured (Bhuiyan & Abrar, 2023). It inspires the establishment of

digitalized governance which plays a vital role in increasing entrepreneurship, economic development and quality of living. It creates employment opportunities, e-literacy and certainty, but increases the risk of data security and hacking (Amin, Rahman & Badhan, 2022). It provides quicker and smoother services to the community people at a limited cost. Females get various services from the centers, though they use less ICT than the male. It charges less (75%), saves time (72.5%) and makes life easier (77.5%) for them. Service quality assurance and capacity enhancement are required to ensure for gender based participation and engagement (Saha, 2022). UDC is considered the most potential to empower rural communities. However, poor people are taking limited services from the UDC and the marginalized people are far behind from the empowerment due to lack of proper engagement at the centers. An effective strategy should be implemented to empower the whole society (Hosen, Nur & Khatun, 2022). The center has tried to ensure e-service delivery to rural people at a minimum cost. People mostly visit the center for birth registration and citizenship certificates and they are mostly satisfied with the services. But service diversity, commitment and network should be ensured for more improvement (Hasan & Tipu, 2022). It tries to reduce social inequality among community people through easy accessibility, empowerment, quality service delivery and a cost-effective system. However, lack of awareness, conflict of job responsibilities with UP secretariats and weak networks are the main barriers to effective e-service delivery (Abedin et al., 2021). The centers are decorated with community-based modern services. It has become a channel for ensuring the decentralization of service delivery, strengthening LGI and empowering the community. It has been working to bridge the gap between rural and urban people and mitigate the digital divide across the country (Khadiza & Ullah, 2020). Information, delivery system and services of the centers affect citizen satisfaction and citizen participation is significant for ensuring the stability of the centers (Biswas & Roy, 2020). It provides information for commercial and government services to the rural people at a minimum cost. Lack of equipment and manpower, slow internet speed and load shedding are the main obstacles to the sustainability of the center (Khatun, 2020). The social and financial success of UDC mainly relies on the contribution of various stakeholders like government, private groups, society etc. However, the private entrepreneur plays a critical role in establishing the sustainability of the respective center (Faroqi, Siddiquee & Ullah, 2018). The sustainability of UDC is a multi-dimensional cause-effect issue. Entrepreneur qualifications like professionalism and technical skill, Infrastructure like electricity and internet, Location like accessibility and availability of

needed services and government intervention like governmental support and political will play crucial effect on the sustainability issue. It will be only possible when all factors ensure equal cooperation and participation (Manun & Begum 2018). People find very little interest in the Union Digital Center at Gaibandha, Narail and Chapainawabganj due to a lack of updated information, new service, poor internet & infrastructure and poor skills of entrepreneurs compared with the respective private centers. A huge improvement in the issues is essential for the reestablishment and sustainability of UDC (Nowrin, 2018). UDCs are working on mitigating the digital divide among marginal people in Bangladesh grounding on PPP aspects. However, the sustainability of UDC undergoes a critical process concluding several stakeholders. We need to restructure the organizational pattern between a2i and DCA, implement a single networked internet-based system, design the revenue-sharing model between the agency and DCA and enlarge social awareness for engaging woman entrepreneurs to ensure sustainability for UDC in Bangladesh (Sarker, 2017). Union Digital Center is accelerating Digital and further Smart Bangladesh's reflection on community people ensuring various services through PPP. However, the sustainability of the center is in danger except the government budget which is a crucial issue. It depends on innovation, mass contribution, proper maintenance and entrepreneurship. Community engagement, participation and acceptance are essential for the purpose (Sarker & Kim, 2017). To ensure the access of rural people to all government-non-government services through information and communication technologies, the government established UDC across the country. But the purpose is going to be threatened due to scarcity of skills manpower, management and opportunity. That's why; sustainability has become an inclusion of social and financial terms. The selection of the right entrepreneur, availability of modern service and proper delivery system are the prerequisites for ensuring the sustainability of UDC in the country (TIB, 2017). UDC significantly contributes to mitigating the digital divide among rural people through the digital transmission of various services. However, it is going to lose its appeal due to the scarcity of service, infrastructure and other facilities nowadays. Authority needs to form new rules and regulations to ensure sustainable UDC all over the country (Faroqi & Siddiquee, 2017). Tele-center-based e-governance has been established to link the illiterate and poor rural people with the government. Service availability, accessibility, profitability and guarantee are influential factors for the sustainability of the centers. The satisfaction level of the service providers is only 20-30% (Reza, 2016). Most of the UDC entrepreneurs are earning very minimum profits and starting to think about their permanent future.

Monthly income largely depends on the level of equipment and service provided by the government along with the entrepreneur. It also depends on the acceptance and participation of community people. To ensure the financial sustainability of UDC, all the factors associated with the platform must work jointly with complete diligence (Faroqi, 2015).

So, there are several types of research on UDC issues regarding services, qualities, and the e-governance role of it. However, there are a few numbers of studies that emphasize on sustainability of UDC. Nevertheless, most of the research is based on the southern and western parts of Bangladesh. There is no research on the sustainability issue of UDC focusing on the northern part of Bangladesh. That's why; researchers conducted the study focusing on the limitations of the issues.

Significance of the Study:

The government of Bangladesh has established the UDCs in rural areas and still is working diligently for the betterment of the community through this initiative and trying to service delivery at a very minimum cost. The centers are empowering rural people through ICT and bridging the urban-rural people across the country (Hosen, Nur & Khatun, 2022). Digital booths have garnered significant attention from researchers, prompting a substantial amount of research from multiple perspectives. However, the sustainability of the centers is still neglected and very few researches are available which focus partially on it. This research aims to assess the sustainability status with a focus on the socio-economic aspects of northern Bangladesh. The findings of this study will be valuable for academics, scholars, researchers, stakeholders, and policymakers.

Theoretical Framework:

There are various capital models on sustainability to measure the status of indicator namely the Three Capital Model (Radulescu et al., 2015), the Four Capital Model (Ekins, Dresner & Dahlstrom, 1992) and the Five Capital Model (Porrirt, 2005) etc. This study has followed *the Five Capital Model of sustainability* as a theoretical framework considering the socio-economic perspective of Bangladesh. It was developed by Jonathan Porrirt in 2003, co-founder of an NGO in England namely 'The Forum for the Future'. This model indicated five capitals namely financial capital, social capital, manufactured capital, natural capital and human capital etc. In this study, financial capital means income or profit in returns of investment, social capital means community acceptance & social indication, natural capital means working environment & infrastructures, human capital means skilled manpower & capabilities and manufactured capital means

quality service and delivery system (Goodwin, 2003). It identified that sustainability can be established and strengthened through the effective presence of the capital of any organization. The equilibrium among the capitals is a prerequisite for maintaining sustainability in any society. Any priority to a special capital may affect others negatively. The capitals are closely interrelated to each other. So, the sustainability of any organization is not possible without maintaining a balanced effort among the different capitals (Mamun & Begum, 2018).

Data Analysis:

Demographic Information

The demographic characteristics of the respondents will help us to understand the overall features of the study sample. A frequency distribution of the respondents has been presented below:

Table 1: Demographic information of the respondents

Variables	Characteristics (Frequency & Percentage)			
	Categories	Service Receiver	Service Provider	Managerial Staff
Gender	Male	199 (66.33)	26 (86.67)	29 (96.67)
	Female	101 (33.67)	4 (13.33)	1 (3.33)
Age	10-20	36 (12)		
	21-30	131 (43.67)	8 (26.67)	
	31-40	78 (26)	20 (66.66)	4 (13.33)
	41-50	49 (16.33)	2 (6.67)	24 (80)
	51+	6 (2)		2 (6.67)
Profession	Students	104 (34.67)		
	Job holders	62 (20.67)	30 (100)	7 (23.33)
	Businessman	79 (26.33)		22 (73.33)
	Unemployed	39 (13)		
	Housewife	6 (2)		
	Farmer	10 (3.33)		1 (3.33)
Education	Illiterate	5 (1.67)		
	Class 8	69 (23)		2 (6.67)
	SSC	67 (22.33)		7 (23.33)
	HSC	72 (24)	7 (23.33)	7 (23.33)
	Honor's	50 (16.67)	14 (46.67)	10 (33.33)
	Masters	37 (12.33)	9 (30)	4 (13.33)
Monthly income	0	39 (13)		
	1-10,000	132 (44)	14 (46.67)	2 (6.67)
	11,000-20000	69 (23)	9 (30)	4 (13.33)
	21000-30000	60 (20)	7 (23.33)	8 (26.67)
	30,000+			16 (53.33)
Service experience	7 days	86 (28.67)		
	1 month	32 (10.67)		
	3 months	55 (18.33)		

	6 months	44 (14.67)		
	1 year	83 (27.67)	30 (100)	30 (100)

In this study, the total number of participants was 300 from the service receiver's aspects. Among them, more than half, 199 (66.33%) of the participants were male, and the other 101 (33.67%) were female. The finding shows that the participants were aged between 10 to 50+ years. The majority 131 (43.67%) of the respondents were aged between 21 to 30 years, and 78 (26%) were 31 to 40 years. The other 36 (12%) were 10 to 20 years, 49 (16.31%) were 41 to 50 years and 6 (2%) were more than 50 years. As per occupational status, 104 (34.67%) are students, 62 (20.67%) participants are job holders, 79 (26.33%) are businessmen, 39 (13%) are unemployed, 6 (2%) are housewife and another 10 (3.33%) are farmer. In education, 37 (12.33%) have completed a master's Degree, 50 (16.67%) have completed honors, 72 (24%) respondents have completed HSC, 67 (22.33%) have completed SSC, 69 (23%) have completed class 8 and 5 (1.67%) are illiterate. In terms of income, 39 (13%) respondents' monthly income is zero, 132 (44%) beneficiary's monthly income is 1-10,000 TK, 69 (23%)'s monthly income is 11,000-20,000 TK, 60 (20 %) 's monthly income is 21000-30,000 TK. In terms of service experience, 86 (28.67%) participants have 7 days of experience, 32 (10.67%) have months of experience, 55 (18.33%) have three months of experience, 44 (14.67%) have six months of experience and 83(27.67%) have one year experience.

From the service provider's aspect, the sample was 30. Among them, 26 (86.67%) were male and 4 (13.33%) were female. The majority 20 (66.66%) of their age were 31-40 years, 8 (26.67%) were 21-30 years and 2 (6.675) were 41-50 years. As per occupational status, 30 (100%) participants are job holders. In education, 9 (30%) have completed a Master's Degree, 14 (46.67%) have completed honors and 7 (23.33%) were completed HSC. In terms of income, 14 (46.67 %) SPs have monthly incomes of 1-10000 TK, 9 (16.67%)' monthly incomes are 11000-20000 TK and 7 (23.33 %) SPs have monthly incomes of 21000-30000 TK. In terms of Experience in providing UDC service, 30 (100%) participants have more than one year of experience.

From the Managerial staff aspects, 29 (96.67%) respondents were male and 1(3.33%) was female. Among the managers of UDCs 4 (13.33%) were between the 31-40 year age groups, 24 (80%) were between 41-50 years and 2 (6.67%) were 50+ years old. Professionally, 7 (23.33%) respondents were job holders, 22 (73.33%) were businessmen and 1(3.33%) was farmer. Among them, 2 (6.67%) had completed class VIII, 7 (23.33%) passed SSC, 7 (23.33%) passed HSC, 10

(33.33%) completed Honor's degree and 4 (13.33%) completed Master's degree. In monthly income, 2 (6.67%) were in the range of 1-10000, 4 (13.33%) were in the range of 1100-20000, 8 (26.67%) were in the range of 21000-30000 and 16 (53.33%) were in the range 31000- 40000 TK. All of them had more than 1 year of experience in the centers.

Receiving UDC Service

How frequently the respondents receive the service of UDC in the study area was asked of the sample people. The response has been presented through a frequency distribution table below.

Table 2: Receiving UDC Service (SR)

Variable	Characteristics (Frequency & Percentage)	
	Yes	No
Regularly take the services of UDC	222 (74)	78 (26)
Necessary services related to IT from this center	190 (63.33)	110 (36.67)
Easy to get service from this service center	165 (55)	135 (45)

Table-2 shows that 222 (74%) participants were regular and 78 (26%) participants were irregular service receivers of UDC. Among them, 190 (63.33%) participants were getting the necessary ICT services while 110 (36.67%) were not getting the necessary ICT services. Moreover, 165 (55%) seemed easily get service and 135 (45%) had difficulty.

Service Diversity of UDC and Satisfaction Level of SR:

The service diversity of UDC and the satisfaction level of SR consider five measurement scales namely highly satisfied, satisfied, undecided, dissatisfied and totally dissatisfied. These measurements are categorized into two major and one minor indicators i.e. positive level- highly satisfied & satisfied, negative level- dissatisfied and totally dissatisfied and undecided respectively for data analysis.

Table 3: Service Diversity of UDC and Satisfaction Level of SR

Variables	Characteristics (Frequency & Percentage)					
	Quite Satisfied	Satisfied	undecided	Dissatisfied	Quite Dissatisfied	Rank Order
UDC's versatile services	51 (17)	141 (47)	18 (6)	89 (29.67)	1 (0.33)	1052
SP's Behavior	70 (23.33)	151(50.33)	10 (3.33)	65 (21.67)	4 (1.33)	1118
Service Costing	28 (9.33)	82 (27.33)	43(14.33)	127(42.33)	20 (6.67)	871
Internet Speed	6 (2)	62 (20.67)	45 (15)	123 (41)	64 (21.33)	723
Electricity Connection	25 (8.33)	223 (74.33)	3 (1)	42 (14)	7 (2.33)	1117
IT Device Availability	13 (4.33)	97 (32.33)	63 (21)	124(41.33)	3 (1)	893
Infrastructure	20 (6.67)	200 (66.67)	14 (4.67)	62 (20.67)	4 (1.33)	1070
SP's Working Speed	18 (6)	106 (35.33)	24 (8)	143(47.67)	9 (3)	881

UDC Present Condition	27 (9)	134 (44.67)	30 (10)	104(34.67)	5 (1.67)	974
Govt. Role in UDC	57 (19)	178 (59.33)	28 (9.33)	27 (9)	10 (3.33)	1145
Role in Smart Bangladesh	24 (8)	122 (40.67)	97 (32.33)	49 (16.33)	8 (2.67)	1005
Service Quality	39 (13)	126 (42)	44 (14.67)	85 (28.33)	6 (2)	1007
Continuous Development	29 (9.67)	105 (35)	90 (30)	73 (24.33)	3 (1)	984

Table 3 shows the measurement of the satisfaction levels were mostly positive in center's versatile services (17% & 47%), SP's behaviour (23.33% & 50.33%), electricity connection (8.33% & 74.33%), infrastructure (6.67% & 66.67%), existing condition (9% & 44.67%), government role (19% & 59.33%), role in Digital Bangladesh (8 % & 40.67%), service quality (13 % & 42) and continuous development (9.67% & 35%); while they were in negative level in service costing (42.33% & 6.67%), internet speed (41% & 21%), IT device availability (41% & 1%), SP's working speed (47.67% & 3%) etc. According to the rank order, respondents have the highest satisfaction with the government's role in the center such as service provider's behavior, electricity connection, UDC infrastructure and service diversity while the lowest satisfaction is with internet speed, service costing, service provider's working speed, IT device availability, present condition and continuous development respectively.

Related Knowledge of SR:

The related knowledge of SR consider five measurement scales namely very good, good, medium, low and none. These are categorized into two main (Strong level- very good & good and low level- low and void) and one minor indicator-medium.

Table 4: Related Knowledge of SR

Variables	Characteristics (Frequency & Percentage)				
	Very Good	Good	Medium	Low	None
IT knowledge	29 (9.67)	72 (24)	74 (24.67)	41 (13.67)	84 (28)
Political participation	42 (14)	66 (22)	48 (16)	36 (12)	108 (36)
Usefulness of service	70 (23.33)	180 (60)	38 (12.67)	9 (3)	3 (1)
Sustainable supervision	LGI 72 (24)	Govt. 47 (15.67)	DC 52 (17.33)	UNO 92 (30.67)	NGO 37 (12.33)

Table 4 shows the levels were mostly lower in IT knowledge (13.67% & 28%) and political participation (12 % 36%); while the level was strong in the usefulness of the services (23.33% & 60%). Importantly, 92 of the respondents thought of effective supervision of UNO, 72 of LGIs, 52 of DC, 47 of government and 37 of NGO for sustainable UDC.

Skills of Service Provider:

The skills of SP consider five measurement scales namely very good, good, medium, low and none. These are categorized in two main (Strong level- very good & good and low level- low and none) and one minor indicators-medium.

Table 5: Skills of Service Provider

Variables	Characteristics (Frequency & Percentage)				
	Very Good	Good	Medium	Low	None
IT skills	15 (50)		15 (50)		
Training	1 (3.33)	24 (80)	2 (6.67)	3 (10)	
Daily service	6 (20)	2 (6.67)	4 (13.33)	18 (60)	
Political participation	1 (3.33)	18 (60)		4 (13.33)	7 (23.33)
IT knowledge	6 (20)	21 (70)	3 (10)		
Service diversity	2 (6.67)	13 (43.33)	15 (50)		

Table 5 shows the levels were highly strong in training (3.33% & 80%), political participation (3.33% 60%) and IT knowledge (20% & 70%); lowest in daily services (60%) and strong-medium in IT skills (50% & 50%), service diversity (6.67%, 43.33% & 50%).

Satisfaction Status of UDC focusing SP Aspects:

The satisfaction status of UDC focusing SP's aspects was calculated considering five measurement scales namely highly satisfied, satisfied, undecided, dissatisfied and totally dissatisfied. These are categorized in two main (Positive level- quite satisfied & satisfied and Negative level- dissatisfied and quite dissatisfied) and one minor indicators-undecided.

Table 6: Satisfaction Status of UDC focusing SP Aspects

Variables	Characteristics (Frequency & Percentage)					
	Highly Satisfied	Satisfied	undecided	Dissatisfied	Totally Dissatisfied	Rank Order
Daily Income		8 (26.67)	1 (3.33)	19 (63.33)	2 (6.67)	76
Financial assistance for emergency needs		7 (23.33)		19 (63.33)	4 (13.33)	70
Internet speed		9 (30)		20 (66.67)	1 (3.33)	77
Electricity connection & supply	5 (16.67)	17 (56.67)		7 (23.33)	1 (3.33)	108
Work environment	10 (33.33)	15 (50)		5 (16.67)		120
Monthly income		11(36.67)	4 (13.33)	15 (50)		86
Political will in operation		11 (36.67)	6 (20)	12 (40)	1 (3.33)	87
Legal provisions in operation	3 (10)	8 (26.67)	7 (23.33)	12 (40)		92
Social acceptance	5 (16.67)	9 (30)	2 (6.67)	11 (36.67)	3 (10)	92
Relationship with LGI	4 (13.33)	12 (40)	2 (6.67)	11 (36.67)	1 (3.33)	97
Service receiver's behave	7 (23.33)	20 (66.67)		3(10)		81

Table 6 shows the satisfaction levels were mostly positive in electricity connection and supply (16.67% & 56.67%), work environment (33.33% & 50%), relationship with LGIs (13.33% & 40%), SR's behavior (23.33% & 66.67%); while the negative level was in daily income (63.33% & 6.67%), financial assistance during emergency needs (63.33% & 13.33%), internet speed (66.67% & 3.33%), monthly income (50%), positive political willingness (40% & 3.33%), legal provision (40%) and social acceptance (36.67% & 10%) etc. According to the rank order, respondents expressed their highest satisfaction for the working environment, electricity connection and supply, relation with LGI, Legal provision and social acceptance while expressed lowest satisfaction for financial assistance for emergency needs, monthly income, internet speed and service receiver's behavior respectively.

Attitude towards UDC of MS:

The attitude towards UDC of MS was measured focusing five measurement scales namely very good, good, medium, low and void. These are categorized into two main (Strong level- very good & good and low level- low and void) and one minor indicator-medium.

Table 7: Attitude towards UDC of MS

Variables	Characteristics (Frequency & Percentage)				
	Very Good	Good	Medium	Low	None
Regular visit to UDC	30 (100)				
Observation to UDC	16 (53.33)	13 (43.33)	1 (3.33)		
IT knowledge	1 (3.33)	7 (23.33)	15 (50)	4 (13.33)	3 (10)
Coordination skills	10 (33.33)	19 (63.33)	1 (3.33)		
Political participation	13 (43.33)	15 (50)		1 (3.33)	1 (3.33)

Table 7 shows the levels were mostly strong in regular visits (100%), observation (53.33% & 43.33%), coordination skill (33.33% & 50%) and political participation (43.33% & 50%); but mixed up mainly with strong-medium in IT knowledge (3.33%, 23.33% & 50%).

Satisfaction towards UDC of MS:

The satisfaction level towards UDC of MS considering five measurement scales namely quite satisfied, satisfied, undecided, dissatisfied and quite dissatisfied. These are categorized in two main (Positive level- quite satisfied & satisfied and Negative level- dissatisfied and quite dissatisfied) and one minor indicators-undecided for effective data analysis.

Table 8: Satisfaction towards UDC of MS

Variables	Characteristics (Frequency & Percentage)					
	Highly Satisfied	Satisfied	undecided	Dissatisfied	Totally Dis satisfied	Rank Order

Overall performance of UDC	16 (53.33)	12 (40)	1 (3.33)	1 (3.33)		133
Professionalism of SP	11 (36.67)	14(46.67)	4 (13.33)	1 (3.33)		125
Service receiving rate of receivers	12 (40)	18 (60)				132
Skills/efficiency of SP	11 (36.67)	14(46.67)	3 (10)	2 (6.67)		124
Public-private partnership	1 (3.33)	20(66.67)	6 (20)	3 (10)		109
Electricity connection-supply	6 (20)	21 (70)	1 (3.33)	2 (6.67)		121
Internet speed		13(43.33)	4 (13.33)	13 (43.33)		90
Political will and Legal system	2 (40)	15 (50)	1 (3.33)	2 (6.67)		77
Your role in UDC	15 (50)	15 (50)				135
Socio-economic reality	4 (13.33)	23(76.67)	2 (6.67)	1 (1.33)		120
Work environment	12 (40)	16(53.33)	1 (3.33)	1 (3.33)		129
Government role	13 (43.33)	13(43.33)	1 (3.33)	3 (10)		126
Financial management system		21 (70)		9 (30)		102
Financial assistance during emergency	11 (36.67)	8 (26.67)	1 (3.33)	10 (33.33)		110

Table 8 shows the satisfaction levels were mostly positive in the overall performance of the centers (53.33% & 40%), SP professionalism (36.67% & 46.67%), service receiving rate (40% & 60%), skills of SP (36.67% & 46.67%), partnership pattern (3.33% & 66.67%), electricity connection and supply (20% & 70%), political will and legal system (40% & 50%), personal role (50% & 50%), socio-economic reality (13.33% & 76.67%), work environment (40% & 53.33%), government role (43.33% & 43.33%), financial management system (70%) and financial assistance during an emergency (36.67% & 26.67%); but mixed up mainly with positive-medium-negative in internet speed (43.33%, 13.33% & 43.33%). According to the rank order of the managerial staffs' satisfaction level, the MS are mostly satisfied with their role in UDC, the overall performance of UDC, service receiving rate and the working environment while they express less satisfaction to political will, internet speed, financial management, emergency financial assistance and PPP respectively.

Sustainability of UDC:

The sustainability of UDC was measured through service diversity, budgetary allotment, service quality, privatization, and foreign aid through NGOs etc.

Table 9: Sustainability of UDC

Variable	Characteristics	Frequency	Percentage
How can UDC be sustainable?	Service diversity	108	30
	Budgetary allotment	77	21.33
	Service quality	108	30
	Privatization	43	12
	Foreign aid through NGO	24	6.67

The result shows in Table 9 that a substantial portion of respondents, 108 (30%) endorsed the idea of sustainability through diversification of service, 77 (21.33%) emphasized the importance of budgetary increase, 108 (30%) highlighted the significance of service quality, 43 (12%) favored for privatization and 24 (6.67%) expressed support by foreign aid through NGO as the prerequisite to the sustainability of UDCs.

In-depth interview 1

Samira khatun, 28 years old, works as teacher of a government primary school at study area. She has been receiving various services from the UDC since 2012. She has known about it from her teacher. She has taken help from the center in education, recreation, job searching etc. She has received various results and job information from the centers. Even now the center has become a part and parcel of her daily life. She feels safe and informed using the center. She has got various operational training on social media sites, internet browsing and computer applications. Other girls from her community visit and take services from it. It has become an important center for the socio-economic development of the area. She expressed moderate satisfaction while asking the service she gets from the center. She said ‘I have got the birth registration certificate, result and mark sheet, passport application and land-related services from the center. I inspire others to visit the center to get various services at a low cost. People regularly visit the center and are satisfied with the centers. But load shedding and poor internet connection disturbs regularly.’ She emphasized the government involvement in the UDCs permanently.

In-depth interview 2

Aminul Islam, 32 years old, has been working as a service provider at a UDC of Nilphamari since 2010. He has vast experience in the process of establishing and strengthening the center as a one-stop door service for the people of diverse background. The center as well as SP has got popularity in society. It has solved the unemployment problem of the SP and approached a partnership with the government. But various preconditions like electricity, internet, income, partnership patterns and other mechanisms are not in satisfaction level according to him. He has been suffering from the insecurity of job placement and the future of the center. Improvement of service quality with diversity, proper advertisement, budgetary allocation and effective supervision could contribute in ensuring sustainability of the center in society after the completion of the project of government. He said, ‘The government has implemented the UDC under the a2i project through PPP mechanism. It has become an excellent center for establishing and strengthening communication

among community people, LGI and the government digitally. We're working hard to serve the people with ICT mechanisms. Community people are satisfied with the mechanism. But we don't get much salary and benefits from the job. Even, electricity, internet and device are not in moderate condition. It's now become a concerning issue. The government should include budgetary allocation for us and identification should be ensured.'

In-depth interview 3

Nur Mohammad, 46 years old, is a member of a union parishad of the research area. He has been carrying out the supervision role of UDC for 2.5 years. He considers the center as a store house of various GO-NGO services with digital mechanisms. He assured that it has decreased the gap between the privileged and underprivileged people by ensuring equal accessibility for all. He regularly visits the center and watches users' happiness in taking services. He always tries to provide sufficient support to the SP with the consultation of officials. However, he is concerned about the existence of UDC in the long run. Inadequate distance coverage, lack of modern ICT mechanisms, budgetary allocation and insufficient emergency support are the main obstacles to the prospects. A new policy with proper socio-economic effort is essential for the betterment of the centers. Addressing the usefulness of the center, he added, 'The UDC is serving the community with various services through ICT mechanism at a very low cost. It has decreased the gap between people and representatives. It has also decreased the workload and suffering for us. However, the procedure needs to be modified for the betterment of the centers. Proper arrangement of modern equipment, partnership, decentralization and budgetary allocation should be ensured for the betterment of the centers.'

Discussion:

Union Digital Center (UDC) has become an integral part of community development. A recent report shows that there are 4554 UDCs across the country and provided 150 public-private services to the people. The entrepreneurs of the centers have earned \$32.95 million. Almost 2.1 million online registrations of prospective migrant workers have been completed, 4 million citizens are involved in M-Banking, 0.29 million citizens are enrolled in life insurance, 367 million services are provided and 75 million birth registrations are completed through the UDCs (a2i, 2022). Faroqi indicated that the financial sustainability of the UDC depends on the various capitals. Monthly income is a big factor in this aspect. But it is a composed result of the interrelated indicators like

entrepreneurs skills, ICT mechanism, social acceptance, partner's contribution and service delivery frequency etc. Most of the entrepreneurs don't have an effective attachment (participation, contribution and monitoring etc.) to the mechanism and it affects their overall performances. Financial visibility has become a major concern for the future of the center due to its backwardness (Faroqi, 2015). This study shows the financial instability of the centers. It indicates that most of the visitors (55.67%) age is below 30 years, 47.67% are student and unemployed, 71% are HSC or below educational qualified and 57% earns less than 10,000 taka per month. That's why, only 36.66% of respondents are satisfied with the service costing of the centers. But Most of the service provider (76.67%) earns less than taka 20,000 per month, only 26.67% are satisfied with their daily income, only 36.67% are satisfied with their monthly income and only 23.33% are satisfied with the emergency fund mechanism. Most of the indicators of financial aspects remark a negative status of the centers. Sarker & Kim stated that social status is crucial for the sustainable UDC in the local area. UDC has already established and strengthened rural ICT based connective society. But rural people are not satisfied with the service cost as they think it is cost free or government service. Moreover, female entrepreneurs are neglected to work day long at the centers for socio-economic constraints (Sarker & Kim, 2017). Mamun & Begum found that social viability is significant for the aspects. Almost 50% people highly and 35% people moderately accept the UDC. But 85% service providers seek other job due to the uncertainty and pure stability of the centers (Mamun & Begum, 2018). This study reveals that UDC has already grasped the community attention through various easy and useful services. Most of the responders (74%) regularly visits the centers and satisfies (90%) with the service providers intervention. It has become a center of hope and aspirations to 83.33% responders. They are also satisfied with the government role (78.33%) and LGI relation (53.33%) with the centers. So, it has become a major tool for the fulfillment of Digital Bangladesh for the rural people. Mamun identified that human capital is prominently significant for ensuring sustainability to the UDC in local area for a long run. Various qualities like education, skills, trainings, IT knowledge, experience and professionalism are the main aspects of an effective center. It computes the overall service delivery and service receivers satisfaction. Mass people are found a little reluctant with the lacking of service providers in some areas (Mamun, 2018). This study indicates some unique issues of the UDCs focusing human capital. The UDC personnel especially service providers are educated, experienced, skilled, trained and IT knowledgeable. Most of the responders (73.66%) are satisfied with the SP behavior and

electricity connection (82.66%). But the ratio of satisfaction in internet speed, IT machine and SP work speed are respectively 22.67%, 36.66% and 41.33%. Though the outrage of the center has multi-dimension, the inner has various shortages.

Islam & Rahman found that though UDC plays pioneer role in removing digital divide among the countrymen, it has a little future prospects. LGI personnel try to influence the activities of the centers from the socio-economic perspective. The centers are losing entity and objectivity due to lack of the accountability (Islam & Rahman, 2020). Sarker stated that UDC follows numerous policies focusing private-public partnership pattern of e-service delivery to empower community people through ICT mechanism. But effective management of the centers is still in dilemma because of the lack of basic rules and regulations (Sarker, 2017). The result of the study shows that most of the people (73.34%) are satisfied with the UDC structures, while 53.67% are satisfied with the exiting status. Moreover, most of the service providers (83.33%) are satisfied with the work environment, 44.67% are with the continuous development of the centers. Hoque found that community people positively consider UDC as a major tool for establishing and strengthening e-governance in Bangladesh. It also signs to remove digital divide and sustains good governance (Hoque, 2020). Biswas & Roy added that service delivery system and service quality affects community satisfaction significantly (Biswas & Roy, 2020). This study finds that UDC is working continuously through community satisfaction. Most of the people (64%) are satisfied with the diversity of services, while 63.33% people are getting essential ICT service from the centers and 55% are fully impressed. Even though, most of the LGI (93.33%) are satisfied with overall performance, visited (96.66%) the centers regularly and considered as a strong administrative addition (90%) for socio-economic reality. So, it is clear that overall sustainability of the UDCs is in a moderate status. Though social sustainability is moderate, others likely financial, natural, manufactured and human etc. are not in a satisfactory level due to the socio-economic backwardness, lack of professionalism, lack of ICT machinery, lack of monetary support and absence of MEAL mechanism. Service diversity, professionalism, modern technology, effective partnership and community engagement should be ensured to strengthen the sustainability of the UDCs in the study area.

Limitations of the Study:

The research has focused and is based on only 30 UDCs of the district. Due to budget, time and resource constraints, it was not possible to cover other Districts in Bangladesh. A total of 360 respondents were considered for a survey and a limited number of respondents were considered for in-depth interviews. Shortage of necessary literature such as relevant books, journals and written documents in various libraries and educational institutions regarding this issue was another limitation of this research. Moreover, few respondents did not want to answer the whole question eagerly, because they were busy with professional and routine work.

Conclusion:

ICT services to the common peoples by UDCs are playing the key role for inclusive development. UDC initiatives, by using ICTs, attempt to reduce cost, optimize efficiency and effectiveness, make government more accountable and transparent, reduce the scope for corruption, and so forth. UDC essentially helps to reduce the gaps by increasing the capacity for both the government and other stakeholders by facilitating strong communication among them with the help of ICT. Various studies show that UDCs are playing a significant role in establishing and strengthening a network between government and rural people through ICT-based service delivery. It's also reducing the gap between rich and poor sharing a common platform for all and mitigating the digital divide across the country. It has already become a center of hopes and aspirations for the people. Having huge potentiality to serve common people how long it will be sustained is the main concern in this study.

The result of the study shows that UDC has gained immense popularity among rural people for its usefulness. It seems as a prerequisite for the sustainable socio-economic development of a society. People visit the centers regularly for various services on social, financial, political, economic and cultural aspects. The center has already got a social identity as a positive indicator of development for the rural people. However, the sustainability of the center depends on various socio-economic indicators focusing *Five Capital Model*. The center has earned the highest social capital highly but other capitals like manufactured, natural, financial and human gained moderately. That's why the sustainability of the centers is still far away considering the existing environment. It will be possible to improve service delivery, service quality, skilled manpower and participatory partnership under government supervision. It'll be more fruitful and effective if we can ensure the sustainability of the center.

Acknowledgement:

This research work was approved and financially supported by Begum Rokeya University, Rangpur, Bangladesh.

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