

FINANCIAL SUSTAINABILITY OF UNION DIGITAL CENTRES IN BANGLADESH

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ABSTRACT

This paper examines the financial sustainability of the Union Digital Centres (UDC) in Bangladesh in terms of Entrepreneur's monthly income. In the context of precipitating dropouts of entrepreneurs from limited income understanding and predicting a sustained level of income attains significance. The study identifies the major enablers of sustained income and the interrelationship among them that evolve from the interplay of partners engaged under the public-private partnership. Using the binary logistic regression model the study shows that partnership components such as infrastructure and service inputs, entrepreneurial capacity along with people's participation all have a significant part in explaining the monthly sustained income. The author argues that some of the inputs still could not make any significant contribution due to the lack of effective involvement of relevant partners. But to ensure financial sustainability of all UDCs and to prevent the dropouts of entrepreneur's the increase in units of these factors can play a significant role.

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INTRODUCTION

The telecenter movement is increasingly attaining popularity in developing countries for its missions of digital inclusions, e-service promotion and e-literacy in the context of technological, financial and human resource constraints for establishing wider connectivity (Bhatnagar, 2004; Hanna 2010). Often, for cheaper and convenient capacities this innovation is adopted by many governments as the leapfrogging strategy to bypass massive infrastructural and management cost burdens. Being a window of e-delivery point it enables the government to reach those who are otherwise unreachable with the promised benefits of e-government. Since the aim is to curtail cost and reach out with greater efficiency a great majority of telecentres are founded on Public Private Partnership (PPP) approach. It is understood that though the government take the initial responsibility to build them they would ultimately be owned and operated by the private sector with the financial viability attained. But to date the achievement is half-way between success and failure (Naik, 2011; Sharma, 2011; Jensen, 2007).

On a parallel trajectory Bangladesh has also followed a similar solution to connect its citizenry, vast majority of who live in rural and distant communities, to digital information and services (A2I, 2011). The government's technical and advisory unit, in charge of e-services for the mass people, the Access to Information (A2I) under the Prime Minister's Office has adopted a quick-win strategy by introducing shared access points in all Union Parishads (UP), the lowest tier of local government existent all across the country (4547). In operation since 2010 these access points were known as the Union Information and Service Centres (UISC) and currently renamed as the Union Digital Centres (UDC) that aims to work as the focal point of service delivery by bringing various government, private and local government services to the doorsteps of people. The specific objectives of the UDC are to connect the UP to the global and national network and make it the vibrant knowledge-based institution, ensure easy access of common people to the needful information and services, downstream ICT infrastructure in local government and foster local entrepreneurship (A2I, 2011a). This initiative is built on the bottom-up approach from which the demand driven service chain is expected to cause electronic transformations in the upper units¹ of government making the vision of 'Digital Bangladesh' a reality (A2I 2012).

Operated by two private entrepreneurs (Uddakta), one male and a female, under the public-private partnership model, the UDC is an ICT enabled one-stop centre where rural people can avail various information or services of multiple provider agencies including government, local government and private enterprises. It is equipped with computer, laptop, internet modem, mobile phone, webcam, photocopier, scanner, printers, multimedia projector, digital camera and solar panel, etc. initially supplied by the government and the UP. It charges prescribed fees for delivery of services to meet the day to day operation costs and income for entrepreneurs. It is likely to generate revenue sufficiency since it enmeshes government services with the commercial ones. To supply with these variety of services and make the model an economically viable one the government has engaged other partners such as banks, life insurance companies, mobile phone providers and

non-governmental organisations (A2I, 2012). While the government has assisted in the initial set up of UDCs it expects that entrepreneurs would eventually take the responsibility of sustaining the business in the long run (A2I, 2014; UN 2012)

However, the initial observation and interview with relevant stakeholders suggest that this project suffers from a very high rate of drop-outs of entrepreneurs from a variety of reasons such as low levels of income, conflict with the UP and mobility for marriage and higher jobs, among others, which challenges its ability to serve the intended mission. The lack of income serves as a major disincentive for entrepreneurs, especially women entrepreneurs, who leave the UDC premise trailing behind the promise of the centre interrupted with financial and opportunity costs. A number of factors have been articulated for Entrepreneurs insufficiency of income that range from lack of adequate equipment, slower internet connectivity, lack of government services, operator's incapacity and lack of entrepreneurship to lack of cooperation from the UP and government administration (A2I 2014; Siddiquee and Farqi 2014). Hence, understanding the financial sustainability in terms of operator's income attains significance in for its implications for sustainability of the model.

RELATED WORKS

In the context of externally supported telecentre project financial sustainability attains utmost importance in the discourse of sustainability since donor subsidies cannot be taken for granted for ever (Harris, 2007). The term refers to the capacity for earning adequate income for covering costs for operation and initial set up (Shadrach and Sharma 2013; GGA 2007). However, as the revenue sufficiency does not preclude receivables from the outside along with its own, for government owned projects the financial sustainability may not always refer to attain the 'break-even' point by charging users because many other government services are not burdened with such a responsibility (Hudson, 2001; Harris, 2007). But under PPP it must ensure generation of adequate income for its entrepreneurs (who are not salaried) to support themselves and their families since it is a social enterprise (Sharma, 2011). Income sustainability is very important for continuity of the service of the entrepreneurs and future ownership by them. If the telecentre cannot run on its own operation the investment behind it becomes a drain of public resources incurring the opportunity costs of development finance. Moreover, without establishing market principles it would not have incentives to better permanence and continue its existence in the face of competition (Wellenius, 2003). The surplus revenue generation is also required to replace the inexorable breakdown of equipment along with operating and maintenance costs to avoid shut down (Proenza, 2001). The continued earning capacity largely depends on trained staff or their competent replacements with their capabilities maintained and utilised. When skilled people find a better market place they would usually be lured away from the project but opportunity of sustained income can help with quicker replacements (Baark and Heeks, 1998). In the context of Indian Common Service Centres (CSC), which is also founded on PPP, an assured income for the operator equivalent to USD 150 is considered as the desirable level to sustain and adhere him/her to the business (Sharma, 2011).

Among all forms of sustainability such as social, political and technological (Shadrach & Sharma 2011) the financial sustainability attracts most concerns since it is related to the very survival of the centre while the formers can be developed once the latter is guaranteed (Kumar, 2005). Just as financial sustainability can lead to other dimensions of sustainability so as latters can have contributions to the financial success. For instance, financial sustainability is necessary for technological sustainability as the most noticeable cost usually relates to maintenance and replacement of equipment (Harris et al 2003). Similarly, people's visit in an increased number can ensure community acceptance and potential earning base as well. Wellenius (2003) stresses that without initial public support from the rural poor commercial viability is at risk. The veracity of services streamlined with social inclusion can attract people to visit the telecentre more frequently and thus sustaining community acceptance (Whyte, 1999). When people feel empowered by the telecentre they also offer their most to keep it in operation (Delgadillo et al. 2002 cited in Kumar, 2005). Even with the severe case of digital divide due to remoteness and isolation people oriented contents and partnership with the multidisciplinary organisations including the local ones won a strong community participation in *eBario* project of Malaysia (Lautz-Cauzanet, 2013).

Under PPP the relevant stakeholders' effective involvement is considered as the driver of financial sustainability. The leadership in government creates avenues for such engagement by building up friendly policy, infrastructure roadmap, needful services and resource channelling for ensuring other sustainability dimensions too such as 'Organizational', 'Policy' and 'Social' along with the 'Financial' one (Sadrach & Sharma, 2011). In Philippines both the roles of leadership and multi-sectoral partnerships are considered as determinants of community eCentre's sustainability. The enablers for much needed financial viability ascertained are equipment infrastructure and its usage, relevant contents and people's participation as happened in the case of *Akshaya* telecentre in India in attaining economic, social and entrepreneurial sustainability

(Prasad, 2012; Toyama et al 2005). These enablers emerge from the role play of partners in the model which function as the roof of the structure and supports entrepreneurship. Partners also look for mutual benefits. For instance, while the government wants efficient delivery the private entrepreneur wants profit maximisations. Local applications and contents attract social acceptance and local ownership (Shadrach and Sharma, 2011; Kumar, 2007).

To achieve financial sustainability private partner's entrepreneurial capacity is considered as the backbone. Researchers underscore that management and governance structure should be streamlined to promote telecentre as an enterprise. A good entrepreneur understands the business mechanisms in the market and designs his enterprise accordingly. Training and subsidisation on business plan, investment and market skills are essential attributes of entrepreneurship. Careful recruitment and ongoing training are conducive to producing competent entrepreneurs (Shadrach and Sharma 2011; Cecchini & Scott, 2011). External management support also plays significant roles in promoting financial sustainability. As the growth of telecentres needs conducive policy environment the government should shoulder the initial responsibility by providing public subsidies to promote it. Also, determining location for operation, optimum utilisation of office space as well as ensuring power supply and connectivity are management roles that have impacts on the earning capacity of it (Sharma, 2011). Ensuring less costly and speedy connectivity, adequate trainings to the provider, reward for good performance, and incentives from the generated revenue are helpful to entrepreneurship development (Kumar, 2007).

While these studies focused on the overall financial sustainability to reach a break-even point there are clearly lack of studies to provide any model to explain as what factors contribute to the sustained level of income of entrepreneurs. There is an urgent need to develop a model and test on financial viability as most externally funded telecentres face challenges with the exit of donors (Kumar, 2005) Moreover, in Bangladesh no studies have previously focused any forms of sustainability concerns of the UDC. Hence, this study focuses on the financial viability of the UDC from identifying the factors evolved from the interplay of partners in the model that have influence on the variability of entrepreneur's income. Despite there are other forms of sustainability this research paper only deals with the income sustainability. Correctly ascertaining the factors behind it will have implications for preventing drop-outs, and thus ensuring sustainability of the UDC.

Research Question and Hypothesis

The research question of the paper is: What factors are responsible for the income sustainability of UDC Entrepreneurs? Since major drivers of income sustainability evolve from involvement of partners under PPP with different inputs and people's participation (as the literature suggests) the hypothesis of the study is:

Partnership involvement in terms of infrastructure inputs, entrepreneurship and people's participation contributes to the Entrepreneur's income sustainability.

This paper is organised into 6 sections: Section 1 introduces the research problem, literature review, research question and hypothesis. Section 2 identifies the methodology which is followed by discussions on independent and dependent variables in the section 3 and 4. Section 5 presents the income sustainability model by using the logistic regression model followed by conclusion in the last section.

METHODOLOGY

The research is about the financial sustainability of the UDC and, hence, the respondents for questionnaire survey and the interview² are key stakeholders who are responsible for various aspects of operations and management such as Entrepreneurs, Management officials and UP representatives. Entrepreneurs who are member of a blog, *the UISC Blog*, are surveyed online and 538 of them responded to the questionnaire. The internet survey is used to get responses from large number of respondents with least cost and time. It has also advantages of getting objective, accurate and complete answers (Couper and Bosnjak, 2010). The response rate is 27% which is consistent with typical response rates of conventional online surveys (Nulty, 2008; Shih & Fan, 2008). Information on key variables used in the model are collected from the entrepreneurs since they are the ultimate managers and users of equipment, existing services, record keepers of service recipients, beneficiaries of government and local government supports and income from the UDC along with their own investment in the project (Bhatnagar, 2009). Since all entrepreneurs are not active in the blog, in the field level from 4 districts³, 19 UDC entrepreneurs are interviewed in-depth along with relevant management officials and UP representatives for richer understanding of how quantitative values are created and supplementing the quantitative outputs (Mingers, 2001). The argument is made primarily based on the survey data corroborated by interview findings and some secondary literature. Using the SPSS version 21 the survey data is analysed (SPSS, 2012). For all cases (out of all variables considered in the model) there are some missing values (36%). The trend of the missing values suggests that are more reasonably for skipping the questions progressively by

respondents and hence they are kept as they are. Since there is a lack of erstwhile research all effect sizes are reported according to Cohen's (1988 cited in Gray and Kinnear, 2012) classification. The Income sustainability model of Entrepreneurs is developed using the binary logistic regression since the dependent variable 'Monthly Income' is a negatively skewed one and there is a need to make a cut point for sustained level of income. The validity and reliability of certain composite concepts used as predictors in the regression model are determined through Exploratory Factor Analysis (EFA) and Cronbach's Alpha respectively (Gray and Kinnear, 2012; Pallant, 2011).

DISCUSSION ON INDEPENDENT VARIABLES

In our model the following variables are considered as independent variables.

The UDC's Infrastructure Inputs

The UDC is located in a room hosted by the Union Parishad. In few cases the office of the UDC is shifted to nearby shops at growth centres or commercial points considering the convenience of people's access or marketability. The space in the office or the availability of furniture there maintains a close affinity with the overall conditions of the UP. As nearly half of all UPs, visited by the researcher, run their offices in very old and often abandoned small structures UDC premises are no exception to that. Hence, office space and furniture are not adequate to provide customer amenities. The UDC equipment is initially provided by the government assisted by donors and the UP from its Local Government Support Project (LGSP) funded by the central government. Subsequently, entrepreneurs also have added some equipment along with the expense for day to day operating costs. The following table 1 depicts the equipment available in the UDC and their working conditions.

TABLE 1. AVAILABILITY OF SERVICE EQUIPMENT AND THEIR WORKING CONDITIONS.

	Good Working Condition		Moderate Working Condition		Out of Order		Being Used Not for UISC		Not Present in the UISC	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Desktop computer	324	60.2%	92	17.1%	31	5.8%	15	2.8%	76	14.1%
Laptop	344	63.9%	60	11.2%	35	6.5%	20	3.7%	79	14.7%
Internet Modem	331	61.5%	151	28.1%	16	3.0%	8	1.5%	32	5.9%
Laser Printer	218	40.5%	48	8.9%	108	20.1%	2	0.4%	162	30.1%
Colour Printer	262	48.7%	102	19.0%	79	14.7%	2	0.4%	93	17.3%
Scanner	417	77.5%	32	5.9%	17	3.2%	4	0.7%	68	12.6%
Digital Camera	314	58.4%	65	12.1%	68	12.6%	6	1.1%	85	15.8%
Photocopier	193	35.9%	65	12.1%	63	11.7%	0	0.0%	217	40.3%
Generator	65	12.1%	19	3.5%	23	4.3%	4	0.7%	427	79.4%
Multimedia Projector	308	57.2%	49	9.1%	61	11.3%	9	1.7%	111	20.6%
Nebuliser	24	4.5%	8	1.5%	5	0.9%	0	0.0%	501	93.1%
Solar Panel	68	12.6%	24	4.5%	21	3.9%	3	0.6%	422	78.4%

The equipment presented in the table 1 can be categorised into two types based on their availability and nature of job they perform: ICT equipment and Non ICT equipment. The ICT equipment such as computers, laptops and internet modem which are required to provide e-services are overwhelmingly available in all UDCs (around 85%) and their working conditions are also good in majority cases (around 75%). The Non-ICT equipment can also be of two types: (1) 'picture equipment'⁴ such as digital camera, colour printer and scanner are also commonly existing in all UDCs not exceeding their absences for more than 18% for the most and; (2) 'advanced equipment' such as photocopier, generator, multimedia projector, solar panel, etc. These advanced equipment are dearer and hence are not available in all UDCs with their marked absences except for the multimedia projector which is absent only around 20% UDCs. Whereas all equipment has a role in providing services and thus earning an income for the entrepreneur the picture equipment specifically is associated with the higher income as is found from the correlation {rho (N, 527) =.233} between mean of it and the income

which is higher than that of ICT equipment and advanced equipment with the income (which are rho (N, 527) = .183 and .200 respectively) and it is thus used as a predictor in our model later.

Regarding internet infrastructure, the above table shows that the most available equipment in the UDC is the internet modem (90%) which is actually used for connecting the mobile internet. The field observation suggests that this type of connectivity is very slow and prone to frequent breakdown. Consistent with the internet modem's higher percentage, the frequency distribution of the type of internet connection (not shown here) also demonstrates that only 10% UDCs have broadband connection. However, research shows that broadband have an impact the income level worldwide (UN 2012). Dose this happen in our case of entrepreneur's income? Cross tabbed with the monthly average income the resulting frequency distribution of internet connection type is presented in the table 2.

TABLE 2. CROSS TABULATION OF INTERNET CONNECTION TYPE WITH MONTHLY AVERAGE INCOME.

		Internet Connection Type					
		Dial-up or Mobile internet		Broadband		Total	
		Count	Column N %	Count	Column N %	Count	Column N %
Average monthly income in last 3 months	0-5000 Taka	175	41.6%	12	25.5%	187	40.0%
	5001-10000 Taka	128	30.4%	18	38.3%	146	31.2%
	10001-15000 Taka	53	12.6%	6	12.8%	59	12.6%
	15001-20000	35	8.3%	4	8.5%	39	8.3%
	20001-25000	16	3.8%	1	2.1%	17	3.6%
	25001 and Above	14	3.3%	6	12.8%	20	4.3%
	Taka						
	Total	421	100.0%	47	100.0%	468	100.0%

It can be observed from the table 2 that column percentages are higher for Broadband as income categories progressing. Do these proportions of broadband users are independent of income categories or they have an association with income categories? The Chi-Square Test of Independence calculated (not shown here) is found to be statistically significant. This is written as $\chi^2 = 10.801$; $p < 0.05$ (Fisher's Exact Test), Cramer's V = .165, a smaller than typical effect, according to Cohen's (1988) Classification (Gray & Kinnear 2012, pp. 425-432). The type of internet connection, therefore, is used as an independent variable in the model.

Services from the UDC

The UDC uses these equipment to provide a range of services that are conventionally offered by the local government, the government and the private organisations and shops. Among these services a great majority are the UP service i.e. online/computer composed certificates (birth, death, inheritance and character) along with other commercial services (compose, photocopying, printing, email, projector rent, skype, etc.) which account for nearly half of all UDC's income. The rest half comes from 11 types of services including education services (admission/registration/result check, etc.), computer training, UP office works and data entry. The government services such as land copy, electricity bill pay, passport and mobile banking earn very minimum for the UDC since they are not available everywhere. But their presence is found to be correlated with higher income from the UDC as is evident from the interview with entrepreneurs as well the correlation {rho (N, 527) = .157} between it and the income. Thus, the mean of government services⁵ is considered as a predictor in the model.

Entrepreneurship

The entrepreneurship is conceptualised here in terms of four variables such as the entrepreneur's computer competency, contract with the UP, investment in the UDC and his overall satisfaction on income, people's participation and cooperation from the UP and administration.

Computer Competency

For both gender a large percentage of entrepreneurs (43.4%) have trainings less than 06 months among which 6.8% are operating without any formal computer training. Only a few have higher level trainings such as Diploma (7.8%) and Bachelor (4%). In the open ended option of the online Survey questionnaire some of them

responded that they had become acquainted with the computer after their employment in the UDC. Some also mentioned that they had received training from the local administration in addition to the previous training and their job in the UDC was improving their computer skills. Higher computer competency has implications for spread of e-literacy in the rural area which is one of the important goals of the UDC and it also carries potential for earning from computer training of rural youths in the UDC premise. Hence this variable is also considered in the model as a predictor.

Contract with the UP

Another important component of entrepreneurship under public-private partnership is the execution of the contract with the UP which is a legal document that gives the entrepreneur a short term guarantee of his/her job for 3 years. This tenure is renewable subject to the mutual satisfaction of both parties (LGD, 2010). Only 57% entrepreneurs could enforce the contract with the UP, which is usually reluctant to do so. The execution of the contract with the UP is, however, have implications to the difference of incomes from the UDC. The percentage distribution (not shown here) demonstrates that monthly income are higher for entrepreneurs having a contract with the UP. To examine the difference for population proportion the Chi-Square Test of Independence is calculated and found to be 11.406 which is significant beyond the 0.05 level i.e. $\chi^2 = 11.41$; $p < 0.05$, Cramer's $V = 0.148$; a small effect. Because of this significant association between the execution of a contract with the UP and the increase in entrepreneur's income this variable is used as an independent one in the model.

Investment by the Entrepreneur

The UDC is established on public-private partnership in which the government has made investments on infrastructure development, equipment purchase, training of the entrepreneurs, mass mobilisation, etc. But the expectation is that the project would be owned and operated the local community and the private entrepreneurs in the long run. Contrary to this expectation, the amount of investment from the private sector in the UDC is very low. 47% of entrepreneurs have invested less than 20,000 Taka among which 9% do not have any investment in the UDC. 33% have an investment which ranges from 20000 to 100000 taka. Only the remaining 20% entrepreneurs made an investment beyond that level equivalent to USD 1200 and above, which is the required limit for partnership. According to the contract, entrepreneurs are required to maintain day to day operating cost as well as make investment for expansion of the business by adding new equipment and repairing the existing ones. The interview findings suggest that most entrepreneurs come from unemployed rural youths and lack a business plan. Moreover, lack of entrepreneur's access to loan and poverty in the rural area encumber adequate investment in the UDC. Yet, those whose earnings are good tend to invest as they understand the market principles. There is also an association between investment and income. The nature and strength of relationship between them by using the correlation coefficient i.e. Spearman rho is found to be positive and expressed as $\rho(522) = .281$; $p < .01$; a small effect. However, this correlation is moderated by another variable i.e. the internet connection type. The association is examined between these two variables after splitting the data by internet connection type. For 'Dial-up or Mobile internet': $\rho(417) = .270$; $p < .01$; a small effect. For 'Broadband': $\rho(47) = .568$; $p < .01$; a large effect. It is evident that that when moderated by the Broadband the correlation between these two variables is higher. This association can be interpreted in the manner that those who have greater investment under PPP tend to earn more from the UDC. Those with broadband internet connection tend to have more earnings associated with greater investment. Money invested in the UDC by the entrepreneur is, thus, considered in the model as an independent variable.

Entrepreneur's satisfaction

Entrepreneur's satisfaction is also very important to keep him/her in the business. Entrepreneur's satisfaction on certain issues such as income, people's participation, cooperation from UP and Local administration is asked in a rating scale of 5 ranging from 1= Very dissatisfied, 2 = Dissatisfied, 3= Neither Satisfied nor Dissatisfied, 4 = Satisfied and 5= Very Satisfied. The mean summary of the findings are presented in the table 3.

TABLE 3. DESCRIPTIVE OF ENTREPRENEUR'S SATISFACTION

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
People's participation in the UISC	237	1	5	3.89	1.240
Reduced time and cost in service delivery	183	1	5	3.28	1.286
Income from the UISC	283	1	5	3.04	1.178
Training and Other Technical Support from the local administration	180	1	5	2.98	1.273
Online service support from the local administration	173	1	5	2.75	1.330
Cooperation from the Union Parishad	269	1	5	2.45	1.244
Valid N (listwise)	0				

From the sorted mean (descended) presented in the table 3 it appears that Entrepreneurs are satisfied most in people's participation ($M = 3.89$, $SD = 1.24$) followed by reduced time and cost in service delivery ($M = 3.28$, $SD = 1.29$) and Income from the UDC ($M = 3.04$, $SD = 1.18$). Typically, they are less satisfied about training and other technical support and online service support from the local administration. They are least satisfied on the Cooperation from the UP, which is noteworthy since it supports UDCs for office, equipment, operations, security, mass mobilisation etc. For sustenance of UDC there is no alternative for improving this relationship. Overall composite mean from these variables is used as a predictor in the model to see how the satisfaction of the Entrepreneur explains his/her sustained income.

People's Participation in the UDC

Consistent with the entrepreneur's highest level of satisfaction with people's participation it can be supposed that UDCs are well participated in reality too. The percentage distribution (not shown here) suggests that 60% UDCs experience visits by people more than 200 in a month among which 40% are visited by more than 300 people. Only 6% UDCs provide services to less than 50 people. Considering the density of the country and the average number people a UDC serves in its catchment area (approximately 30000 people) this high level of participation is expected. As the country is one of the most densely populated one in the world the UDC enjoys a potential demand base compared to lack of it for many telecentres in other developing countries (Harris 2007).

The visits by service recipients can have a significant bearing for the financial sustainability of the UDC. When calculated (not shown here) a significant correlation is found between Entrepreneur's monthly income and the number of service recipients. This is written as: $\rho(449) = .442$; $p < .01$, a medium effect. Thus, people's participation is an important factor for financial viability. More people visiting for services is associated with more income meaning the UDC being engaged in retail business. Then the question arises as what kind of people they are. Are they only those who have the better ability to pay or who can be upfront to the office environment? What about the participation of those who are less vocal such as women and less able to pay such as poor and socially handicapped people such as illiterate? The UDC is meant to bridge the digital divide due to the different socio-economic circumstances and give horizontal reach to all kinds of recipients (A2I, 2012).

Participation of Disadvantaged

Three types of people are considered here as disadvantaged such as women, poor (both men and women), and illiterate (both women and men) entrepreneurs were asked as among all service recipients what approximate percentages of people consist of these kinds. The percentage distribution of their answer (not shown here) demonstrates that 60% (Cumulated) entrepreneurs consider that they have women participation that ranges from 10% to 30%. 22% consider that their total service recipients consist of 40% of women while 18% are visited by 50% or more women that reaches up to 80% for 1% of UDCs. This level of participation by women is considerably higher than their participation in traditional service delivery points since women constitute of a tiny portion of service recipients from government offices (TIB 2012). Similarly, the participation of poor people is also considerably high. Half of all Entrepreneurs consider that they have poor people consisting of 50% or more, among which 29% consider that they are participated by poor people who consists approximately two thirds of their total service recipients. Likewise, the illiterate people also have participated massively in the UDC service provision, according to Entrepreneurs. 75% (Cumulative) consider that they have the illiterate people's participation that ranges from 10% to 40%. 11% consider that half of their clients are illiterate while 6% find it to be 80%.

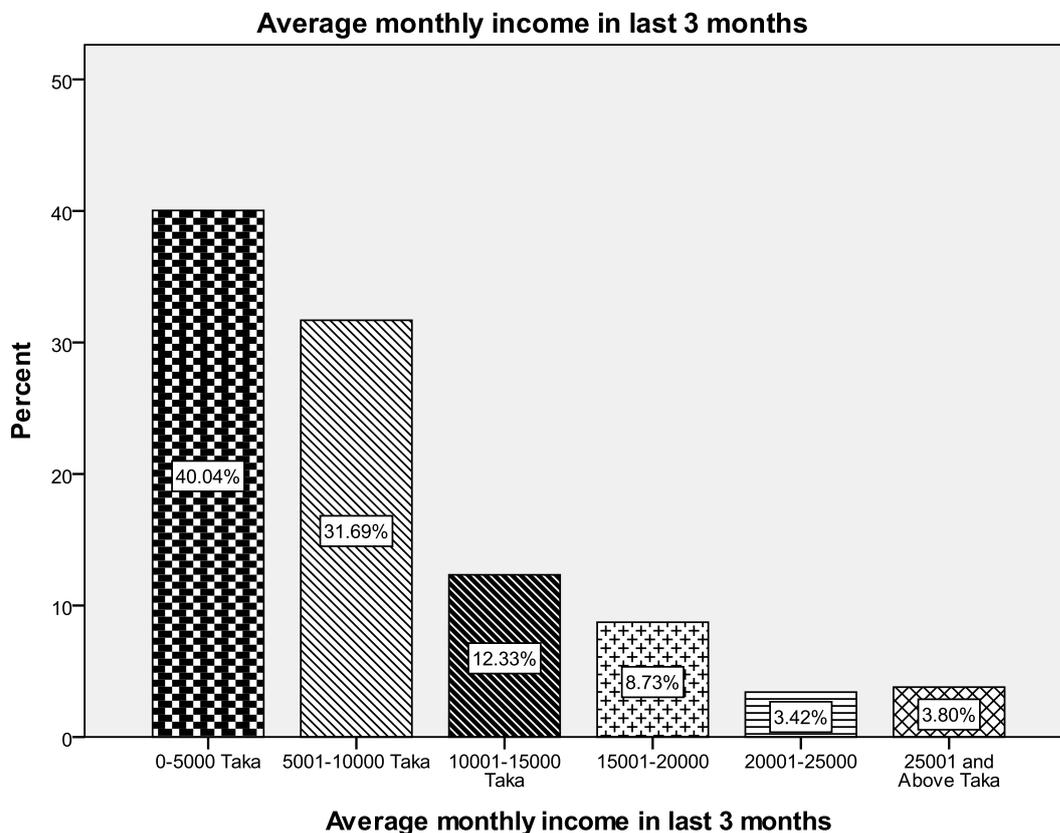
This is also supported from the qualitative findings:

“The UDC has turned the UP to be a more crowded place like that of a market. People are visiting the UP in an ever more scale because of new ideas and services ushered to the scene with the existing UP services. The UP was not providing the kind of services now it provides. People are coming and having services and are expressing their happiness and content. Mass awareness has increased because we did multimedia assisted display on UDC products at night in various locations of the Union followed by miking, leafleting, etc. I, along with other UP representatives, have joined several of such displays and campaign programmes which attracted enormous participation of mass people. In my opinion, about 70% of inhabitants of the Union now are aware of the UDC who believe that using ICT better services can be offered. People are getting services at their doorsteps” (Chairman, Ghagutia Union Parishad, Comilla. 2013).

DISCUSSION ON THE DEPENDENT VARIABLE- THE MONTHLY INCOME OF ENTREPRENEURS.

Entrepreneurs’ monthly income is a crucial indicator of financial viability, which is associated with a number of variables as found earlier. The percentage distribution of average monthly income of entrepreneurs is produced in the following bar chart 1.

FIGURE 1. PERCENTAGE DISTRIBUTION OF AVERAGE MONTHLY INCOME IN LAST 3 MONTHS.



The percentage distribution shows that 40% Entrepreneurs have an income of 5000 Taka or less than of it (Taka 5000= 63 USD). Considering the Monthly Salary of UP Secretaries that ranges from 5200 to 11235 Taka (LGD, 2014) this income is lower. The field interview with management officials suggests that a majority of low income UDCs have to find new entrepreneurs either 2nd or 3rd time within the last 3 years largely due to entrepreneur’s drop out from lack of adequate income. But about 32% entrepreneurs can rival their UP Secretaries with an income that ranges from 5001 to 10000 taka. The remaining 28% surpass the income of their supposed immediate senior official, the UP Secretary, among which more than 7% enjoy an impressive income of more than 20, 000 taka a month. The UP secretaries are permanent government employees who enjoy salaries according to the National Pay Scale (NPS). Since their salary starts from over 5000 taka a month, as well as considering the prevailing unemployment rate and low paid jobs in the country Taka 5001 and above is

considered here as minimum sustainable income for Entrepreneurs. This level of income is also sustainable since the UDC equipment is purchased by the government and some of its maintenance costs such as electricity bill, office rent, internet bill in some cases, are paid by the UP. Entrepreneurs are not asked to pay anything to the UP, at least for the initial 3 years, as per the contract (LGD, 2010). Whereas in other telecentre models the financial sustainability means the recovery of cost of infrastructure as well the operational cost, as in the CSCs in India and *Nenasala* in Sri Lanka (Shadrach and Sharma 2013), in Bangladesh the entrepreneurs are not encumbered with similar responsibility to reach break-even point since the government and the local government are also partners with continued supports. Yet, the financial sustainability is desired since external funding cannot be taken for granted indefinitely and entrepreneurs are meant to bear the operating costs. It is expected that starting with at least 5001 taka would help with the survival of the entrepreneur as well give him a chance to expand the business with subsequent investments over time (LGD 2010; Interview with A2I Official).

More than one third of entrepreneurs are earning less than this threshold among whom the level of satisfaction is very low and the dropout rate, especially among women entrepreneurs, is very high as the qualitative interview suggests. The researcher's field visits of 16 UDCs find that half of them are without women entrepreneurs and they are mostly part timers in the rest predominantly for limited income that cannot afford two entrepreneurs together. Our model presented in the next section ascertains what factors contribute to this sustainable income level using the logistic regression. The variable 'Average Monthly Income' is dichotomised into binary of these two categories (Up to 5000 taka and 5001 and above taka) for the reason mentioned above as well as for the highly skewed nature of the variable, where the use of regression coefficient is unsuitable (Gray and Kinnear, 2012).

SUSTAINABILITY OF INCOME OF ENTREPRENEURS

The sustainability of Income of Entrepreneurs is presented through the following model 1.

MODEL 1. LOGISTIC REGRESSION ON THE SUSTAINABILITY OF ENTREPRENEUR'S INCOME

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	342	63.6
	Missing Cases	196	36.4
	Total	538	100.0
Unselected Cases		0	.0
Total		538	100.0

a. If weight is in effect, see classification table for the total number of cases.

Categorical Variables Codings

		Frequency	Parameter coding (1)
Internet Connection Type	Dial-up or Mobile internet	306	1.000
	Broadband	36	.000
Contract with the Union Parishad	No	141	1.000
	Yes	201	.000
Computer Competency Training	Less than 6 months	105	1.000
	6 Months and Above	237	.000

Classification Table^{a,b}

		Predicted			Percentage Correct
		Monthly Income		Percentage Correct	
Observed	Monthly Income	Up to 5000 Taka	5001 and Above Taka		
		Step 0	Up to 5000 Taka	0	141
	5001 and Above Taka	0	201	100.0	
Overall Percentage				58.8	

a. Constant is included in the model.

b. The cut value is .500

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	98.720	8	.000
	Block	98.720	8	.000
	Model	98.720	8	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	364.812 ^a	.251	.338

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table^a

Observed		Predicted			
		Monthly Income		Percentage Correct	
		Up to 5000 Taka	5001 and Above Taka		
Step 1	Monthly Income	Up to 5000 Taka	93	48	66.0
		5001 and Above Taka	33	168	83.6
Overall Percentage					76.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	Computer_comp_recoded(1)	.244	.284	.740	1	.390	1.276
	Q4_Contract_UP(1)	-.447	.262	2.905	1	.088	.639
	Internet_connection_recoded(1)	-.416	.464	.802	1	.370	.660
	Q10_Money_invested	.375	.122	9.452	1	.002	1.455
	Q12_Averagerecipientsinthelast03months	.277	.055	25.133	1	.000	1.319
	Mean_picture_equipment	.817	.176	21.411	1	.000	2.263
	Mean_government_services	.164	.185	.787	1	.375	1.178
	Uddakta_Satisfaction	.589	.197	8.923	1	.003	1.803
	Constant	-5.677	1.067	28.317	1	.000	.003

a. Variable(s) entered on step 1: Computer_comp_recoded, Q4_Contract_UP, Internet_connection_recoded, Q10_Money_invested, Q12_Averagerecipientsinthelast03months, Mean_picture_equipment, Mean_government_services, Uddakta_Satisfaction.

Stepwise logistic regression was conducted to assess the impact of a number of factors on the likelihood that entrepreneurs would report that they had an income of 5001 and above taka (Sustainability level) as presented in the above model 1. There are 8 (eight) independent variables in the model ('computer competency', 'contract with the UP', 'internet connection type' are categorical variables; 'money invested by the entrepreneur', 'average monthly service recipients in the last 3 months' are continuous variables; 'picture equipment'⁶ 'government services'⁷ and 'entrepreneur's satisfactions'⁸ are continuous variables with composite means). The full model containing all predictors was statistically significant, $\chi^2(8, N=342) = 98.72, p < .000$, indicating that the model was able to distinguish between entrepreneurs who have 5001 and above Taka and those who have 5000 or less taka income from the UDC. The model as a whole explained between 25.1% (Cox & Snell R square) and 33.8% (Nagelkerke R square) of the variance in income status, and correctly classified 76.3% of cases. As shown in the above table that four of the independent variables made a unique statistically significant contribution to the model (money invested by the entrepreneur, average monthly service recipients, picture equipment and entrepreneur's satisfaction). The strongest predictor of having an income of 5001 and above taka is the average number of service recipients in a month with the Wald value 25.13. The odds ratio for all significant continuous independent variables are > 1 indicating that for every additional increase in units of each of them entrepreneurs are more likely to report to have an income of 5001 and above taka, controlling for every other factors in the model (Pallant, 2011). Thus our hypothesis that partnership involvement under PPP in terms of infrastructure inputs, entrepreneurship and people's participation contributes to the entrepreneur's income sustainability is partially supported.

Four other independent variables are not found to be statistically significant at $p < .05$. From quantitative point of view we know that independent variables cancel each other in the regression model and only the influential predictors can make a place for statistical significance (Grey and Kinnear, 2012). From qualitative point of view we can also justify this stance. At this stage, the 'Computer competency' does not have any independent influence on the sustainable income. It might be because the UDCs do not provide much of services

that require higher computer skills. For instance, the UDC provides very few internet based e-services. Moreover, for any external services introduced in the UDC the entrepreneurs are given training on relevant operations by the local administration beforehand. However, with the introduction of more internet based services, the higher level computer skill might be a significant factor for sustained income. Likewise, contract with the UP does not play any significant role in explaining the dependent variable, perhaps, because many entrepreneurs are not yet aware of it as nearly half of them are yet sign any such partnership binding. Similarly, the internet connection does not have any significant impact on sustainable income which might be for the reason that Bangladeshi broadband is also slow. Broadband's Bangladeshi standard of minimum 128 kbps is not consistent with the ITU determined bandwidth i.e. at least 1mbps. As per ITU standard this bandwidth can at best be termed as narrowband. Besides, few available broadband connections are mostly mobile, not connected with fibre optics (Prothom Alo, 2013). Similarly, the government services are available widely in UDCs.

CONCLUSION

Despite the precipitating trends of drop-outs of Entrepreneurs, the sustainable income can cling them to the business and thus help with the sustainability of the model. Sustained income can also lead to investment, expansion and growth of the operation. The emphasis on income sustainability has the least consequences of compromising of serving the people including those who are less able to pay since the UDC is engaged in retail business by earning from a massive number of people. Moreover, the pricing and any grievances related thereto are under the watch of local administration and, more importantly, the UP representatives who can favour the people who elected them. People's participation as the strongest predictor of the income sustainability validates that the UDC is quite popular to them. Along with mass participation, infrastructure inputs and entrepreneurship of operators also play significant roles for income sustainability as the partial support of the hypothesis test suggests. Hence, the income sustainability can assist with the social sustainability too given other opportunity cost benefits from receiving services from the UDC are ensured. The income sustainability can also lead to the technological sustainability which is very vital for the survival of the model. Thus, those UDCs that are performing below this threshold of income can increase inputs along these lines of components. However, as these inputs come from the interplay of relevant partners, hence, their effective engagement is crucial to ensure financial sustainability for preventing drop-outs or making quicker replacements of entrepreneurs.

FOOTNOTES

¹ Since the automation and e-delivery in the upper administrative units are only at the beginning stage and is unable to support the lower access points with services.

² The survey and interview were conducted by the researcher himself during April to August 2013.

³ 4 UDCs are selected from each of 4 districts that belong to 4 greater old administrative divisions such as *Comilla* from *Chittagong*, *Jessore* from *Khulna*, *Bogra* from *Rajshahi* and *Rajbari* from Dhaka division.

⁴ The concept 'picture equipment' and others mentioned here are developed using the Exploratory Factor Analysis and the internal consistency for concept is found to be .564 using the Cronbach's alpha.

⁵ The concept 'Government Service' and others mentioned here are developed using the Exploratory Factor Analysis and the internal consistency for concept is found to be .750 using the Cronbach's alpha.

⁶ Picture equipment is a mean from availability and working conditions of scanner, digital camera and colour printer.

⁷ Government Service is a composite mean of land copy, electricity bill pay, passport and mobile banking.

⁸ Entrepreneur satisfaction denotes a composite mean of satisfaction on issues such as income from the UDC, reduced time and cost, cooperation from the UP, training and technical support from admin, online service support and people's participation.

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