



Benefit on Investment: An Answer to Why Should Invest for Public Access to ICTs

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【Abstract】 The paper introduces a new concept Benefit on Investment (BOI) for measuring benefit of public access to ICTs, particularly telecentres. It brings in the benefit received by the community along with the profit received by the investor. The paper elaborates methodology of measuring “Benefit on Investment” (BOI) and addressed the missing ‘public goods’ dimension of “Return on Investment” (ROI). The paper also discusses the application of the methodology in four public access venues branded as “Pallitathya Kendra” in remote rural areas of Bangladesh. The result shows that benefit of public access to ICTs is several times higher than investment which proves the worth of investing in it. The research also shows that variation of BOI depends on a number of factors among them the most important is quality of infomediary.

【Keywords】 BOI; ROI; ICT4D; sustainability; telecentre

1. Introduction

Public access to ICTs through public access venues came into lexicon in the backdrop of changing information and knowledge landscape followed by emergence of Internet in early 1990s^[8]. People started to behave differently in terms of accessing information and knowledge. Communication pattern across the globe also started to evolve. People visit library because it is not possible to buy all books and journals for an individual. Similarly everybody can not afford a PC and Internet connection, thus cyber café has become obvious choice for accessing information and knowledge, where an ICT-literate individual can access ICTs directly. However, in developing countries, the difficulties are more severe in accessing computer and Internet, which are multiplied for non-urban community^[8]. Affordability, general illiteracy, ICT illiteracy are the factors deterring access to information and knowledge. Thus the “Telecentre” has emerged as a new choice for public access to ICTs for the rural community. Telecentres have numerous synonyms across the globe; in Bangladesh it is known as *Pallitathya Kendra (PK)*, community information centre (CIC), community e-Centre (CeC), community multi-media centre, community resource centre (CRC), rural knowledge centre, e-Hut, e-Village, *gonokendra* etc. ^[9].

Public access to ICTs is bringing changes to markets, private and public sectors and economies in the developed and less developed world. There has been a large wave of investment over the past decade in ICT for development^[2, 12]. Donors, social entrepreneurs, philanthropists have started



putting resources for development of telecentres in Asia, Africa and Latin America since mid 1990s^[4]. Now the question is about sustainability and benefit from these investments. The debate on sustainability and benefit surrounding the ICT-based intervention in rural areas is intense, and legitimately so. In a country like Bangladesh, where scarcity of resources does not allow improving quality of education or decent pay for the government officials, investment for building a country-wide information and knowledge system must be justified from many different perspectives. The primary justification is cohesion with national aspiration of building a poverty-free inclusive knowledge society. The immediate next justification is cost-effectiveness, which means the benefit to the community should surpass the amount of money spent on establishment and operationalization of a public access venue. Such justification is also true for many developing nations. However, impact assessment is not adequate. While lack of political will and motivation may be a reason, probably lack of knowledge on how to undertake impact assessment of ICT4D is also a factor^[3].

2. Literature Review

A number of methods are available for analysis of benefit of development intervention, particularly ICT4D intervention^[3, 5, 6, 7, 10, 11]. Some impact assessment studies focus only on the costs and not the benefits^[11]. Others focus only on the benefits and not the costs^[7]. For example, Khelladi (2001) compares the cost effectiveness of alternative interventions with example in Salvador. He shows that infocentros are economically sustainable and reach the break-even point in 18 months^[5]. Lobo & Balakrishnan (2002) focuses only on benefits not costs (e.g. time taken for service, quality of service, user satisfaction) between groups served versus non-served by an e-Government service kiosk scheme^[7]. Another interesting approach is estimation of consumer surplus by Richardson et al.^[10]. Consumer surplus is the difference between what a user actually pays for an ICT4D service and what they would have been willing to pay. It typically relies on calculating the true financial value/benefit through some alternative means other than price. For example, the consumer surplus for communicating information (e.g. via phone or email) is often calculated by assuming the true value is represented by the cost of the journey for which that communication substitutes. That true value is calculated in terms of the wages lost (because of the time taken for the journey) and the actual cost of transportation. The consumer surplus (i.e. additional value/benefit) of communication is then = Cost of wages foregone + Cost of transport - Price paid for communication. This approach is very pragmatic and has merit to be considered in methodology of benefit of investment (BOI), which is elaborated in the paper.

There are two types of cost-benefit analysis (CBA). Internal CBA looks at the costs and benefits from the perspective of the ICT4D application-e.g. the costs of setting up a telecentre vs. the income it generates. The external CBA looks at the costs and benefits from the perspective of ICT4D users-e.g. the time/financial costs vs. the time/financial savings plus income generated from using the ICT4D^[3]. The BOI is one type of external CBA. The BOI is a ratio of benefits to the community on investment for public access to ICTs in monetary terms to investment in public access to ICTs. The methodology was tested in four telecentres named "*Pallitathya Kendra*" (rural information centre). Next section will present *Pallitathya* model before explaining the methodologies.



3. Understanding *Pallitathya* Model

The *Pallitathya* model is an ICT-based system of information and knowledge exchange for the poor and marginalized. The model consists of five basic elements; content (agriculture, health, law, non-farm income generating activities, education, appropriate technology etc.), multiple channels of information and knowledge exchange, infomediary (human interface between information and ICT-based knowledge-base), ownership and mobilisation (marketing). The system is based on two common assumptions; it focuses on the need of a poor and marginalised community, and it emphasizes on income generation for financial sustainability, where possible. The model has two physical components; one is fixed location specific public access venue (*Pallitathya Kendra*), and, second is a mobile lady (lady, with mobile phone, moving door to door to connect female users to consultants sitting in a helpdesk). The look of a *Pallitathya Kendra* (*PK*) depends on availability of resources and local demand for information, knowledge, communication and other services. A *PK* flourishes in an ecosystem, where community beneficiaries are at its centre. The design of a *PK* depends on the state of system elements of the ecosystem. Generally *PK* is established in the rural areas at a cross-section of roads and closer to public gathering place so that community beneficiaries can visit *PK* conveniently. As mentioned, the *Pallitathya* model introduced mobile phone based help line services at the door-step of community people, particularly women and physically handicap facilitated by a mobile infomediary (all are female) who rides bicycle to reach them. The combination of fixed centre and mobile helpline allows introduction of “no exclusion policy” and “no refusal policy”. *PKs* under the experiment obtained multimedia computers with UPS and power back up system, mobile phone, scanner, printer, digital camera, radio, bicycle, weighing machine etc. All *PKs* are connected to the Internet. Most importantly, all *PKs* are equipped with detailed information management system including system of tracking each community beneficiary. *PK* deployed a system of user ID card to track returning users of services and facilities. Some of the facilities in *PKs* are free for the community and others against a charge [1, 9, 13]. *PK* provides two types of services for the community; livelihood information services, and ancillary services.

Livelihood information services. Livelihood information using ICTs is the core service of *PKs*. Rural people can access their required livelihood information (agriculture, health, education, law and human rights, appropriate technology, non farm economic activities, disaster management, employment, citizen services, directory information etc.) using five ICT based channels and modes (a) digital offline content (*Jeeon* IKB in Bangla) browsing; (b) helpline (mobile phone, email, skype); (c) Internet (online content) browsing; (d) issue based camp (face-to-face consultation with experts) and (e) audio-visual content [1, 13].

- Ancillary services. Ancillary services are integrated with *PKs* for maximum utilisation of resources and equipments. In general, the available ancillary services are email and skype; diversity visa application; soil test for measuring fertilizer requirement; pond water pH test facilities for fish cultivation; printing and fill-up government forms; photography; body weight and height measurement; nebuliser use; composing and printing; blood pressure measurement; mobile phone call for personal use; IT Skills Training etc. [1, 13].



4. Building Methodology

• Location of the study. The methodology was piloted in four *Pallitathya Kendras (PKs)* in four remote villages [8]. The villages were *Babrihar, Nilphamari* (North West of the country); *Shelabunia, Mongla, Bagerhat* (South West of country); *Charbata, Subarnachar, Noakhali* (South East of country) and *Jamtala, Netrokona* (North East of country). The research for estimation of BOI was conducted with data for the period of September 2005 to March 2007. In selection of locations factors like diversity of economic activities, poverty status, educational status, gender sensitivity, ITES status were considered^[13].

• *Sample selection.* During the 18 months research period, people visited 11,056 times to receive livelihood information (5,178 times) and ancillary services (5,878 times) from four *PKs*^[9]. More than 50% of the users received services more than one time. The number of actual individual users was 5,528, excluding the repeated visitor [(total user - (total user × 50%)]]. Sample survey was conducted with 10% of *PK* users to assess the outcome of intervention. Out of the 10% users' sample, 45% (total 251) was taken for the BOI study. The BOI study samples were distributed proportionately in the service types, service delivery channels and location of *PKs*.

• Data analysis. The simple BOI (Benefit on Investment) was calculated using the following formula:

$$BOI_i = \frac{\sum_{j=1}^n \sum_{k=1}^m V_{jk}}{\sum_{k=1}^m C_k} \quad (1)$$

where,

BOI_i is Benefit on investment for i -th telecentre; V_{jk} is Monetary value of benefit received by the community members for j -th service in k -th period dispensed by the telecentre; C_k is Total cost of establishment and operation of a telecentre in k -th period.

The criterion of acceptable level of BOI is [$BOI_i > 1$].

However, the estimation of V_{jk} was the major challenge. The benefits to the community by a *PK* were four types;

- Saving cost of livelihood
- Increasing income opportunities
- Saving from loss or damage from any sudden occurrence
- Value of benefit claimed as a result of exercising rights.

• **Estimation of net saving of cost of livelihood.** Benefit in terms of total net saving of cost of livelihood by a community was estimated as follows;

$$V_j \hat{\delta} = \sum_{q=1}^m (E_{N_j}^p - E_{N_j}^c) \quad (2)$$

Where,

V_j is Monetary benefit related to j -th service received by a community; $E_{N_j}^c$ is Current Expenditure related to j -th service received by q -th community member; $E_{N_j}^p$ is Expenditure prior to application of j -th service by q -th community member.

Generally, sign of the outcome is positive considering that previous expenditure was higher than



the current expenditure. If the outcome is negative, it means that after receiving service expenditure shot up.

• **Estimation of net income by community.** Benefit in terms of net income after receiving various services by the community was estimated as follows:

$$V_j^E \hat{\Delta} = \sum_{q=1}^m ((I_{jq}^c - I_{jq}^p) - (E_{jq}^c - E_{jq}^p)) \quad (3)$$

Where,

V_j^E is Monetary benefit related to j -th service received by a community; I_{jq}^c is Current income related to j -th service by q -th community member; I_{jq}^p is Income prior to application of j -th service received by q -th community member; E_{jq}^c is Current Expenditure related to j -th service received by q -th community member; E_{jq}^p is Expenditure prior to application of j -th service by q -th community member.

It is to be mentioned that some savings of cost of livelihood may have simultaneous rise or fall in income. In those cases, estimation of saving and estimation of income can be made separately. When a community member starts a new venture after receiving advice from a *PK* or finds a new job following the services of the *PK*, there may be no previous expenditure to the related service received by her/him. In that case, the formula can be simplified as follows:

$$V_j^E \hat{\Delta} = \sum_{q=1}^m (I_{jq}^c - E_{jq}^c) \quad (4)$$

Where,

V_j^E is Monetary benefit related to j -th service received by a community; I_{jq}^c is Current income related to j -th service by q -th community member; E_{jq}^c is Current Expenditure related to j -th service received by q -th community member.

• **Estimation of saving from loss or damage.** The estimation of loss or damage is based on experience of loss or damage personally by a community member or by any other member of a community. There might be two scenarios in case of this estimation; one, prevention of potential loss may result in increased income; second, the outcome of use of service may result in return of asset which was potentially lost. The formula in the first scenario is similar to the formula of estimation of income with different interpretation:

$$V_j^E \hat{\Delta} = \sum_{q=1}^m ((I_{jq}^c - I_{jq}^p) - (E_{jq}^c - E_{jq}^p)) \quad (5)$$

where,

V_j^E is Monetary benefit related to j -th service received by a community; I_{jq}^c is Current income related to j -th service by q -th community member; I_{jq}^p is Income prior to application of j -th service received by q -th community member; E_{jq}^c is Current Expenditure related to j -th service received by q -th community member; E_{jq}^p is Expenditure prior to application of j -th service by q -th community member.

For the second scenario the formula is;

$$V_j^{PL} = \sum_{q=1}^m (E_{jq}^c - E_{jq}^p) + \sum_{q=1}^m V_{jq}^a \quad (6)$$

where,

V_j^{PL} is Monetary benefit related to j -th service received by a community; E_{jq}^c is Current Expenditure related to j -th service received by q -th community member; E_{jq}^p is Expenditure prior to application



of j -th service by q -th community member; $V_{j_q}^a$ is Value of asset/ claim which was recovered due to j -th service received by q -th community member.

• **Estimation of benefit from exercising rights.** As a result of awareness related service and support, a community member may gain rights to receive any particular benefits he is entitled according to the law. In that case the formula of estimation of benefit is as follows:

$$V_j^R \uparrow = \sum_{q=1}^m (E_{j_q}^c - E_{j_q}^p) + \sum_{q=1}^m V_{j_q}^c \quad (7)$$

where,

V_j^R is Monetary benefit related to exercising rights due to j -th service received by a community; $E_{j_q}^c$ is Current Expenditure related to j -th service received by q -th community member; $E_{j_q}^p$ is Expenditure prior to application of j -th service by q -th community member; $V_{j_q}^a$ is Value of claim which was recovered due to j -th service received by q -th community member.

• **Application of BOI equation.** As mentioned earlier, BOI was calculated based on 251 samples. Application of BOI formula is shown below for one sample. Mr. S. Mistry (a farmer of Selabunia village, Mongla, Bagerhat) cultivated vegetable in his land. In the base year, he spent only for seed for vegetable production, where the expenditure was only BDT 40. He also spent for fertilizer BDT 250. He spent BDT 50 for selling his products. Total cash expenditure was BDT 340. He sold his vegetable for BDT 900. In the study year, he received advice from PK. He was suggested to apply a certain dose of fertilizer for better production based on result of soil testing and apply some precautions. After application of received advice the vegetable production increased. He was able to sell his produce for BDT 3000, where the expenditure increased to BDT 405. Using the equation (3), the net benefit from receiving advice from PK was estimated for the farmer was BDT $((3000-900)-(405-340)) = 2035$. For all 251 samples net benefit from receiving services was estimated. For estimation of benefits all formulas were used as appropriate. The investment and operating cost for the PKs were also estimated using standard format. Then using equation (1), the benefit from each PK was estimated against all costs incurred by the respective PK.

• **Strength and weakness.** Like any economic indicator the BOI has its own strength and weakness. The strengths of the indicator are; (a) the indicator is community oriented, the BOI can be estimated for individual social group in a community; (b) the indicator can be operationalized with strong participation of infomediary and community. Thus, this is a participatory indicator; (c) the indicator relies on tracking of transactions of a centre with individual users, which eases the process of identification of targeted survey interviewee for estimation of BOI.

The weaknesses of the indicators are; (a) a structured system of tracking of individual service recipient is required, which is time consuming and sometimes inconvenient to a service seeker; (b) the indicator is based on statement of an individual service recipient, which might be subdued or exaggerated. The skill of field investigator matters.

Legitimacy: During the implementation of the project hard debate was going on surrounding the sustainability issue. The learning from the interventions gives a number of hints;

(a) Financial sustainability is important in the sense that it should be ensured how the PKs will continue functioning if the operating costs and subsequently the fixed cost are not met. The discussions with the community people, researchers and practitioners generated new ideas. Most importantly we could get out of the box of "financial viability".

(b) Other than financial sustainability a set of non-monetary sustainability issues came out on the



surface; operational sustainability, technical sustainability, socio-political sustainability, each of which may be killer even though financial sustainability is ensured.

(c) Sustainability does not work in a “yes-no” pattern, rather it functions in a spectrum, which is determined by a combination of local and global factors.

5. Findings of the Research

BOI analysis showed that total estimated benefit from 4 PKs was BDT 42.83 million. The estimated BOI for the whole *Pallitathya* experiment is 4.64, which means for each taka investment for 18 months of operation of the system the community benefit taka 4.64. It is to be mentioned that the BOI mentioned above was estimated considering all costs including local unit set-up and operation cost, research cost and cost of operation at head office level. The BOI is 18.33 considering only local unit cost, i. e. community received benefit Taka 18.33 for each Taka investment.

• **Benefit by service categories.** Total samples were classified by service categories; 121 samples were taken for livelihood information and knowledge services, 130 were taken for ancillary services [the income generating service for PKs]. The estimated benefit from information and knowledge services was BDT 40.50 million, whereas the benefit was BDT 2.32 from income generating services. The BOI for information and knowledge service was 4.42, whereas BOI for income generating services was only 0.25. Considering only the local unit cost, the BOI for information and knowledge services is 17.43 and for income generating services is 1. Benefit from information and knowledge services was 17.43 times higher than the income generating services although the number of income generating service users was higher (53%) than the information and knowledge service users^[9]. It reveals that creating ICT based information and knowledge system in the rural community generate more benefit. It is to be mentioned that benefit from the information and knowledge services depends on some key factors; application of received information and knowledge by the recipients for the specific purpose, authenticity and accuracy of the delivered information. In the rural area of Bangladesh; livelihood information and knowledge requirement exist, but access point is limited, they are not aware about the importance of information, seeking information through ICTs is also a new phenomenon for them, it requires behavioural change, it does not happen in a short period of time^[13]. In *Babrijhar, Nilphamari PK*, it was found that only 13% household members visited that PK for different purpose in 10 months period^[13], which means total benefit will be increased further, if more household members visit PKs regularly for their livelihood purpose.

• **Benefit by ICT based information delivery channels.** The highest benefit BDT 24.56 million came from using the mobile phone, email and skype based helpline channels followed by BDT 15.38 million from ICT based *Jeeon* IKB, BDT 0.49 million for using audio-visual content, BDT 0.05 for delivering information by face-to-face discussion channels and BDT 0.02 million for using on-line content. Considering all cost BOI was 2.68 for helpline channel and BOI 1.68 for *Jeeon* IKB channel. Considering only local level investment, BOI was 7.02 and 4.39 for helpline and *Jeeon* IKB respectively. Initially, helpline was the most popular (use of helpline 39%, *Jeeon* IKB 17%, issue based camps 26%, internet 13%, audio-visual 5%) channel for getting information and knowledge^[13]. It was a factor that worked for highest benefit from helpline, although the use of *Jeeon* IKB was increased later (use of *Jeeon* IKB 45%, helpline 35% and issue based camps 11%)



[9]. Mobile infomediary moved door to door with the mobile phone and helped the people to consult their livelihood problem with the expert. Weaknesses of the infomediary in searching *Jeeon* IKB which resulted a tendency to forward questions to the helpline without searching content database resulted increase of helpline users instead of content users. After discovering it was rectified through capacity building refreshers' training of infomediaries [13]. Benefit from Internet was the lowest due to the unavailability of relevant content online and capacity of infomediary to understand English. Benefit from audio-visual content was not significant, because of inadequate volume of content in *PKs*. BOI depends on the quality and efficiency of infomediary and their tendency to use channels to deliver information and knowledge services.

• **Factors behind varying BOI.** Higher rate of BOI have a direct correlation with the quality of infomediary [8]. In *Bagerhat*, the infomediaries could earn good reputation in the community. They were enthusiastic and enjoyed the new profession. They understood the importance of their work and won heart of the community people. In *Netrokona*, infomediaries could not reach the heart of community people. They were reluctant to work hard in generating benefit for the people. The outcome assessment study showed that the outcome of public access to ICTs was not up to the mark due the low quality of infomediary [9]. In addition, local ownership model matters for the success of *PKs*. In *Bagerhat*, the local ownership model functioned better than the other locations.

6. Conclusion

The experiment revealed that financial viability of a telecentre depends on a few factors; learning curve of infomediary, pace of behavioural change of the community in terms of accessing ICT-based information services, and community's ability to pay. Some communities are more prepared to receive ITEIS than others and there is better willingness to pay. Thanks to better economic conditions of populace. In other cases, willingness to pay is low, but community benefit is high from usage of services offered by the *PK*. Furthermore, use of the *PK* space for adult literacy (particularly for women), pre-primary schooling of children from poor families, infotainment for children, entertainment for adult population and also as a library makes the *PKs* truly a community place, benefit of which can not be measured in terms of financial return. As the financial return is varying, the idea of estimating "Benefit on Investment" emerged to understand financial benefit of the community from the *PKs*.

The BOI estimate strongly argues for public assets and public goods opposed to only financial sustainability argument, while income generating aspects are not ignored. The investment for public access to ICTs is justified through this study (BOI 18.33) in countries where competition exists to invest in other important areas of development. Earning more benefit for the community is possible, if the country can reduce the investment cost and multiply the use of existing resource. Information and knowledge system throughout the country can be built using the existing public access points like public libraries, community libraries, local government premises, community clubs, post offices, health complex etc.. Applying mobile infomediary concept (a recent development, a mobile public access to ICTs in rural community using EEE PC/Classmate PC and other necessary equipments and information system), the investment and operation cost can be reduced and people can draw multiple benefit. Availability of digital livelihood content and knowledge (of-



fline, online, text, audio-visual, readable by disable people) in native language is essential to maximize the benefit.

The need for such indicator was felt necessary to make decision, whether to investment in public access to ICTs by various players, including the government.

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