

A Market Analysis for Mobile Computing Services in rural India

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Introduction

The Glab team, comprised of four students from Sloan's Global Entrepreneurship course Nathan Eagle, Sergio Delgado, Amir Hasson, and Prabhat Sinha, spent most of the month of January 2002 working in New Delhi with the 12 person Indian startup, Drishtee. After we completed an initial market overview, Drishtee was chosen simply because it is one of the very few companies in the world that has become profitable by installing computers in rural villages. With only a single entrepreneur as a manager, a staff of about a dozen, and virtually no funding, Drishtee has successfully launched over 80 kiosks throughout rural India. Using a tiered franchise and partnership model (described later in this report), it has enabled a wide range of rural services including access to government programs and benefits, market-related information, and private information exchanges and transactions.

The digital divide, which we can broadly define as the unequal distribution of the benefits of the rapid technological advances of the last decade not only among rich and poor nations but also across social groups within a given society, is experiencing one of the most spectacular reversals in rural India. That rural India, with 70%¹ of the country's population of one billion, would become one of the hotspots in this transformation seems far-fetched given the country's lag in basic infrastructure and low income. There are only 3 telephones per 1000 rural inhabitants, 65% of the population is illiterate, and the average income is only US\$1 per day.

Despite this, there is a market for digital services in villages. For example, to sell their produce, farmers traditionally rely on traders who are known to quote rates far below the market price and pocket the difference. Farmers otherwise have to travel long distances to find a wholesale market that offers more competitive rates.

It is also not unusual for villagers to travel to faraway government offices at district headquarters to submit applications, meet officials, obtain copies of public records, or seek information regarding prevailing prices in commodity markets. This involves the loss of a day's income as well as the cost of transportation. Once at the government office, the relevant official, record, or information could be unavailable, forcing repeated visits and additional expense. Villagers also face discomfort, harassment, and corruption from public officials, or they are simply not given or do not understand the correct market prices. The government clerk or officer-in-charge works from paper records and has a monopoly over the information and records, leading to inefficiency and a lack of transparency.

Wiring up the farmers' villages may seem like an unusual way to help them with their problems. Nevertheless, studies show that there is potential for digital services rural settings. It is a matter of providing the right kind of services with reasonable cost, and overcoming poor power and communications infrastructure.

Overview of Rural Indian Digital Market

A number of projects have been launched, with the sponsorship of both public² and private entities, offering a limited breadth of services such as information kiosks, e-governance and internet access. Companies/projects include: Gyandoot, Rural information centers in Kerala (an Indian State), Info kiosks, Warananagar project, SARI, TARAAhaat, Drishtee, and EID Parry.

A number of different business models are being tested all over the country with the common objective of bringing IT to the masses and empowering the world's poor in the process while creating a viable business proposition. Through cyber kiosks various services are being provided to villagers. Primarily these services include E-Governance, entertainments, e-horoscope, computer education, health and agriculture related information, market rates, weather information etc.

¹ Refer URL 1 of the Reference section

² Public sponsors so far have been mainly state governments with the likes of Madhya Pradesh, Kerala, Rajasthan, Maharashtra, among others.

Following host of issues are seen as the common challenges faced by these projects:

- **Partnership model** - understanding the potential of partnerships with third parties
- **Business model** - right mix of services, revenue projections, aligned incentives
- **Technology** - how to deal with the lack of power and telecom infrastructure, and poor technology penetration
- **Efficient back-end** - operations and buy-in from content providers.

However Drishtee, through its profitable kiosk business, has proven that significant demand does exist.

Drishtee – An Overview

Drishtee is a socially oriented company seeking to bridge the cultural divide in rural India by delivering on- and off-line kiosk-based services. Drishtee plans to build an intranet platform that would be scaled to offer a wide range of information, services and goods across all of rural India.

At the current stage of the project rollout, Phase I, the firm is facilitating a limited offering of government services. These services include basic government transactions, for example, obtaining a driver's license, filing complaints relating to government-run services, and obtaining below poverty line, marriage, and death certificates. In addition, Drishtee offers computer training in its kiosks. The rates charged by Drishtee average 20 rupees (40 US cents) per transaction and 300 rupees (US\$6) a month for computer training.

In Phase I we have identified three factors that contribute to the success of digital divide solutions and the viability of the business model:

- Create an economically **sustainable** business model by addressing local needs and utilizing the appropriate technology within a specific geographic, economic and social context
- Extend value proposition to a large customer base in order to realize efficiencies and **economies of scale and scope** within a broader geographic, economic and social context
- **Replicate and franchise** core sustainable and scalable aspects to similar areas.

Business Model

The current business model of Drishtee mirrors the three-tiered government structure as shown in the Figure 1.³

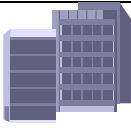


	Network Tier	Penetration	Role
	Network management company (Drishtee)	1 Head office 8 Regional offices 29 State offices	Network-creation •Demonstrate business-success with model district-hubs •Recruit & incubate partners Ongoing support •Manage & upgrade software •Interface with state government, corporate-clients
	District operators (Hubs)	550 (1 per district)	Network-creation •Recruit & incubate village-partners Ongoing support •Provide service-fulfillment backend for village kiosks •Manage hardware at village kiosks •Interface with local government
	Village operators (Kiosks)	55,000 (100 per district)	Marketing & delivering services to villagers

Figure 1: Drishtee three-tier Model and their roles

³ BCG Delhi

Network management company (Drishtee)

This is the role performed by Drishtee, at this level the network is planned and managed. The roles of the network management company are to create the network by demonstrating the business success of the district operators and recruiting partners and to provide ongoing support by managing and updating software and interfacing with government entities and corporate clients.

District operator (hub)

The business plan foresees the recruitment of 550 district operators (1 per district). The responsibilities of these operators include building the network at the village level, which requires recruiting and incubating local entrepreneurs in each village as well as providing backend support to the village kiosks and interfacing with the local governments.

Village operator (kiosks)

A total of 55,000 village operators is targeted throughout rural India (100 per district) and its key role would be to market and deliver services to villagers.

The network would be supported by two sources of revenue: a one-time licensing fee and a stream of transaction-based fees. The village kiosk would pay the one-time fee to be split between the district and the network operators and share its transaction-based revenue with the other tiers. District hubs also pay a licensing fee to Drishtee.

Based on aforesaid model, Drishtee plans to earn money through one time licensing fee and a percentage of transaction fee for various services. The transaction fee ensures continuous inflow of revenue to the company. The revenue model is shown in Figure 2.⁴

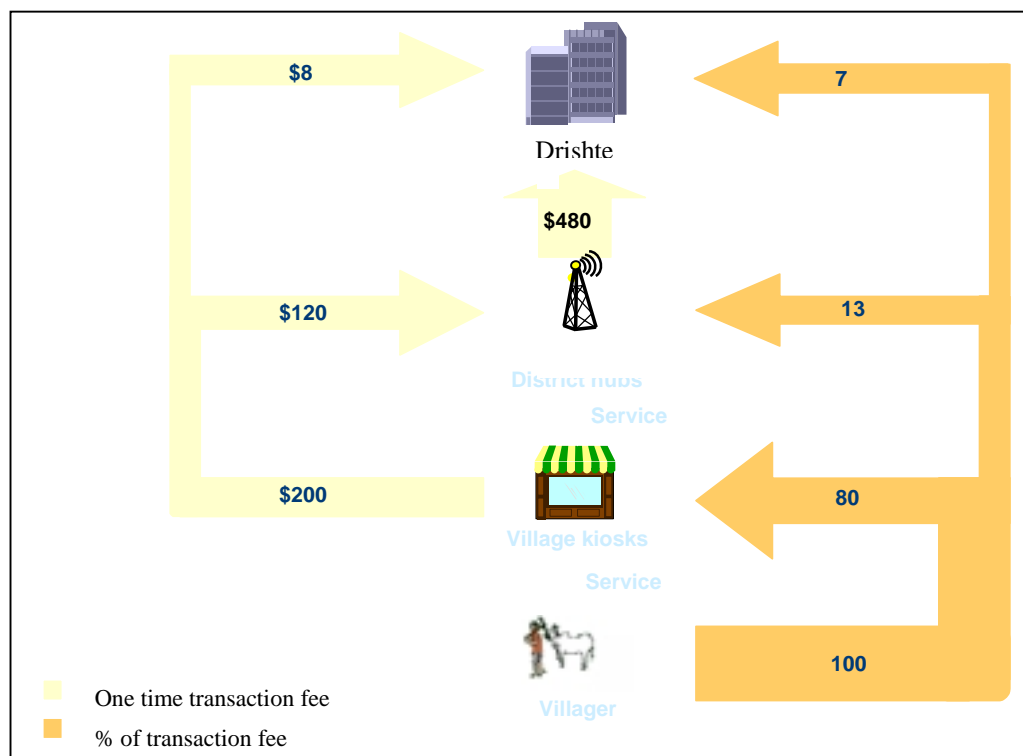


Figure 2: Drishtee Revenue Model

⁴ BCG Delhi

The deficiency in communications and other basic infrastructure in rural India creates an opportunity to establish partnerships with corporations active in the agricultural Indian industry. From trading companies to capital equipment providers, these firms would greatly benefit from the creation of a network that would make the Drishtee business model economically sustainable.

Future rollout

Even though there is a proven demand for digital services in rural India, considerable thought and planning must go into customizing service offering to local needs and the necessary resources required to service those needs. The following services are being considered as future offerings:

- Entertainment,
- Horoscopes,
- Employment exchanges,
- Rural e-marketplace,
- Computer training,
- E-health services,
- Government applications.

However, the offering of some of these services entails an added layer of complexity and even involvement in vested interests that limit their development over the near term. As a result, further investment in connectivity infrastructure is unwarranted to offer some of these services.

The challenge for Drishtee and its peers is to introduce additional services based on complexity and potential demand while developing or acquiring the appropriate means (e.g. connectivity) to deliver these services on a case-by-case basis.

How We Helped

We met with rural kiosk companies and with management consultants from BCG Delhi. After analyzing the current market data, it was determined that in order for Drishtee to succeed, it needed to penetrate more deeply into the village market. Expanding existing kiosks' customer base thus became our exclusive focus.

Our team hypothesized that in order to fully penetrate the market, kiosk services must be expanded beyond customers who are willing to walk to the kiosk itself. There appeared to be two demographics the current model was ignoring: those who live within eight kilometers of the kiosk, but are unable or unwilling to walk there (typically women), or those who live beyond the eight kilometer radius where the kiosk is simply too far away. A handheld computer, coupled with a kiosk, provides a means of reaching both demographics and scaling beyond the 1% of the market implicit in Drishtee's business model.

In order to test the hypothesis, we brought several handheld computers and inexpensive digital cameras into the rural village setting and loaned them to existing kiosk entrepreneurs. After participating in the first round of field-tests and training the entrepreneurs, we returned to Delhi with initial results, but left the devices at the kiosks for further testing. Although we only have limited results from these field trials, the kiosk owners were eager to integrate the devices in order to expand their existing suite of services, their customer base, and their revenues.

Upon returning from the villages, the remaining portion of our time was dedicated to writing up our progress (available online at www.media.mit.edu/~nathan/research/mla) and nurturing partnerships with companies potentially interested in the Drishtee network. We met the executives from Indian businesses including venture capital firms, NGOs, a health diagnostic software company and a handheld device startup (Simputer).

We left three handheld devices at three kiosks located in the different parts of the country for field-testing. The locations are shown in the figure below.



Figure 3: Handheld Devices left in three places for field-testing: Sirsa, Jhansi, Patna.

Handheld Services

Handheld devices can be used to provide various personal and group related services. It is important to note that the entrepreneur (the “PDADoot”) visits about 10 villages surrounding the kiosk on regular basis.

Following is the list of paid services that handheld model can provide.

Personal Paid Services

1. Camera and Printer combination
 - Picture taking and printing
2. PDA without internet connection
 - Picture viewing once taken with digital camera
 - Inter-village communication (voice mail/email)
 - Performing various tests with appropriate equipment, ie: health related and soil tests, etc.
3. PDA with internet connection
 - Email
 - Voice mail
 - Internet browsing (cached from kiosk)
4. Scanner/Camera and Printer combination
 - Scanning and printing formal documents

Apart from personal services, PDADoot can also deliver group services for the whole village. For group services, the panchayat⁵ pays for the services.

⁵ A village panchayat consists of a president and ward members. The members are elected from each ward and all the electors of the village panchayat directly elect the President. The number of ward members can be minimum six and a maximum of fifteen depending on the population.

Group Paid Services

1. Weather Information
2. Mandi (Market rate)
3. Government Schemes
4. Post local jobs and ads etc.

In order to generate awareness among villagers, it is important to provide free services. In addition, free service will help the entrepreneur to be able to build up relationships with its customers (villagers), and thereby increasing its customer base. Following is a brief list of personal and group services that can be delivered for free.

Personal Free Services

1. First five emails/voice emails are free.
2. Take the picture and see it on television /PDA, etc.

Group Free Services

1. Community Health Awareness
2. Community awareness about education/ employment news, knowledge about population control
3. Transportation schedule
4. Agricultural information

The Handheld Model

The handheld model is shown in Figure 4. The entrepreneur who runs village kiosk should own the handheld device. Depending upon the demand, he/she (or his/her family member) visits the surrounding village at regular frequency.

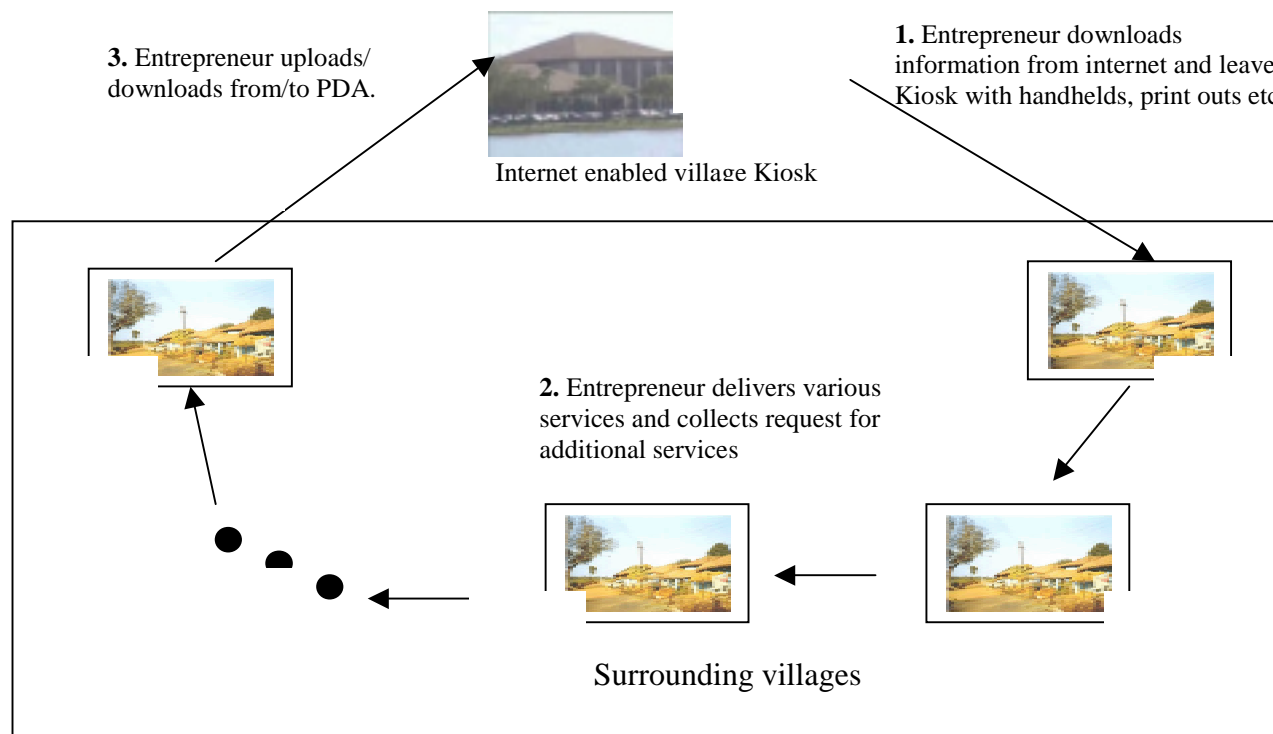


Figure 4: The Handheld Model

On the entrepreneur's visit to various villages, he not only delivers various services but also collects requests for specific services for which he needs to get information from Internet. After coming back from villages, he downloads information from web on the PDA (while also taking printouts of various forms) and in the next visit he delivers those services.

Since the PDADoot moves from village to village, it's important for PDADoot to be a male member of the community (for most parts of the country). Apart from being literate, a PDADoot must be chosen who does not discriminate nor is discriminated by people of different caste.

Lessons Learned

Our lessons learned are summarized below:

1. Mobile services **do** add value by:
 - Generating greater awareness of existing services
 - Penetrating more broadly within and surrounding the village geographic market, as shown in Figure 5.

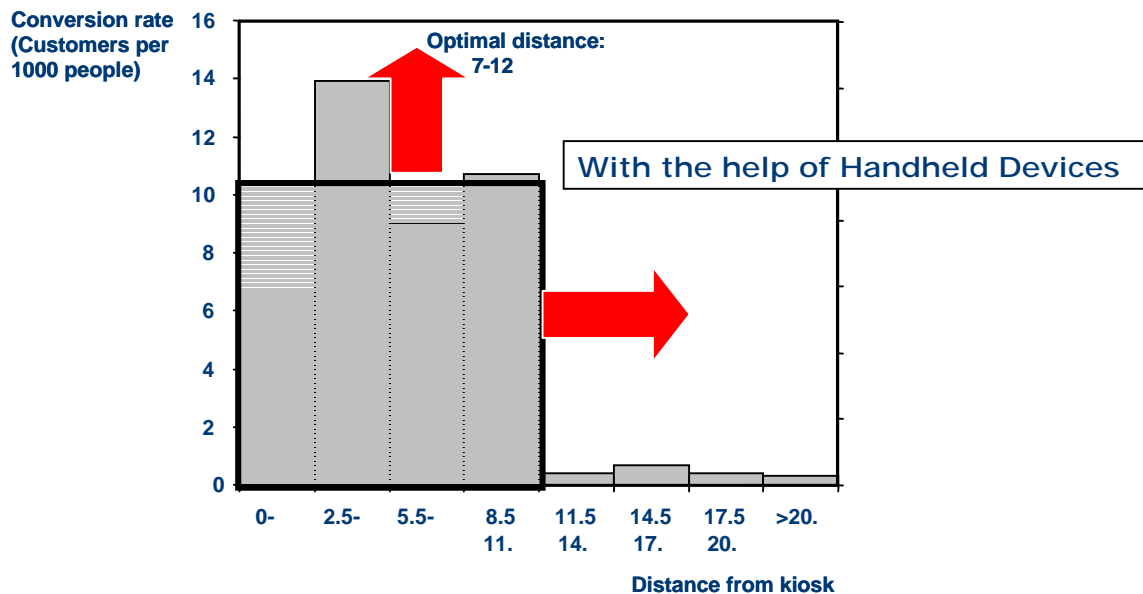


Figure 5: Expanding Kiosk Customer base with the help of Handheld

2. Fig 6 shows the services that can be provided by kiosk in ovals. The PDA helps reduce the complexity when providing some of the services, like email/voice mail, E-horoscope, Government online etc. At the same time, by providing door-to-door service the demand for these services also rises. In addition, handheld devices can also be used to provide following three services (shown with the green star in Figure 5):

- Inter-village email/voice mail: The PDADoot can record email/voice mail on the way from one village and deliver it to the next village. It is pretty common that these villagers have relatives/friends in the neighboring village.

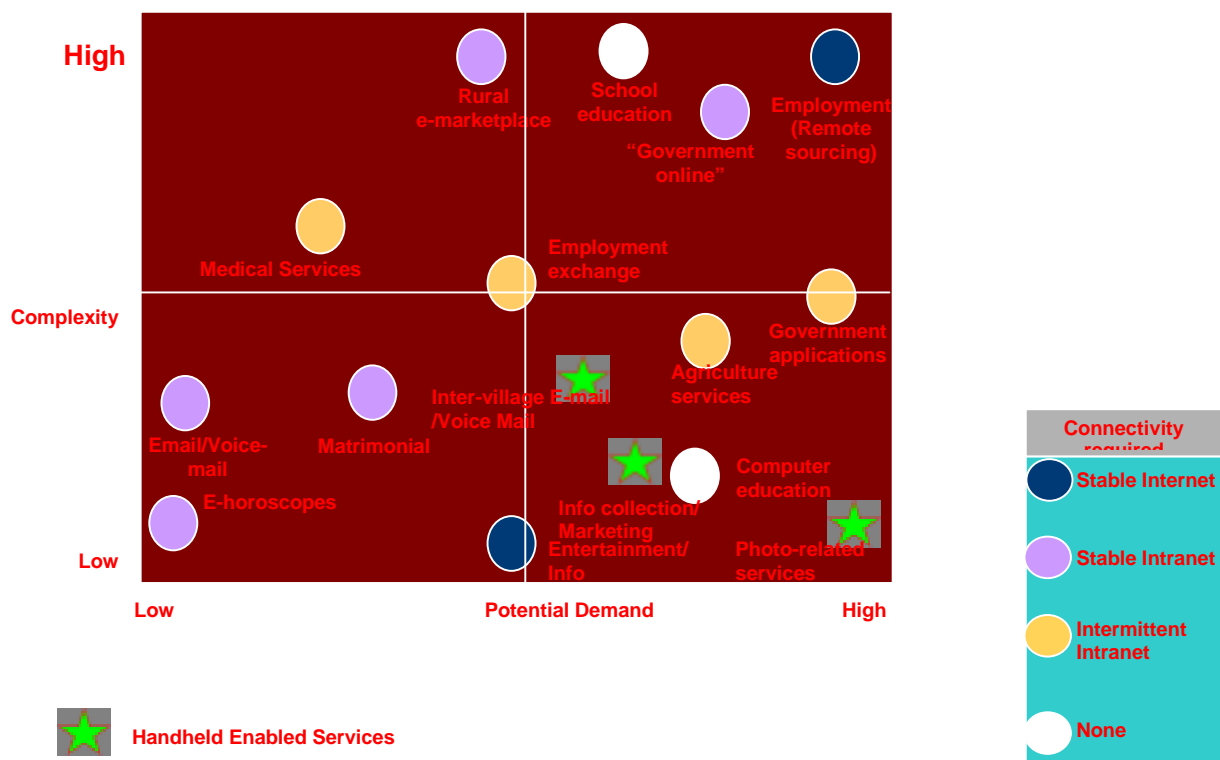


Figure 6: Kiosk Services (in oval) and Handheld enabled services (in Green Star)

- **Information Collection and Marketing:** From time to time the government needs data collection from villages and invests a lot of money. With the Kiosk model and Handheld PC (PDA) service, the PDADoot will collect the desired data while going from one village to another. In addition, if government wants to give information to villagers it can be distributed to the kiosks. These kiosks coupled with PDADoot could also help companies such as tractor or fertilizer manufacturers to market their products among villages.
- **Photograph Related Services:** Handhelds coupled with inexpensive digital cameras (\$80~ Rs 4000) can provide affordable photography services. Traditionally, these villagers go to camera shop in the near by city, get their picture taken (which they can't see before they can be developed), and then again revisit the camera shop to get their pictures after some days. The whole process costs them money in transportation fare and money charged by the camera shop person. In addition it costs their time, by losing several days of work. In the handheld service model, the PDADoot will use a digital camera to take their picture, and then he can show the picture instantly with the help of PDA, and get the approval for printing from the client (villagers). In this way they can also see if a satisfactory picture has been taken. The whole process takes relatively less time and money.

4. The team also learned that whatever be the theoretical findings, it must be tested in the field. The reason being rural digital market has not been tested and hence the final effect can only be known through sample field studies.

Success Criteria for Investment in Handheld Services

Handheld devices offer the opportunity to extend kiosk-based services as well as handheld-specific services to a broader customer base both within and surrounding the village – thus expanding the market reach of the kiosk. In order to assess the value of these handheld services, we constructed a model identifying the success criteria for generating a positive net present value within 5 years (see Table 1 on page 18).

Based on the following assumptions drawn from our field studies, the model indicates that handhelds make a successful addition to existing kiosks if they can generate transactions from 7-8 new households per week, a figure which appears to be realistic:

- No additional labor costs would be required to transport the handheld around the village and deliver the service. This is based on assumption that village kiosks are run by families with underutilized labor capacity.
- Handhelds can generate a total of \$0.65 per household from new services such as photos and voice mail.
- Handhelds can replicate 50% of existing kiosk-based services and corresponding revenue - \$0.30 per household.
- The handheld operator will to travel around the village to deliver the services for \$10/week.
- 10% hurdle rate for the initial capital investment required.

As prices of handheld devices continue to decrease according to Moore's law, the one-time and ongoing costs will decrease, and the model will only become more attractive. Based on these assumptions and data points, we recommend an investment in one handheld for each kiosk to penetrate more deeply into the rural market environment.

The fixed cost of the equipment is taken as per present cost which is expected to drop in future. For example, a handheld PDA company in India, Simputer⁶, is planning to sell handheld at \$250-300.

⁶ Refer URL 7 and 8 in the reference section

Table 1:

Handheld Services Model						
Costs/Handheld						
One-Time						
	Equipment	\$	500			
	Setup	\$	10			
Ongoing (Annual)						
	Maintenance	\$	250			
	Time	\$	-	\$	-	/week
Total Cost		\$	760			
Revenue/Handheld						
Annual Revenue Per Household (Existing Services)		\$	0.30			
	% of Existing Service Revenue		50%			
Annual Revenue Per Household (New Services)		\$	0.65			
	Camera	\$	0.35			
	Voice	\$	0.20			
	Other	\$	0.10			
Total Annual Handheld Revenue/Household		\$	0.95			
Year		1	2	3	4	5
Households/Week		7.54	7.5	7.5	7.5	7.5
Total Handheld Households		392	392	392	392	392
Revenue		\$ 372	\$ 372	\$ 372	\$ 372	\$ 372
Expenses		\$ 760	\$ 250	\$ 250	\$ 250	\$ 250
Cash Flows		\$ (388)	\$ 122	\$ 122	\$ 122	\$ 122
Hurdle Rate	10%					
Discounted Cash Flows		\$ (352)	\$ 101	\$ 92	\$ 84	\$ 76
Net Present Value		\$ 1				

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