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ICTs in Rural India: User Perspective Study of Two Different Models in Madhya Pradesh and Rural Bihar, India

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This article presents findings of two user perspective studies on the impact of ICTs in rural India. It is based on fieldwork conducted by the authors in Dhar district of Madhya Pradesh and Madhubani district of Bihar. The first study examines the impact of a state-led ICT initiative. The second looks at the impact of an ICT initiative by a non-government organisation. The article identifies issues critical to enhancing the accessibility of ICT services to the poorest rural households. A comparison is made between the two models in reaching the ICT services to the rural poor.

THE GROWING EXTENSIVE application of ICTs in poverty reduction strategies in India is encouraging. This article provides primary data on two types of ICT delivery mechanisms in rural India. It identifies good practice for ICTs as enablers of development as well as factors impeding the participation of the most disadvantaged. The aim of the primary research is two-fold. First, to explore if ICTs can be deployed to enable the improvement of rural human capital and increase participation in market opportunities. Second, to study which type of delivery mode maybe better suited for reaching the ICTs to the most disadvantaged groups for capacity building at the individual, community and societal levels.

Introduction

There is growing consensus in the global community on the positive role of ICTs in the development process. More recently the debate on ICTs for rural development has intensified through the emergence of literature—both conceptual and primary, based on ICT applications in developing countries. The success story of India's ICT sector is well documented; however, research into ICTs in the rural sector is at a rudimentary stage. Thus, the central question arises: what is the impact of ICT-enabled development on the rural sector in India?

India is the second fastest growing economy in the world, at over 8 per cent a year, next only to China. Much of the Indian growth is attributed to the rapid expansion of the export-oriented ICT sector. India accounts for almost 17 per cent of the world's population. A majority of these live in the rural sector, and are dependent on agriculture as their main livelihood (Datt and Ravallion 2002; World Bank 2001a). It is also the home to the largest number of poor living under the World Bank's poverty line of US$ 1 a day. An overwhelming majority of these live in the rural sector.

In recent literature the views of the proponents of 'growth is sufficient' have been contested and come under intense criticism. The search for pro-poor growth has gained much support and momentum in the current literature (Baulch and McCullock, 2000; Kakwani and Pernia 2000; Manning, 2007; Paternostro et al. 2007; Ravallion 2004). Further, the evidence for the ICT sector—though much in need of further research—suggests that its growth in India may not be pro-poor (Tiwari 2006). The article is, therefore, both timely and critical in exploring whether and how ICT growth is impacting the lives of the rural poor in India. In addition, it investigates the type of ICT-enabled projects that maybe more pro-poor in the rural sector.

The study is grounded in primary research conducted through field surveys in Dhar district of Madhya Pradesh and Madhubani district of Bihar. In the year 2000 the first ICT-driven development project in India called Gyandoot was implemented by the Madhya Pradesh government in Dhar. The second project, Drishtee, is an NGO developed to replicate the Gyandoot model across the country. Madhubani in Bihar is one of the few areas where the Drishtee is working for rural development though ICTs.

It is envisaged that the findings of the study will further the understanding of the much-contested benefits—direct and indirect ones of ICT-based projects in the selected rural areas. The objectives of the study are:

1. to build and assess the profiles of the beneficiary and the non-beneficiary cohorts of ICT driven rural development projects;
2. to identify causative, impeding and enabling factors in the successful spread of the projects; and
3. to identify which model has a higher reach to the poor.

The article is organised in six sections. A brief introduction is followed by an overview of the current literature on the role of ICTs in developing countries. The context within which the primary research was undertaken is discussed next. Then we move on to a description of the two projects, Gyandoot and Drishtee. This is followed by a brief description of the socio-economic features of the regions where the projects are operating. The methodology for the study and the primary data analysis are given in section four. Section five presents a discussion on the wider debate on ICTs and rural poverty reduction based on the findings of the primary research. Conclusions of the study are outlined finally.

Context and the Current Literature

Amidst growing evidence that ICT can play a constructive role in development (Chapman et al. 2003; Indjikian and Seigel 2005; Hanna 2008; Heeks 2002; Hongladarom 2004; McNamara 2003; Papaioannou and Dimelis 2007; Tongia et al. 2005; World Bank 2006), this article explores the impact of ICT growth on rural poverty in India. Given the increasing interest in ICT and the centrality of rural poverty reduction on the country's development agenda at the global level, this primary research is timely. The study explores the role of ICT as enablers of development, and how ICT excludes the most disadvantaged in rural India. It also explores the type of delivery mechanism that may be better at reaching the poor.

The 'digital divide' underpins much of the ongoing discourse on whether ICT can be harnessed for mitigating poverty in developing countries. The proponents of ICT (UNCTAD 2003) consider them a tool that can

be used to provide the economic opportunity to the poor and improve in human well-being. The World Bank (2001b) identified three critical areas in poverty reduction efforts: opportunity, empowerment and security. Since then vast amounts of resources have been invested (Hanna 2008; UNCTAD 2003: 1) in ICTs in many developing countries. Their growing extensive application in poverty reduction strategies in India is encouraging. Though in terms of both diffusion of technology and the skills/literacy gap India fares worst and most polarised amidst its competitors, Ireland and Israel, and economic rival China (UNCTAD 2003; World Bank 2001a), India is ahead in the ICT 'diffusion' indicators when compared with countries of South Asia and Sub-Saharan Africa. However, the digital divide can further widen if a large section of the population remains unable to participate in the ICT sector.

There is an extensive emerging global literature on the use of ICT in the rural sector of developing countries. The studies cover debates on a wide range of applications from rural manufacturing/enterprise (Duncombe 2006; Galloway and Mochrie 2005; Rhodes 2002; Virkkala 2007), rural connectivity and the rural–urban digital divide (Bowonder and Boddu 2005; Gamage and Halpin 2007; Hartviksen et al. 2002; Huggins and Izushi 2002; Narayanan et al. 2005; Nikam et al. 2004; Ramirez 2007), and rural education (Martin et al. 2001; Misra 2006; Yu and Wang 2006), to name a few. There is also a growing literature on the use of ICTs in agriculture and health services in the rural sector. Most of this literature is based on case studies, highlighting the successful, and in some instances the not so successful, transmission mechanisms of ICT engagement in specific areas. The overall context for ICT-driven services in the rural sector remains positive. Duncombe's (2006) work is of specific relevance to the current study. He studies ICTs and the development discourse within the livelihoods framework, using the case of Botswana. He suggests that the direct benefits of ICT for poverty reduction may be just marginal. A model based on livelihoods approach is proposed, which can be applied to build the social and political assets of the poor and strengthen the mechanisms that favour them. Thus, expanding the benefits the poor can derive from ICT-led services. The present study assesses the benefits of ICT services to examine the impact on livelihoods capital and structures of the user population cohort.

Within the context of rural India, ICTs are being applied in numerous sectors to overcome the digital divide to reach the poor in mitigating

poverty. The objective is to enhance opportunities for the poor. These include improving access to information and health care, empowering them by increasing their use of government services, and providing security through access to micro-finance (PREM).[1] A detailed discussion on the potential role of IT in India's development with a special focus on the rural sector is given in Singh (2002, 2004, 2006). The study identifies extensive pathways of ICT deployment in the Indian rural sector. It then examines both static and dynamic efficiency gains, as well as the envisaged reductions in the economic inequality and the social benefits that will follow. Singh (2006) defines static gains as those accruing just the once through efficient use of scarce resources. These include increases in operating efficiency, as well as reduction in transaction costs. The transaction costs here are interpreted as costs of opportunism and rent seeking. He notes that opportunism is a consequence of information asymmetries, as pointed by Williamson (1981). ICT, by correcting the information asymmetry, can remove opportunism and rent seeking, thus bringing down overall transaction costs. Dynamic gains are considered to be those arising from higher growth, thus improving the overall consumption both in the present and future. According to Singh (2006), ICTs can stimulate innovation, which is an important factor for economic growth within the endogenous growth models.

Singh's ICT-led dynamic gains postulate can be scrutinised within the debate on growth and poverty reduction since the focus of his work is on ICTs and rural development. The relation between growth and poverty remains very contentious in the development discourse. Collier (2007) has refocused the debate to the point that it is the 'quantity' of growth and not the 'quality' that matters to the poor. However, the arguments for the quality to be more important for poverty reduction remain strong (Adelman 2000; Bourguignon and Morrisson 1998; Gallup et al. 1999; Thirtle et al. 2001; Timmer 1997). Where can ICT-led growth be placed in the quantity/quality debate to examine its impact on rural development?[2] The ICT literature for the rural sector indicates their use as tools to improve productivity and expand market opportunities. A technology-intensive interface, though, is likely to engage the educated and the skilled for whom the technology adoption curve would be far less steep as compared with that for education-poor and unskilled cohorts. The quantity/quality debate, therefore, is important for ICT-led initiatives for rural development. Pro-poor ICT initiatives that enable the engagement of the poor either through

initial training and support, or facilitate the use of pictographic and local dialect software, offer a more inclusive development platform.

The ICT projects analysed in Singh's study are based on primary investigations of numerous[3] rural IT initiatives in India. Both demand- and supply-side factors of rural ICT uses are considered, though demand-side arguments are grounded in the conceptualisation of the potential benefits if the ICT implementations are successful. The supply-side analyses are based on the primary work. A useful insight into the applications of ICT captures the potential benefits in education, health, market efficiency, employment, rural development, governance reform and entrepreneurship using both demand- and supply-side constructs.

The following are some other projects in India where ICTs are entwined in rural programmes (World Bank 2002). Gujarat's computerised milk collection ensures fair prices and immediate payments to small farmers, who could neither afford the ten-day lag in payments, nor the hardship imposed through underpayments in the old system. The use of handheld computers provided by the InfoDev-sponsored India Health Care Delivery Project in Andhra Pradesh is intended to cut time spent on collecting and registering data. The freed time allow midwives[4] to expand administering immunisations, offer advice on family planning, and educate people on mother and child health programmes. The Swayam Krishi Sangam (SKS), a micro-finance institution in Andhra Pradesh, expects to lower the cost of delivering by eliminating paperwork, and reducing errors and fraud. The fieldwork by Kumar (2004) and Meera, et al. (2004) examines the performance of ICT projects in agriculture. Kumar (2004) has evaluated the financial sustainability of India's largest rural ICT initiative, known as eChoupals. Meera et al. (2004) have examined three rural projects aimed at improving the information delivery systems in agriculture (Gyandoot, Warana and iKisaan). The eChoupals are distinct in their focus on the agricultural sector by providing the necessary crop and market related information to the farmers. The study concludes that eChoupals can be useful and financially viable, provided these are viewed as tools to enable the exchange of information. Meera et al. (ibid.) found that a majority of the primary users were literate, male, young farmers, though the effective reach of a government project in marginal areas to the illiterate and poor is also noted. The study concluded that the investigated projects were overall beneficial to the farmers. However, an area where much work remains to

be done is gender participation in rural ICT projects. The study observed poor engagement of women farmers in all three projects.

Further case study-based literature on ICT applications presents an overall encouraging picture. Bowonder and Boddu (2005) examine the role of public–private partnerships to reduce the digital divide in rural Tamil Nadu. Their study reports a healthy uptake of services by a good proportion of the poor, middle and rich households. While some very positive evidence of the benefits being availed by the communities is provided, the overall study is based on the functioning of the providers. Bowonder et al. (2005) attribute the success of ICTs in the traditional leather industry in Kolhapur to two factors. First, to the re-engineering of the design, manufacturing and marketing processes using ICTs and, second, to the systematic training of the local craftsman to adopt the technology. This indicates the importance of the appropriate receptivity of users for ICT led initiatives to be successful.

The current literature and primary research on ICTs in rural India appears to be expanding at a much higher rate into the supply-side factors than into the investigation of the demand-side. While a typology of ICT information benefits is discussed in Duncombe (2006: 88) and beneficiary case studies are quoted within the Indian literature, investigations into factors impeding or enabling demand and the study of demand itself remain sparse. This study addresses the gap by grounding the primary research to capture the perceptions and the understanding of the ICT benefits to users in the rural areas. The objective, as noted earlier, is to study the impact of ICT-driven projects on rural poverty. The investigation seeks to explore if ICT can be deployed to enable the improvement of rural human capital and increase participation in market opportunities. Further, what is the evidence at the grassroots level for ICT as enabler of development as well as enhancer of capacity building at the individual, community and societal levels? The next section presents findings of the fieldwork conducted in the Dhar district of Madhya Pradesh and Madhubani district of Bihar.

The Projects: Gyandoot and Drishtee

In January 2000 a government-owned computer network called Gyandoot was launched in Dhar district of Madhya Pradesh. Gyandoot is considered a pioneer experimenting in taking ICT to the rural sector in India. The

objective is to improve the accessibility and use of ICT services by the rural poor. It is a state-run initiative with private partnership at the delivery stage of the services. Drishtee, on the other hand, is an NGO, founded in 2003. It has adopted a similar model to Gyandoot in facilitating rural ICT-based service delivery through franchising of kiosks on a revenue-sharing basis. Drishtee has expanded its network to several states: Assam, Chattisgarh, Bihar, Harayana, Madhya Pradesh, Maharastra, Tamil Nadu and Uttar Pradesh, with over 1,000 kiosks in all. Within the limited scope of this study just one of the networks of Drishtee operational in Madhubani district of Bihar is examined.

A brief description of the areas, Dhar and Madhubani districts, where the research was conducted, along with some of its special socio-economic characteristics follow. The objectives and the delivery mechanisms of the projects are then described in detail. This is followed by a detailed discussion and analyses of the findings of the primary research in the next section.

Madhya Pradesh and Bihar are among the four most backward states in India.[5] Madhya Pradesh, though, has made good overall progress in the last decade. Among these four states it has the highest literacy of 64.1 per cent, with the national average at 65 per cent, while Rajasthan has 61 per cent, Uttar Pradesh 57.4 per cent and Bihar the lowest of 47.5 per cent (Government of India 2001). Further, Madhya Pradesh was one of the seven states in the country that experienced a growth rate of over 5 per cent during the 1990s.[6] In addition, state expenditure in social sectors has improved considerably, accounting for almost 40 per cent of the total in 2000. There is increasing awareness of the challenges facing the government in the delivery of an effective health service. In recent years there has been a concerted effort to expand the provision of public health services and improve their access in both rural and urban areas.

Dhar is one of the fifty-two administrative divisions of the state of Madhya Pradesh. It is primarily an agricultural district, with 62 per cent of its land under cultivation and over 83 per cent of its population residing in the rural sector. It has a rich history, making tourism a strong industry. The district accounts for 3 per cent of the state population of 60.3 million. The literacy at 52.7 per cent—48 per cent rural and 75 per cent urban—is below the state average of 64.1 per cent (NCAER 2004).

The state of Bihar exhibits overall decline and poor progress over much of the past three decades. While there has been a distinct policy shift and

input into the development of the state in the last two years, Bihar remains a region characterised with rigid multiple social divisions, and one of the lowest development indicators of health, education, per capita income and infrastructure in the country. The state has the highest proportion of rural population with almost 90 per cent living in rural areas, with rural literacy of just 44 per cent. Furthermore, 49 per cent of the state's rural population lives below the national poverty line. Of particular concern is the lowest female literacy level in the country at just 33 per cent (28 per cent rural) (Government of India 2001).

Madhubani is one of the thirty-eight administrative divisions in the state and an important agricultural district. The population of the district accounts for around 4 per cent of the state's population of 83 million. Over 95 per cent of the population resides in the rural sector. The literacy rate of the district is 42.35 per cent (57.26 per cent for males and 26.56 per cent for females), which are lower than the respective rates of the state (ibid.).

Gyandoot was launched in Dhar on 1 January 2000, as a pioneering experiment taking ICT into the rural sector. The government-sponsored initiative was set up to use innovative e-governance, e-commerce and e-education to enable development programmes. The specific project objectives were: to improve public access to government services, to improve the government functioning by introducing higher levels of accountability and transparency, to bridge the digital divide, to facilitate citizen–government partnerships in social projects, and to enhance livelihood opportunities. An intranet kiosk network is the main delivery mechanism for the various services provided. The information kiosks (*soochanalaya*) were initially set up in twenty-one village centres of the district. Each information kiosk covers twenty to thirty villages, and a population of between 20,000 and 30,000. The kiosks are run by an operator, known as the '*soochak*', who is generally a local graduate (minimum education qualification is tenth standard) selected by the Gyandoot committee and then trained by Gyandoot engineers. The operator remains a private entrepreneur and at no stage is he or she an employee of Gyandoot. A participatory process involving the community, government officials and the Gyandoot team was deployed to select the services offered. Most services carry a fixed charge. The key facilities offered by the kiosks include: online registration of applications for land records, caste, income and domicile certificates; online public grievance redress, and information

regarding government programmes; e-mail facilities for social issues and transparency in government. The specific services provided by Gyandoot kiosks are summarised in Table 1.

TABLE 1
Key Features of Gyandoot and Drishtee

Gyandoot	*Drishtee*
Government initiative	Not-for-profit organisation
ICTs for rural development	ICTs for rural development
Kiosk-based service delivery	Kiosk-based service delivery
Independent kiosk operators	Independent kiosk operators
No revenue sharing with kiosk operator	Revenue sharing with kiosk operator
Operates in Madhya Pradesh only	**Operates in Assam, Chattisgarh, Bihar, Harayana, Madhya Pradesh, Maharastra, Tamil Nadu and Uttar Pradesh**
Services	
Information and service enhancing: Market opportunities, government schemes for development, agriculture-related input and advice, matrimonial, Hindi e-mail and Internet use	**Capability enhancing:** Computer courses, Web designing, desktop publishing, accountancy, English speaking, and eye care and glasses
Entitlement enabling: Land record certificates, caste certificates, domicile certificates, BPL list, exam results	**Insurance services and books:** Life insurance and motor insurance
Capability enhancing: Computer courses	**Services:** Digital photography, SIM cards for mobile phones, photocopying and long distance call facilities (PCO)

Sources: Drishtee (http://www.Drishtee.com, 2007); Gyandoot (2007).

Drishtee started its operation in Madhubani in 2002 and has since established 58 information kiosks. An NGO, though also addressed as 'a commercial organization, with social objectives' (Singh 2006), Drishtee has attempted to replicate the Gyandoot model of developing IT-enabled services in rural areas. Kiosks based on a revenue-sharing model are the modus operandi of Drishtee. The objectives are to promote the use of ICT applications for the social and economic development of the villagers, ICT centres based on entrepreneurial and service-driven model of Drishtee,

linkages between community needs and the ICT centres, and advisory services related to ICT research and community activities. Drishtee's services portfolio comprises e-governance services, licences, banking, land records, market information, matrimonial services, online grievance postings, local transport schedules and commercial services. These are rendered to villagers for a very nominal fee. Independent entrepreneurs who are the sole investors in establishing these centres run the kiosks. Drishtee in turn trains these entrepreneurs in the running of the centre, and assists in networking and establishing contacts with the relevant officials for the smooth running of the e-governance services. The entrepreneurs pay Drishtee 5 per cent of their total revenue from the kiosk services.

Fieldwork Analysis

One hundred households from each survey area, comprising both users and non-users of the Gyandoot and Drishtee services, were interviewed. Efforts were made to select households from three economic categories: those below the poverty line, marginal and 'comfortable' non-poor households. A comprehensive primary dataset comprising two distinct categories of information in terms of methods deployed and content was obtained from each subject that was interviewed. The first category comprised general quantitative information on the household members' literacy levels, livelihoods, ownership of economic assets and other demographic indices. The second set contained information on the usage of Gyandoot/Drishtee services and interviewee views on Gyandoot/Drishtee services. Semi-structured, open-ended questions focusing on the subject's understanding of poverty and its causes were used to obtain primary qualitative data in the second category.

The fieldwork focused on the:

1. socio-economic status of the beneficiaries and the non-beneficiaries— to find whether the poorest are able to access the benefits, which groups are least able to participate, as well as which groups are able to avail the maximum benefits;
2. the nature of benefits being availed—to study whether these are expanding capabilities, through education, health services, skill enhancement; expanding market opportunities, through enabling access

to buyers' and sellers' markets, market information, agriculture-related information, empowering the participants through knowledge and information or expanding/facilitating entitlements; and

3. how useful are the services being provided are, and what the awareness levels of these services in the interviewed cohort are.

The purpose of the investigation is to explore whether and how the Gyandoot and Drishtee initiatives are meeting their objectives, and, most importantly, who the beneficiaries are. It is expected that the outcome of this primary research will be three-fold. First, it will further the understanding of the distribution and the type of the benefits of ICT-driven projects in the rural sector. Second, it will identify which mode of delivery maybe better suited for reaching the poorest cohorts. Third, it will assist in exploring the linkages between such projects and rural multidimensional poverty. Additionally, it is also expected to provide evidence-based research outcomes showing which of the Gyandoot/Drishtee services are working and which are not, together with some indication of the causative and enabling factors.

Gyandoot Analysis

The spread of users and non-users in the surveyed sample was around 40 and sixty per cent (44 users and 58 non-users) respectively. The data for the first category gives user and non-user profiles in terms of income, education and occupation. The BPL category indicates those below poverty line and APL represents those above. The poverty line here is the national poverty line of Rs 365 per month (Rs 12 per day), which is approximately the equivalent of the World Bank's USD 1 a day (Purchasing Power Parity [PPP], 1993 prices) poverty line.

User and Non-user Profiles

As show in Table 2, the user group comprises a higher proportion of those above the poverty line (80 per cent) as compared with the non-user group (66 per cent). The educational levels for the user group show only 15 per cent of users to be illiterate as compared with 26 per cent of non-users. Large farmer households account for nearly half of the users (49 per cent), while landless and the medium farmers make up almost two-thirds

TABLE 2
Gyandoot User and Non-user Population Profile

Distribution by poverty line	User (%) n = 44	Non-user (%) n = 66
BPL*	20	34
APL	80	66
Distribution by education		
Illiterate	15	26
Primary	31	32
Middle	16	19
Secondary	20	12
Pre-university	7	5
Graduate	9	2
Technical	2	4
Distribution by occupation		
Landless	12	21
Marginal farmer/tenant	2	7
Medium farmer	35	43
Large farmer	49	26
Other	2	3

Source: Author's fieldwork data, 2007.
Note: *Those below poverty line are given a red book by the state government.

of the non-users. Overall, those with higher levels of literacy and income are accessing the Gyandoot services more than those with lower literacy and incomes.

Causation between the indicators—literacy/educational level, income and occupation—was inconclusive. A number of those above the poverty line and in the large farmer category were also in the illiterate category or had very little formal education. At the same time, a number of interviewees who had up to secondary level education were landless and working as casual labour. This conforms to the wider discourse on factor market imperfections and presence of distortions in the rural labour markets in developing countries (Bhagawati 1971; Dhar 2007; Krishna et al. 2002; Tiwari 2001). Two other trends emerged regarding the education levels of the interviewees' household. First, almost all female adults from user and non-user households were illiterate, or at best educated up to third standard. Second, on a more encouraging note, all children (male and female) were enrolled in primary or secondary school. Of the total sample surveyed, none were female users, though two of the fifteen functional kiosks were run by women.

Further analyses of the outcomes noted is given within context of the wider discussion on ICTs and rural poverty reduction in a later section of the article.

Drishtee Analysis

The proportion of users and non-users in the surveyed sample in case of Drishtee was around 64 and thirty six per cent (64 users and 36 non-users) respectively. The much larger proportion of users is significant given that the overall uptake of Drishtee services is medium to low. A partial explanation is provided through the high use of digital photography provided at the kiosks. This service, although outside the original remit of the ICT-enabled Drishtee services, is much in demand and provides lucrative returns to the kiosk operator (Rs 25 per picture).

As with the Gynadoot data, the data for the first category gives user and non-user profiles in terms of income, education and occupation. The BPL and APL categories, and the poverty line definition are the same as those used for the Gyandoot fieldwork. Those below poverty line are given a red book by the state government.

The profiles of the two groups (Table 3) show a higher proportion of users above the poverty line (69 per cent) as compared with non-users (60 per cent). The educational levels show 54 per cernt of users to be graduates compared to 28 per cent non-users. Almost half of the users (49 per cent) belong to the 'other' category of occupation. This category is dominant among non-users as well. The user 'other' category mostly comprises small businessmen/traders, retired government officials and teachers. The non-user 'other' category too includes petty traders. The cohort interviewed for the Drishtee survey appears to be concentrated around the township of Madhubani, where its main operations are based.

The surveyed sample indicates that those with higher levels of literacy and income are accessing Drishtee services more than those with lower literacy and incomes. Occupational distribution trends are far less conclusive. A closer examination of the type of services offered and the usage pattern (discussed in detail in the next section) offers some explanation as to why there may not be any usage trends linked with occupation. Digital photography, an additional service to the ten provided

TABLE 3
Drishtee User and Non-user Population Profile

Distribution by poverty line	User (%) n = 64	Non-user (%) n = 36
BPL	31	40
APL	69	60
Distribution by education		
Primary	2	0
Middle	2	14
Secondary	26	33
Pre-university	16	25
Graduate	54	28
Distribution by occupation		
Widow	5	5
Artisan	9	8
Landless	15	14
Marginal farmer/tenant	11	24
Medium farmer	9	11
Large farmer	2	0
Other	49	38

Source: Author's fieldwork data, 2007.

by Drishtee, has a high uptake—sometimes the only service being used—thus raising the overall number of users.

User and Non-user Profiles

The digital photography service itself has multiple uses, ranging from the simple desire to have family pictures taken at affordable rates, photographs for matrimonial purposes, to photographs for official documentation and records. Both the need and desire components of the service are more 'human being' facing than connected with a particular occupation. Similar to the Gyandoot trends, all female adults from user and non-user households were illiterate. Similarly, all children (male and female) were enrolled in primary or secondary school. Of the total sample surveyed, none were female users—even in the widowed households male children was the users.

The outcomes noted are further analysed in the wider discussion on ICTs and rural poverty reduction later in this article.

**Awareness of Services, Usage and Users' Views on Gyandoot and Drishtee**

The awareness and usage levels of Gyandoot and Drishtee services in the surveyed population of Dhar and Madhubani are indicated in Figures 1 and 2. These services are based on Table 1 and represented by G1 to G16 for Gyandoot and D1 to D10 for Drishtee. G1 is information on agricultural markets and commodities, G2 caste certificates, G3 income certificates, G4 domicile certificates, G5 landlords' passbook of land rights and loans, G6 land records (Khasra Nakal), G7 Hindi e-mail, G8 e-education,

FIGURE 1
Awareness Levels of Gyandoot Services
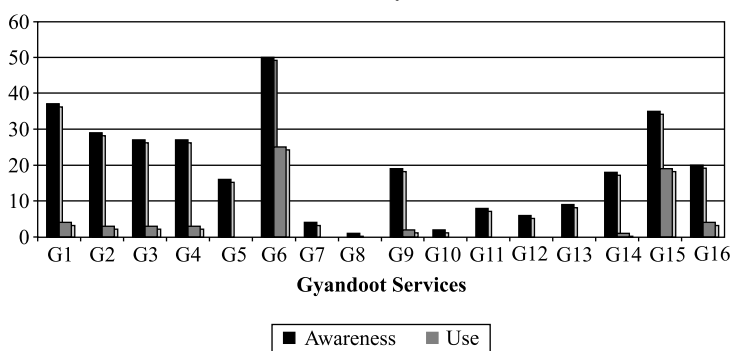
Source: Based on the author's fieldwork data.

FIGURE 2
Awareness Levels of Drishtee Services
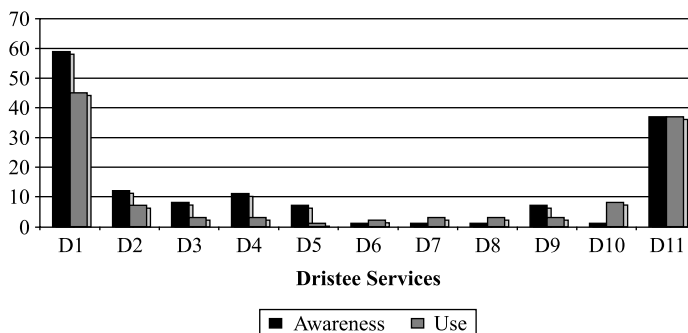
Source: Based on the author's fieldwork data.

G9 advisory module, G10 rural news, G11 rural market information, G12 matrimonial services, G13 employment news, G14 BPL family list, G15 exam results via the Internet, and G16 information on other government schemes.

The overall awareness of Gyandoot services ranges from satisfactory to very low. The usage trends are far grimmer than the awareness levels. Just two or three of the sixteen noted services were being used. The most used service was G6: providing certificates for land records (Khasra Nakal). Users found the maximum benefit in it in terms of savings in time and money. The kiosks are able to provide the documentation for a minimal fixed fee. This not only saves time, effort and costs in commuting to the nearest government office, but also avoids rent seeking and opportunism by officials. The difference in the amount paid to the district officer varied from Rs 100 to Rs 500 per record as compared with the fixed amount of Rs 15 paid to the Gyandoot kiosk. Singh (2006), as noted earlier in the article, explains this as a static gains accruing the once through efficient use of scarce resources.

The usage pattern clearly indicates uptake of entitlement-enabling services, in particular physical entitlement. Land records certificates are used to confirm landownership. The entitlement is then used to avail a range of benefits and subsidised services. These include banking and financial assistance at concessional rates, subsidised agricultural and infrastructure inputs, as well as numerous social welfare measures. The human capital and capability-enhancing services listed in Gyandoot as e-education, health care and advice/information-related modules were found to have negligible uptake. The main reason for this, as it emerged from the survey findings, was the difficulty in comprehending the replacement of the human interface—a medically trained person with a 'machine'.

Information services related to market opportunities, after an initial healthy usage level, appeared to be much on the decline through a possible crowding out effect of mobile technology. Information on current market rates is disseminated widely even if just one person from the village or a relative from another village visits the market. The information is communicated and shared in real time over mobile phones, which have a high penetration in the region. Market information through kiosks on the other hand is not always current, depending on when it is updated. The more efficient technology is, therefore, satisfying the demand for the market information, thus diminishing the use of the kiosks for this service. In

addition, all users and non-users reported poor information and publicity of Gyandoot services. On numerous occasions the survey team found themselves as ambassadors and propagators of the project.

Drishtee services D1 to D11 represent: basic computing (D1), software programming (D2), Web designing (D3), desktop publishing (D4), accountancy (D5), English speaking (D6), eye care and glasses (D7), books/publications (D8), life insurance (D9), motor insurance (D10) and digital photography (D11). The awareness of Drishtee services ranges from very satisfactory—close to 60 per cent in two of its services: basic computer training and digital photography—to very low in the remaining services. The two high-use services appear to be the main income earners for the kiosk operator. The uptake of other services is low to very poor. Digital photography shows a high uptake of nearly 58 per cent of the users, such that 25 per cent Drishtee users only use the kiosk for that particular service. It offers photographs that can be viewed before a print is made available at Rs 25 per piece.

While there is clearly a demand for this and it provides a good return to the kiosk operator, it is neither a Drishtee-listed service nor does it fit into the development programme. It does not enhance capabilities such that the users' opportunities in life are improved; it does not strengthen livelihood outcomes either. It does perhaps fulfil components of subjective well-being and happiness through ownership of photographs of loved ones. In addition, it fulfils the necessity of photographs for documentation and records. The healthy uptake of computer training and learning English language (spoken and written) at Rs 1,000 to Rs 5,000 indicates a positive trend for the educated in the rural sector. Much of the IT-led progress in southern India is attributed to the availability of skilled labour with linguistic competencies. Thus, skill enhancement with English language proficiency in rural Bihar can act as a stimulant to IT services there as well.

Gyandoot and Drishtee: ICTs in the Rural Sector and Poverty

The mission statements and objectives of both Gyandoot and Drishtee focus on the use of ICTs for the socio-economic development of rural communities. Both projects deploy a similar kiosk-based network run by independent operators. One is a state-led initiative of the government of Madhya Pradesh, while the other is a non-profit organisation.

The main differences in the modus operandi of the two initiatives are situated in:

1. the selection of the types of services offered at the kiosks; and
2. the revenue-sharing model of Drishtee.

Gyandoot services G1 to G16 as noted earlier can be categorised into:

1. information and service enhancing: market opportunities, government schemes for development, agriculture-related input and advice, matrimonial, Hindi e-mail and Internet use;
2. entitlement enabling: land record certificates, caste certificates, domicile certificates, BPL list, exam results; and
3. capability enhancing: computer courses.

As noted earlier, the uptake of the entitlement-enabling services is the highest. The capability-enhancing service is used by 14- to 18-year-olds who learn computing skills certified by the government at subsidised prices. The entitlement-enabling services are geared towards the rural population, and also the socially and economically backward classes.

Drishtee services too can be categorised into:

1. capability enhancing: computer courses, Web designing, desktop publishing, accountancy, English speaking and eye care;
2. insurance services and books: and
3. services such as digital photography, SIM cards for mobile phones, photocopying and long-distance call facilities (PCO).

The highest uptake was shown to be for computer courses and services, in particular digital photography. Both services are much needed, and respond to an existing demand as indicated by the interviewees. Drishtee does not offer any entitlement-enabling services either directlythrough issue of various certificates as in Gyandoot, or indirectly by facilitating communication between the issuing authorities and users. Drishtree is constrained in issuing any type of official document as it has not been able to acquire the necessary authorisation to issue certificates on behalf of the state. However, all other services provided by Drishtee kiosk operators at market rates—there are no subsidies—appear to target the literate

population living in the small townships with sufficient disposable incomes to pay for these. The services lack provision to include the socially and economically backward communities in rural Madhubani.

The revenue-sharing model of Drishtee partially explains the absence of services for the poor communities. While its kiosk operators are independent local entrepreneurs, unlike the Gyandoot model, they pay 5 per cent of their income to Drishtee. Hence, unless the revenue from a service is sufficient to meet the costs, plus some profit in addition to the 5 percent commission, the service would not be financially sustainable.

The type of services and the mode of service delivery of the two projects target different cohorts of user populations. Gyandoot *soochak*s have the advantage over Drishtee kiosk operators in having authorised access to government departments. Overall, the Gyandoot initiative offers a more socio-economic inclusive format of services focused towards a rural population. Drishtee services are aimed more towards users with sufficient literacy skills and incomes. The absence of any development-oriented services is noted by the interviewees.

In terms of users' views of both projects, in case of Gyandoot, despite with a clearly pro-poor agenda, there is poor information about the project and the various schemes offered within it. Where the *soochak* has exhibited enterprise, there is better information and dissemination of the services. Overall, those with higher levels of income, literacy and landownership are accessing the Gyandoot services more than those with lower literacy, incomes and landownership. Further, there were no female users of Gyandoot services. In its current format of delivery, it was unable to effectively engage the economically and socially disadvantaged groups. Again, despite a strong supply-side market presence underpinned by a robust rationale for inclusive development, the outcome is far from being achieved.

Drishtee users, on the other hand, reported higher levels of awareness of its services, though services other than those under the Drishtee remit, such as digital photography, have skewed the awareness data. When the usage pattern is disaggregated for each service, the uptake too is limited to just two services. Drishtee's service remit in Madhubani remains distant from its vision of 'ICT for Development' and its mission 'to understand, promote and synergise the ICTs for socio-economic development of rural community'.

Some noteworthy achievements of both Gyandoot and Drishtee initiatives deserve mention. First, the model itself is a unique experiment of engagement with the local community through a private, locally selected individual to deliver the services. This not only encourages entre-preneurship in the rural sector, but also provides a much-needed stimulant in the employment market for the rural educated labour, albeit by a small factor. Second, the near elimination of hardships for the rural poor in terms of the costs—monetary and time,as well as bribes to the officials for obtaining the land record certificates in Gyandoot—was immensely appreciated by users. Third, the provision of IT skill enhancement services as well as services to fulfil subjective well-being and documentation needs through digital photography in rural townships of Bihar is a progressive step that has the potential to feed into the larger labour market.

Possible transmission mechanisms of ICT benefits, both direct and in-direct, to the rural sector are discussed in Tiwari (2006). The direct bene-fits are postulated via the deployment of ICT to enable improvement of rural human capital for poverty reduction. The indirect benefits are con-ceptualised through increased participation of the rural labour in market opportunities made possible by better literacy and skills through ICT. In addition, by improving the skill base of rural labour through higher literacy and better health care, ICT can stimulate the economy to generate employment opportunities. Also, by helping to increase participation and empowerment of excluded groups, it has the potential to reduce income inequality.

The findings of the current study of Gyandoot and Drishtee in Madhubani indicate the presence of mechanisms to bridge the digital divide and improve social poverty via education and health care portals in the projects. The demand-side factors reveal a different story. Services bridging the digital divide and reducing social poverty were found have a low to negligible uptake. The main cause for the market failure of this service is attributed to incomplete and absent market information. The finding contests the assumption that ICT can itself reduce the digital div-ide and enable market participation of the rural population. While the potential for the ICTs to bridge the digital divide and improve rural human capital remains undisputed, it is unlikely that the outcome can be realised without the appropriate stimulation of the demand-side factors. Drishtee's healthy uptake of the computer courses is capability enhancing for the educated cohort. There are positive spillovers in terms better employment

opportunities and expanding the availability of skilled labour in the rural sector. It can also be argued that by raising the skill level of the already educated, it is widening the digital divide between the educated and the illiterate groups in rural Madhubani.

Conclusion

Gyandoot and Drishtee are two initiatives implemented to enable the use of ICT for rural development. Both projects deploy a similar kiosk-based network run by independent operators. One is a state-led initiative of the government of Madhya Pradesh, while the other is an NGO. In addition, Drishtee kiosks run on a revenue-sharing model.

The potential of the Gyandoot model to engage the socially and economically backward communities in an inclusive development format through education and well-being is robustly convincing. The outcomes, though, are far from being realised. Based on the information gathered through the field survey and the users' views, there is evidence of market imperfections through sluggish demand-side factors and information asymmetries. This appears to be the main cause impeding the uptake of the majority of services being offered by Gyandoot. Drishtee services in Madhubani, on the other hand, appear to target a cohort with sufficient educational levels and income. In this aspect Drishtee initiatives are not engaging the socially and economically backward communities in rural Madhubani. Just two of the eleven services—computer training and digital photography—are shown to have a high uptake, while other re-main sparsely used.

Areas where there has been notable success through the Gyandoot initiative are in providing invaluable physical entitlement enabling services, and introducing a unique public–private partnership encouraging entrepreneurship in the local economy. The latter bears the potential to act as a stimulant to the rural labour market for the skilled labour. Working on a similar model, Drishtee has also encouraged entrepreneurship in rural Madhubani. The linkages with other Gyandoot services of education and health together with community engagement and the wider debate on entitlements and capabilities remains weak. Information asymmetries, perceptual gaps and poor receptive capacity of users emerged as the main causes for the poor uptake of services. These could be overcome through

a concerted effort to inform and involve users in the delivery mechanisms of these services.

Overall, the uptake of Gyandoot and Drishtee services is not at an optimum level. While the potential for the ICT to bridge the digital divide and improve the rural human capital remains undisputed, it is unlikely that this outcome can be realised with the current formats of delivery and appropriate stimulation of the demand-side factors in the rural sector.

NOTES

1. Poverty Reduction and Economic Management Network (World Bank, 2002).
2. For a detailed discussion on whether ICT-led growth can be pro-poor, see Tiwari (2006).
3. The following specific IT initiatives are examined in Singh's (2006) study: Drishtee, Aksh, n-Logue, ITC (eChoupals), TARAhaat and Akshaya.
4. Midwives provide most health services in rural India, covering up to 5,000 population per midwife across multiple villages (World Bank 2001).
5. An acronym for Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh is BIMARU. The word in Hindi means 'ill'.
6. The others were: Gujarat 9.6 per cent, Maharashtra 8 per cent, West Bengal 6.9 per cent, Tamil Nadu 6.2 per cent, Rajasthan 5.9 per cent and Kerala 5.8 per cent (Government of India 2001).

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