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**Information Technology and Broad-Based Development:
Preliminary Lessons from North India***

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Abstract

Can information technology (IT) contribute to broad economic development? Can the benefits of IT reach the poor, through better access to education or to government services? We examine two ongoing projects that aim to provide IT-based services to rural populations in India. Several features distinguish these projects from others: a combination of public and private efforts, and goals of commercial sustainability. We draw lessons from comparing different approaches in similar localities. While the goals of the two organizations studied are similar, we identify some important differences in implementation that may have more general implications for the success of such projects.

Keywords: India, South Asia, information technology, Internet, rural development

JEL codes: O12, O3, L31, P2

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1. Introduction

The success of India's export-oriented software industry is well known.¹ Indian software exports since the 1990s have contributed greatly to the easing of India's balance of payments situation, and have inspired a new confidence among individuals, as well as policy makers, in India's economic future. However, whether information technology (IT) can contribute to development beyond the obvious income effects generated by software exports depends on how pervasive are IT's impacts on the economy, ranging from improving the efficiency of existing businesses, to enabling new kinds of goods and services. In a developing country such as India, it is of particular interest whether such benefits can reach the poor, and even help in directly reducing the deprivations associated with poverty. For example, better access to education, agricultural market information or to government services may be relatively more valuable for poor people who cannot afford to use traditional methods or communications media, or to pay for the services of traditional facilitating intermediaries.

This paper examines two ongoing projects that aim to provide IT-based services to rural populations in India. Several features distinguish these particular efforts from others: a combination of public and private efforts, with nonprofit organizations acting as catalysts; goals of commercial sustainability, both for the local entrepreneurs and the nonprofits; and an eclectic approach to the services that are sought to be provided. Our main contribution in this paper is to draw some preliminary lessons from comparing two different approaches in localities that are geographically close and economically similar. While the ultimate goals of the two organizations studied are quite similar, we identify some important differences in implementation that may have more general implications for the success of such projects.

The structure of the paper is as follows. In section 2, we describe the region studied, and the organizations involved in trying to bring IT to these parts of rural India. These organizations include the respective state and local governments as well as commercialized subsidiaries of more

traditional nonprofit, nongovernmental organizations (NGOs). In section 3, we lay out the objectives of the two efforts, in terms of the potential range of services to be provided, and the desired impacts on the populations served. We attempt to lay out a conceptual framework that, at least partly, may be shared by IT-based service efforts in general. This includes the economic and business principles that will drive successful efforts in this area. In section 4, we describe some of the features of implementation so far, based on our initial fieldwork, and the preliminary lessons to be derived from our observations. It is to be stressed that both efforts are ongoing, and are evolving rapidly (partly due to their commercial nature), so any shortcomings may well be resolved quickly. Section 5 concludes the paper with a summary and some conjectures on the future course of events.

2. The Scene and the Actors

Punjab and Haryana are both high-income states by Indian standards. Along with high incomes, they also have relatively good infrastructure. Punjab, in particular has the highest infrastructure index in the country, as calculated by the Centre for Monitoring Indian Economy (CMIE). Punjab is best known as an agricultural state with high productivity, and it is largest supplier of food grains to the central pool used for the public distribution system. In addition, Punjab has diverse industrial production comprising of engineering goods, pharmaceuticals, leather goods, food products, textiles, electronic goods, sugar, machine tools, hand tools, agricultural implements, sports goods, paper and paper packaging. Almost 70 percent of India's total output of bicycles and parts, sewing machines, hosiery and sports goods are produced in Punjab.

Haryana, which was carved out of Punjab in 1966, has to some extent played catch-up with Punjab in agriculture, industrial production, and infrastructure. The liberalization of the

Indian economy in the 1990s has brought substantial benefits to the state's districts that are adjacent to Delhi with investment by multinational firms attracted by proximity to Delhi and its international airport, combined with less congestion and new infrastructure. Table 1 summarizes some of the key characteristics of the two states. Their geographic position, infrastructure and relative prosperity make them, on the surface, very promising candidates for expanding Internet and IT use into their rural areas. One of the lessons of our paper is to identify problems and bottlenecks in realizing such a vision on the ground.

Table 1: Haryana and Punjab Statistics (1997-98)

Characteristic	Haryana	Punjab
Geographical Area (Sq. Kms.)	33,212	50,362
Population (millions)	19.42	23.51
State Income Per Capita (Rs.)	3,997	4,452
Food Grain Prodn. (millions of tons)	11.33	22.69
Districts (nos.)	19	17
Villages (nos.)	6,678	12,464
Roads (Kms.)	22,826	47,605
Power per capita (KWH)	340	774
Language	Hindi	Punjabi
Literacy Rate (percent)	46.3	58.1
Teledensity (per 1000 persons)	24	44

Note: Exchange rate in 1997-98 was about US \$ 1 = Rs 46.

In broad terms, the governmental structures in India's states are quite similar. Under the national constitution, the elected state governments have a wide range of responsibilities, including health and education, as well as more general developmental goals. On the other hand, the central government's influence is quite strong, and extends in many ways beyond the constitutional assignment of responsibilities. This is largely driven by the reliance of the states on financial transfers from the central government to cover a large fraction of their expenditures. For

example, the central government's planning apparatus is still intact, despite economic liberalization, and various kinds of categorical grants flow from the center to the states.

One major innovation in the 1990s has been the strengthening of India's local governments through the passage of constitutional amendments and following legislation by the states. The ultimate goal of these reforms is to move public expenditure decisions closer to potential beneficiaries, so that these decisions, on local roads, sanitation and other public goods, can be made more efficiently. Given the relative centralization of India's governance, and the lack of established rural revenue bases for governments at any level (there is no agricultural income tax, and land revenue has eroded over the past few decades), this will require substantial institutional change.

Meanwhile, the decentralization reforms have created three tiers of elected rural governments, at the level of village or group of villages (the modern incarnation of the traditional *panchayat*), block (also *tehsil*)² and district (also *zilla*). These political structures parallel the older administrative hierarchies, which are under the state government. Thus, each rural government level also has a corresponding administrator, who is part of the state bureaucracy, and answerable to state-level rather than local politicians. For example, in Punjab and Haryana, the Deputy Commissioner (DC) or Additional Deputy Commissioner (ADC) is the chief administrative official at the district level, and under him are Subdivisional³ Magistrates (SDMs) and numerous other bureaucrats with a variety of functional roles.

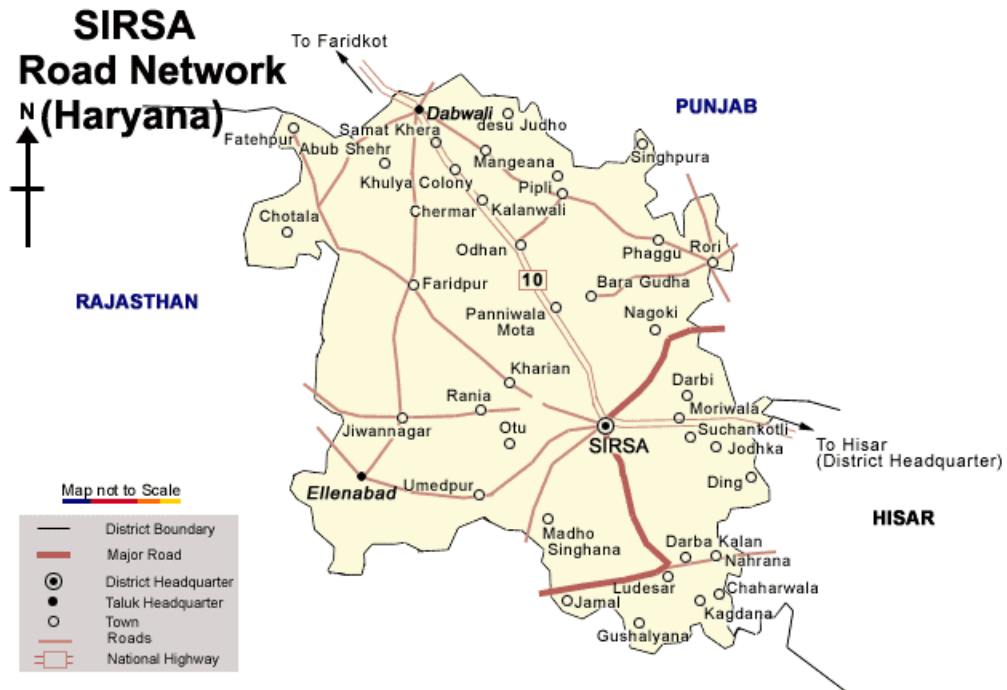
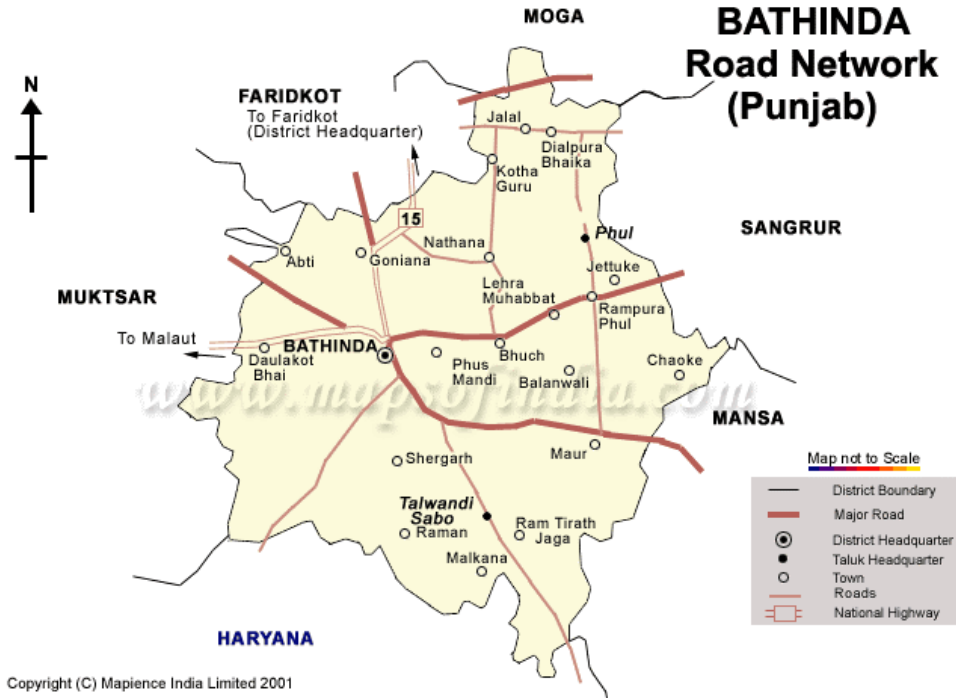
Funds from both the center and the states flow down to the district level for a variety of developmental purposes, which may include public health, primary and secondary education, employment generation, pure welfare transfers, and infrastructure development. These funds are channeled through the District Rural Development Agency (DRDA), of which the DC or ADC is the CEO. The DRDA includes elected local representatives as well as bureaucrats from different functional departments in its membership. DRDA funds may be spent directly, or they may be

delegated to any of the three levels of rural local government. It is important to note that such explicit transfers are only a part of government-controlled funds. The government also channels credit through a number of nationalized banks. While these banks are public sector undertakings with their own management structures, bureaucrats such as the ADC may have considerable influence with local bank managers.

The two rural IT initiatives that we study in this paper are in adjacent districts of the states of Punjab and Haryana. TARahaat is the organization operating in Bathinda district of Punjab, while Drishtee.com is the organization with an initiative in Sirsa district of Haryana. Maps of the two districts are shown in Figure 1. In each case, the headquarters town gives the district its name. Each map shows the network of main roads, and many of the smaller towns in that district. Subdivisional headquarters are also indicated in the maps, for example, Phul in Bathinda and Ellenabad in Sirsa. Visualizing this basic geography will be helpful in understanding the potential roles of the Internet in the two experiments.

All villages in the two districts are connected by road and electricity, but feeder roads in Sirsa connecting interior villages are unpaved and poorly maintained. The districts differ somewhat in population, and industrial development, with Bathinda being somewhat larger and more industrially developed. Bathinda is a major cotton-producing region of Northern India, but recent yields have been hard hit by pests. Sirsa is an agro-based economy, with additional development having taken place around the National Highway that runs through it. In terms of their respective status in their states, Bathinda's development indicators place it somewhat below the Punjab state average, while Sirsa is above average in Haryana in human development indicators, but the variations are not too great.

Figure 1: Bathinda (Punjab) and Sirsa (Haryana) District Maps



We next provide an introduction to the organizations behind the two specific initiatives that we compare in this paper. We will outline some of their history, structure, objectives and broad strategic approaches, with details to be analyzed in section 4.

TARAhAat

TARAhAat is a subsidiary of Development Alternatives (DA), which is a large NGO with two decades of experience of promoting sustainable development in rural India. TARAhAat itself is a commercial enterprise. The acronym TARA stands for Technology Action for Rural Advancement, and by itself is the name of DA's marketing arm. TARA commercializes DA's product initiatives for rural markets, including cost-effective building materials and handmade recycled paper. TARAhAat itself was founded in 1999. In 2001, it was a joint winner in the Global Village category of the international Stockholm Challenge Awards.⁴

TARAhAat has a mix of business and social objectives, which are operationalized by registration under India's Companies Act, but with 51% ownership by a nonprofit foundation (Sustainable Livelihoods). It has a management team where each member has several decades of government, corporate and/or nonprofit experience. The organization's social mission is the creation of sustainable rural livelihoods through improved information flows and education that can be enabled by IT. Implementation of this vision is through a business model that involves franchising information kiosk⁵ owners. The details of implementation are discussed in section 4. Currently, having begun in September 2000, TARAhAat has franchised eight kiosks in Bathinda (Punjab), which are the focus of this paper. Four kiosks were earlier set up in the Bundelkhand region of the state of Uttar Pradesh, but we do not study those here. TARAhAat's stated goal is to have 47,000 kiosks all over India by 2008, with an average of close to five computers and a little over 1,000 users per kiosk, implying 50 million users, or a little over 10% of India's rural 'middle class'.⁶

Another component of TARAhaat's efforts is its educational content partner, called TARAGyan. In association with various partners, TARAGyan is developing content and software for use in TARAhaat's information kiosks. Tailoring educational material for rural markets, both in terms of content and language, is a formidable task given the linguistic diversity of India. Note that basic IT education is naturally an important part of TARAGyan's actual and potential offerings, but it is not the exclusive focus. However, in keeping with its identified market (as discussed in the previous footnote), TARAGyan is not aiming at developing basic literacy materials.⁷

Drishtee

The other organization in our case study, Drishtee.com, had its origins in a government project, named Gyandoot, in Dhar district of Madhya Pradesh, in central India. Gyandoot provided an intranet for 33 village information kiosks, offering a range of mainly e-governance-related services.⁸ The most prominent of these is land record certificates, which are needed by landowners for transactions such as sale or leasing of land. In 2000, Gyandoot was a joint winner in the Public Services and Democracy category of the Stockholm Challenge Awards. While Gyandoot was a specific local initiative, involving heavy support from the District Collector⁹, Drishtee has attempted to take that model and rapidly replicate it across the country. Sirsa District in Haryana is one of the places where this effort is furthest along.

Drishtee is also a commercial organization, with specific social objectives of targeting benefits to the rural poor built into its vision and strategy. Drishtee currently has operations in five locations in three states (Haryana, Punjab and Uttar Pradesh), with over 30 kiosks in operation. The bulk of these are currently in Sirsa. It is attempting to expand soon into three other northern states (Bihar, Madhya Pradesh and Rajasthan). Drishtee's ultimate goal is to have about 100 kiosks in each of India's approximately 500 districts. In Drishtee's case, a kiosk has, at least initially, just one computer, so the implied number of 50,000 kiosks, while greater than

TARahaat's target, is a substantially less ambitious goal in some respects. Drishtee's implied market size per kiosk is a minimum of 10,000 people (roughly one hundredth of a district's population). Drishtee appears to be aiming at a broader cross-section of the rural population than TARahaat, as we discuss in the next section.

Drishtee has developed some software on its own, but is now mainly relying on various partners for software development, as well as, in some cases, other partners for management of the district hubs. Thus Drishtee's model involves not only franchising individual kiosks, but also potentially franchising district hubs. Again, we will discuss the specifics of this model, including revenue sharing and other economic aspects, in section 4. Partnering, especially with local district hub 'channel partners', allows Drishtee to expand faster without creating a bulky organization, spreads risks, and also insulates Drishtee from some of the commercial pressures that might conflict with social objectives. At the same time, it may reduce Drishtee's ability to monitor and implement the achievement of social objectives. This tension between commercial success and meeting social objectives is a point that will emerge more fully from our more detailed discussion later in the paper.

3. IT, Economics and Development¹⁰

At a general level, there are two types of potential economic gains from the use of IT. First are gains in efficiency, both static and dynamic. Static gains are one-time, and come from more efficient use of scarce resources, allowing higher consumption in the present. Dynamic gains come from higher growth, potentially raising the entire future stream of consumption for the population. The second type of potential benefit comes from reductions in economic inequality, to the extent that such reductions are an agreed-upon social goal. These two types of gains may conflict, if growth requires increased inequality, or they may be mutually reinforcing, where broad sharing of the benefits of growth enhances the rate of growth. We can discuss the

role of IT in achieving greater economic gains along both dimensions, without having to commit to a particular position on the relationship between inequality and growth.

Benefits that are measurable as increased market-based economic activity, and hence show up in GNP statistics, are not the only component of development. Development can include improvements in the capabilities of the population, independently of any direct or indirect economic impact. Minimum levels of education, health and nutrition are perhaps the most important examples of such capabilities. The ability to participate in democratic decision-making can also fall into this category. Of course, broad-based improvements in the capabilities of a population can have positive impacts on long-run economic well being, but this is not a necessary condition for desiring such improvements. The role of IT in effecting improvements along non-economic dimensions must also be considered in our analysis, though this role may be harder to quantify.

IT involves the electronic processing, storage and communication of information, where anything that can be represented in digital form is included in the term ‘information’. Thus news, entertainment, personal communications, educational material, blank and filled-out forms, announcements, schedules, and so on are all information. Software programs that process data (searching, tabulating, and calculating, for example) are also information in this sense, representing a particular kind of intermediate good. We can use standard economic characterizations to classify the different kinds of information. For example, entertainment, personal communications, and sometimes news, are final goods. Educational material, job announcements, or some kinds of news (weather news for farmers, for example) are intermediate goods, typically used for improving income-earning opportunities.

Information goods typically have the characteristic that one person’s use does not reduce their availability for another person. Thus, a message or weather news can be viewed by many people, simultaneously or sequentially. Depending on the content of the news or message,

different people may place different valuations on the information. Only friends and relatives may be interested in a personal message, all farmers in a district may be interested in local weather news, and so on. The ability to share information among users can impact the feasibility of providing it on a commercial basis. IT dramatically increases shareability of information, and this affects the economics of private provision of information goods and services.

Information goods may also be provided by the government. The potential rationale for government provision exists for any goods that are shareable, and where users cannot be excluded. The classic example is national defense, but such goods may also be local in character, such as public parks or law and order. Of course many local shareable goods can be provided exclusively, in which case private provision is a feasible alternative (in a club-like arrangement). In such cases, government provision may be justified more on equity grounds than on the basis of failure of private provision. In some cases, government financing through taxes or statutory user charges can be combined with outsourcing of delivery to private providers to achieve both equity and efficiency goals.

Often, private provision is feasible, but neglects the spillover benefits that it creates, in which case government subsidization may be socially beneficial. For example, primary education has private economic benefits that people are willing to pay for, but it can also have substantial non-economic benefits to the individual and to others in the society (improved understanding, ability to make sound judgments, political decision-making capacity, and so on). Additional roles of government that are important to bring out are in redistribution to achieve equity objectives, and in regulation of private activities through licensing and certification. In both cases, the government also uses economic resources, and IT has a potential role in increasing the efficiency of government.

For both government and private provision, one of IT's main direct benefits is in increasing efficiency by economizing on resource use. Information that would otherwise be

conveyed through face-to-face contact, post, courier, print delivery, telegraph or telephone may instead be communicated in digital electronic form via the Internet. Efficiency gains from Internet use are not automatic: the telephone, in particular, is an efficient means of communication for many types of information. IT also requires new investment, so the benefits of trips, time and paper saved must be weighed against the costs of installing and maintaining the new infrastructure. Efficiency benefits of IT are not restricted to the communication itself. IT can improve the efficiency of the telephone network, and it can make it possible to track and analyze communications. Word processing, maintaining accounts, inventory management, and other such activities that may not require long-distance communications are also made more efficient by IT.

Experience with IT in developed countries, and the US in particular, suggests that information exchange related to the completion of market transactions is especially valuable. The ability of IT-based communications (combined with storage and processing) to bring together buyers and sellers more effectively represents major potential gains. These gains can come about through lower search costs, better matching of buyers and sellers, and even the creation of new markets. The successes of auction websites and employment websites in the US illustrate these gains. In the rural Indian context, farmers selling their crops and buying inputs, parents seeking matrimonial alliances for their children, and job seekers are all potential users of Internet-based matching services.

Efficiency gains of IT can also come about through the enabling of new goods and services. In many cases, the new good is related to something available earlier, but is presented in a form that reduces costs and expands the size of the market. For example, recorded music is a mass-consumption item, whereas only a small minority of the population could afford or have access to live performances by the highest quality musicians. Educational material is another example where recording and duplication can replace more expensive, skilled-labor-intensive alternatives for delivery. The possibilities for interactivity with IT-based educational materials

illustrate the advantages of IT over older technologies based only on recording and duplication. Interactivity also implies personalization, in that an individual can select the precise content that he or she wishes to see. This feature also distinguishes IT-based content from what was available through previous technologies. Finally, the sheer volume of information that is accessible through IT is much greater than before: this also allows new kinds of services to be provided at a cost that is affordable to larger segments of the population.

We have outlined the potential static efficiency benefits of IT, but the direct dynamic benefits in terms of higher growth are harder to identify. Of course, if IT economizes on current resources, more is available for investment, which can increase growth. If IT can increase the efficiency of education delivery to the broader population, this investment in people (human capital acquisition) is also likely to lead to higher growth. IT may also have positive impacts through impacts on the innovation process. For example, IT can make innovation easier by allowing simulation and low-cost testing of new designs or searching through possible chemical compounds for beneficial drugs. Finally, IT may speed the diffusion of innovations, which may stimulate further innovation, though this last channel is somewhat speculative.

An important barrier to realizing the economic benefits of IT is the often-substantial up-front cost of investment in new infrastructure – both hardware and software. In developed countries such as the US, large potential customer bases and efficient capital markets help overcome this barrier. Hardware and software designed for developed country markets can easily be adapted to serve higher income consumers in developing countries, but this leaves out the majority of the population in developing countries. Thus, one potential consequence of IT is an exacerbation of inequality, as only higher income groups enjoy its benefits – this is the so-called ‘digital divide’.

Since government-provided goods and services, including redistributive transfer payments, are often aimed at lower income groups, to the extent that IT can increase the

efficiency and effectiveness of government, the benefits of IT will be more widely spread, partly reducing ‘digital divide’ concerns. However, achieving these benefits requires more than just internal use of IT: beneficiaries of government services (particularly the economically disadvantaged) must be able to access IT resources also. While governments may invest in such front-end interfaces with citizens (and have done so in developed countries), the cost of doing so for governments in developing countries may be prohibitive. Such governments typically already have difficulties in raising sufficient resources through taxes and user charges.

While successful examples of implementation of ‘e-governance’ initiatives exist¹¹, there is a conceptual alternative. This comes from recognizing the fact that citizens typically incur private costs (often substantial) in availing of government-provided services. If the use of IT can reduce such costs, even low-income individuals may be willing to pay at least some fraction of the cost savings, and there is scope for private provision of intermediate services that reduce the cost of access to government. Of course, this idea is not specific to IT: private intermediaries already help in filling out forms, getting access, and so on.¹² One difference that IT can make is in reducing costs even further, often by an order of magnitude. In broad terms (as is also the case with electronic marketplaces and job-matching boards), IT changes the scope and nature of intermediation.

Private providers may therefore have a role in providing IT-based information services that are complementary to government services, as well as in providing conventional private goods and services. However, the private individual benefits that determine the prices charged by private providers may not reflect the overall social benefits of provision. As discussed earlier, these may include benefits such as greater awareness and participation in the political process. In such cases, as we noted, there is a role for government subsidization of private provision. This assumes that government provision is likely to be less efficient than private provision, which seems to be true in some cases in developing as well as developed countries. In either case, richer

information flows increase the transparency with which the government operates, thereby promoting better monitoring, and potentially – depending on whether electoral and legal institutions are effective – greater accountability. The ultimate payoff is more efficient delivery of government services.

In cities and larger towns in India, cyber kiosks have already begun to proliferate. Urban population densities, income levels, cultural attitudes and telecom infrastructure all seem to be sufficient for the commercial success of these enterprises. The falling cost of hardware and the availability of a variety of English language software have also supported this trend. Finally, the government's belated opening up of Internet service provision to competitive entrants has been a crucial supporting development. In non-Internet IT-related services, IT education has clearly taken off in cities as well, inspired by India's success in software exports. In rural areas and smaller towns, however, the various demographic and socioeconomic factors such as income levels, cultural attitudes, and geographic and social fragmentation may not be present in configurations that would easily enable the diffusion of commercial access to various IT-enabled services. Furthermore, the market power of traditional rural intermediaries may act as a barrier to partial innovations in how matching of buyers and sellers is conducted. Finally, vernacular language requirements and different demand patterns imply the need for software that is tailored for fragmented rural markets. In the next section, we examine how TARAhaat and Drishtee have approached these challenges, and what the initial impacts of their experiments appear to be.

4. Implementation: Cases, Impacts and Lessons

Our analysis of the two ongoing IT initiatives in Bathinda (TARAhaat) and Sirsa (Drishtee) is based on a field visit in December 2001, meetings with the respective CEOs and field managers, material available on their websites, and documents provided to us by the two organizations. Both organizations began their efforts in these districts in mid-2001, with broad

goals that were strikingly similar: bringing the benefits of a range of IT services to rural populations. Envisioned social benefits included improved market accessibility, employment opportunities, raising income levels, and heightened social and political awareness. Furthermore, the selection of these districts in each case was influenced by specific encouragement of the respective chief district administrators. However, the implementation strategies of the two organizations have evolved along very different lines in just a few months, with consequent divergence in achievements and social and economic impacts.

TARahaat

TARahaat's long-range plans include a comprehensive portal for rural information services. After its well-publicized success with Internet kiosks in a region of central India, the organization was invited to Bathinda by the then-ADC, and their entry also had at least symbolic support at the state government level, including the Chief Minister himself. The government had already designated 'focal points' for economic development in each district of the state, and TARahaat agreed to choose these focal points as locations for its information kiosks. The Bathinda DRDA and TARahaat advertised, and selected 8 franchisees. This was, however, well short of the 32 potential kiosks, based on the number of focal points in the district. Each franchisee made an investment of Rs. 250,000-300,000 (US \$5,000-6,000) to start an Internet kiosk (TARAkendra). The DRDA initiated institutional financing for the setting up the kiosks through nationalized banks, with the franchisees expected to raise about 25 percent of the start-up cost from their own funds. The local *panchayat* in many cases provided its premises to house the kiosk. TARahaat helped commission each kiosk with four to five desktop computers, a server, printer and scanner, and support items such as UPS, generator, and furniture. It also provided basic software to the kiosk and carried out a one-week intensive training program for the franchisees.

An immediate problem faced was the poor level of telephone connectivity. While phone lines might be available or installed specifically for the kiosk, the quality of service turned out to be so poor in most cases that potential Internet-based services were undermined, and the portal (www.tarahaat.com) remains with limited functionality and use. Therefore, TARAhaat has relied initially almost entirely on offline IT and English education to generate revenue for franchisees and for itself (through a revenue sharing agreement).¹³ The materials, in Punjabi, were developed by TARAgyan (see section 2), and designed for short courses. Certificates were signed by the DRDA, to provide a limited form of accreditation. These courses were successful, so much so that another provider of IT education, the Punjab Technical University, which has the advantage of offering degree courses,¹⁴ linked up with the franchisees through the DRDA, to offer its courses through the TARAhaat franchises.

While TARAhaat's long-term strategy still includes connecting people to markets and government via an Internet portal, it has been hampered by the lack of rural telecommunications infrastructure of a quality that makes connectivity feasible, and also by setbacks in collaboration with the state and local governments. The practical issues for such collaboration occur at the district level, and the transfer of the ADC who had invited them in the first place, soon after their start, adversely affected TARAhaat's strategy, with not one aspect of e-governance being implemented in the district in the initial months of operation. Our interviews with three of the eight kiosk owners in Bathinda suggested that the inability of TARAhaat to deliver on its promises of e-governance had hurt the credibility of the organization with the franchisees, as well as that of the franchisees with their customers and potential customers. Nevertheless, TARAhaat's rapid adaptation to the ground realities through its focus on offline IT and English language education represented a shift to a strategy that relied much less on institutional changes beyond their control, used the kiosk infrastructure that had been created, filled an identified market need for such education, and reduced the risks of failure by diversifying and generating

immediate revenue. We will return to further developments in TARAhaat's strategy later in this section.

Drishtee

Drishtee, which also began its North India initiative in Sirsa, Haryana with plans for a range of Internet-based services, ended up taking a very different approach in its initial implementation. The initial focus was driven at least partly by Drishtee's greater emphasis on reaching poorer segments of the population. Whereas the required investment in a TARAkendra drew franchisees from the middle-class (typically with some business experience in the family), and a clientele of students with a reasonable educational background (and therefore again not from the bottom rungs of society), Drishtee implemented a model with smaller kiosks, initial financial investments well below Rs. 100,000 (US \$ 2,000), and a focus on access to government services targeted particularly at the poor. The small size of the initial investment was, in fact, determined by the ceiling on eligibility for loans to low-income entrepreneurs, and Drishtee franchisees are typically less educated and less well off than those of TARAhaat.

Drishtee's initial strategic focus requires substantial support from the district administration and other government offices, raising its risk and the complexity of implementation. As in the case of TARAhaat in Bathinda, Drishtee was faced with the transfer of the administrator who had encouraged their entry into Sirsa. However, they have been able to work closely with the current ADC. Building effective collaboration with the district administration required proving the value to the district constituents of Drishtee's initiative. This was achieved partly by regular visits to Sirsa by the Drishtee CEO,¹⁵ and more so by creating a substantial and recognizable constituency of franchisees. To do this, Drishtee expanded aggressively, setting up 30 kiosks in a period of a few months. In about half the cases, even basic phone connectivity was absent in the kiosks, but the existence of the kiosks became a reason for trying to accelerate its provision. Drishtee has circumvented the absence of phone lines by having

kiosk owners use their computers for data entry, but using paper and physical transportation methods to get the information to the district headquarters. This still represents a substantial economy for villagers who are individually saved a day's travel.

The government information services facilitated by Drishtee include filing applications for the Prime Minister's Rozgar Yojana (PMRY – a central government anti-poverty scheme), registering complaints, issuance of 'below poverty line' (BPL) certificates required for welfare payments, and registration for old age pension OAP). An example of the breakup of services provided is given in Table 2.¹⁶ Using estimates of the time and other opportunity costs of villagers associated with personal travel, and taking about 10 percent of these estimates, Drishtee fixed user charges for the various services, e.g., Rs. 10 (US \$ 0.20) for registration for a BPL application. Each kiosk with a phone line is connected to the hub of the Drishtee intranet at Sirsa, run by a partner, Infotech India. All queries received at the nodal point are passed on to the DRDA's web server (also maintained by Drishtee), and thereafter to the respective government departments. To make this work, of course, the local DRDA office has agreed to accept electronic applications and complaints. Kiosks without phone lines aggregate user requests and send them through the state transport bus driver, who passes the packet to an Infotech India employee in Sirsa. The packet is then sent to the hub office, which registers the request directly on the web server.

Table 2: Drishtee Kiosk at Ellenabad – Breakup of Activities

Type of Service	Number of requests
Registration of vehicles	15-20
Driving License Application	15-20
Complaints	35
Application for BPL/OAP	115

Despite the ingenious working around the inadequate infrastructure, rapid expansion to establish presence and scale economies, and a reasonably successful collaboration with the ADC of the district and the DRDA, the Drishtee model also faces sustainability issues and challenges. These include concerns about the telecommunications infrastructure, responsiveness of the various government departments to requests and complaints submitted through Drishtee, the ability to roll out additional services to make the kiosks more financially viable, and related concerns about the sustainability of revenues when many e-governance services are used on an infrequent or even one-time basis. In particular, the narrowness of the initial offering is a concern, but the effort of broadening the services provided will compete for resources and attention with plans to complete the coverage of the district with 100 kiosks.

Comparisons

In contrast to Drishtee's swift expansion, TARAhaat was unable to expand beyond its initial eight kiosks despite substantial efforts. One of the reasons for this is their relatively high start-up cost.¹⁷ In addition to the constraint of the entrepreneur's own share of the start-up capital, our field interviews uniformly indicated that the process of getting a bank loan in each case was more onerous than might have been expected *a priori*. The kiosk owners for TARAhaat mostly seemed to come from a relatively small group of middle-class families with some entrepreneurial experience and higher education, including some technical education. Family ties seemed to be the reason in some cases why the franchisee with these skills and capital did not seek employment in an urban area. However, they did not always belong to the exact place where they opened the kiosk, making reaching out to their local markets more difficult because of their being perceived as outsiders.

Drishtee, on the other side of the border, had substantially lower start-up costs, ranging from Rs. 50,000 to 80,000. This investment is widely acceptable because the PMRY allows any educated youth to obtain a loan up to Rs. 100,000 at a nominal rate of interest for self-

employment purposes, without fulfilling the official formality of producing a collateral security. This scheme is therefore attractive for educated rural youths seeking to start an enterprise within their local vicinity. Most of the kiosk owners in Sirsa belong to lower income groups, and some are from backward castes. All kiosk owners hailed from their respective places of operation. Thus, the entrepreneurs were more likely to have the confidence of the residents when they started operations.

Just as the TARahaat and Drishtee initiatives have drawn on different pools for franchisees, they have also focused on different customer bases, and hence different social segments. TARahaat's education focus might be viewed as increasing computer awareness in the rural masses. However, the actual population segment for its computer familiarization courses has been college and school age students who are already relatively well educated, and wish to add computer literacy and skills to their repertoire. The piggybacking of PTU, offering degree courses, on TARahaat's efforts further skewed the population that is being reached. Cases where other groups were attracted to learn about computers appeared to be relatively well off individuals with specific needs, such as communicating via email with relatives abroad, or seeking technical farming information from Punjab Agricultural University.

Drishtee's e-governance services, as illustrated in Table 2, were much more clearly targeted at the less well off. This is straightforward for interactions such as registration for the BPL scheme. One can argue that the opportunity costs for the poor of direct interaction with the government are a higher proportion of their incomes, and the reduction in costs offered by Drishtee would benefit them more, even in the case of more non-targeted interactions such as complaints. However, this focus does not guarantee sustainable levels of revenue, both because the user charges must be kept low for affordability, and because many of the interactions are one-time or infrequent by their nature. Broadening the service offerings to include land record access and updating (which requires a substantial effort on the part of the state government at the back

end) and private interactions such as classifieds and matrimonial ads (which require better connectivity) is likely to be necessary to sustain the ability to deliver e-governance benefits to the less well off.

One interesting response to the creation of an opportunity by TARAhaat and Drishtee has been true entrepreneurship by the franchisees. In the case of TARAhaat, the DRDA in Bathinda helped initiate the entry of the PTU, increasing as well as stabilizing the revenues of the kiosks. One disadvantage of this, however, is that TARAhaat has perceived that it is being crowded out, and the future of its relationship with the current franchisees is in doubt. Instead, TARAhaat is focusing on its own kiosk in Maur (see Bathinda map, Figure 1), where it hopes to validate a stand-alone model that does not require PTU courses. In several cases, kiosk owners offered a range of services on their own initiative. Several kiosks in Sirsa have started computer education classes, independently of Drishtee. In Ellenabad (Sirsa), the kiosk owners offer word processing and form preparation on their computer, and, in December 2001 were planning to introduce some desktop publishing services. In Chak Fateh Singhwala, a village near Nathana (Bathinda, see Figure 1) the female kiosk owner, who had computer training, chose to add cooking and sewing classes for girls. While such innovations cannot hurt, they are unlikely to be important in creating sustainable franchises – that must rely on Internet-based services.

We next discuss how the two organizations have tried to market their initiatives to reach their target rural populations. Education at all levels is recognized as important in rural society, and the quality of education services is a matter of concern for many (PROBE Team, 1999). Thus, an initiative focused on rural education services has a potential market. However, our field survey and review of TARAhaat's literature suggested that they entered without a specific marketing strategy, relying on kiosk owners to generate effective demand. The kiosk owners we interviewed had made announcements about their services by using the local *gurdwaras*' (Sikh temples) loud speakers, distributing flyers at events, and in one case giving a demonstration at the

gurdwara. However, our discussions with TARAhaat representatives and franchisees suggested that these efforts had mostly not gone beyond creating awareness, failing to get villagers to try out the kiosk services. Our field interviews suggested some level of distrust of the new enterprises.¹⁸

Since local government services are relatively weak in rural areas of India, Drishtee's initiative also has focused on a promising approach, of reducing the distance between government and people. By expanding more rapidly, it has been able to establish its brand quite effectively, so much so that the local intermediaries it used for day-to-day operations, belonging to a formally distinct organization, were viewed as 'Drishtee people' by franchisees. Drishtee has also been able to enlist some tiers of local administration in its efforts, but the sticking point now (as our interviews revealed), is that more efficient communication from villagers to government has not been automatically followed by timely action and response. Thus Drishtee is in danger of being viewed as promising more than it can deliver. However, Drishtee personnel, taking their lead from the CEO, have been proactive in helping kiosk owners publicize their services, as well as forming the kiosk owners into a pressure group for improving delivery of government services. For example, Drishtee has tried to arrange periodic meetings with kiosk owners, as well as jointly with them and district administrators, to understand location-specific problems and identify solutions, and to create a road map for expanded services. Drishtee's ability to serve as an intermediary between government and constituents, while simultaneously pursuing commercially sustainable objectives, represents one of the most interesting aspects of its experiment, and distinguishes its implementation from that of TARAhaat, where initial government interest and support appeared to have faded.¹⁹

Drishtee's intermediary role presents some new challenges also. In one case, a kiosk owner participated in a local protest against State Roadways staff who had 'misbehaved' with some girl students at Ellenabad. The local administrator, learning of this, appeared to pressure

Drishtee officials into getting the kiosk owner to abstain from such activities. To be able to resist such pressure, Drishtee needs to avoid becoming overly dependent on e-government-related services. More independent services such as computer education, health services, and private e-commerce related services would reduce dependency on the district administration, as well as improving revenue prospects for franchisees.

Table 3: Performance Appraisal of TARAhaat & Drishtee (December 2001)

Indicators	TARAhaat	Drishtee
Number of kiosks	8 franchised + 1 self-operated	30 franchised (approx.)
Investment required per kiosk	Rs. 250,000-300,000	Rs. 50,000-80,000
Population covered per kiosk (approx.)	15,000-20,000	8,000-10,000
Main services offered	Computer and English education content and courses	Access to state and local public services
Connectivity status	All connected to Internet – quality varies	About 50 percent connected to Internet/Drishtee Intranet
Revenues per month	Rs. 3,500-6,000	Rs. 3,000-4,000
Franchisee’s share	25 percent for 2001-2002 (reduced from 40 percent)	20 percent + Rs. 9,000 up front
Support to kiosk from franchiser	Initial training and periodic visits by local TARAhaat officials	Initial training, periodic meetings of franchisees and Drishtee officials, regular field support
Government role	Initial infrastructural support but no active participation	Active participation, periodic meetings with ADC, acceptance of electronic applications for services

Table 3 summarizes a comparison of TARAhaat and Drishtee, based on our discussion so far. The revenues are calculated exclusively on the basis of services offered by main franchisees. These are rough estimates, based on conversations with franchisees and members of the two organizations. They also represent some smoothing out, especially for TARAhaat, where seasonal fluctuations in revenue were quite large due to the regular school year cycle of terms and examinations. We next turn to a consideration of future plans of action. We have already indicated some of these earlier, so our treatment is brief.

TARAAhaat is at a crossroads in its strategy. It views itself as being crowded out of its kiosks by the PTU courses, and is trying to validate a stand-alone model with a self-operated center, not relying on a franchisee. Ultimately, however, only a franchise model can achieve the requisite scale to be commercially (and politically) sustainable. Having established several franchises, it risks losing reputation if it pulls out of the current arrangements, even though they are viewed as far from ideal. How it handles this balancing act will provide significant new lessons. In particular, the pure entrepreneurial model of risk-taking is hard to apply here, when the entrepreneurs have also ‘bought into’ the social value of their enterprise.

The problem of how to handle failure may be even more serious for Drishtee, where the kiosk owners are less well off, and where the nature of services provided and government involvement push it even further away from the standard entrepreneurial approach. As an example of the risk aversion issue, one Drishtee kiosk owner even suggested that they should be salaried employees of the government.

Drishtee may be able to overcome problems of failure if it can expand the number of successful kiosks rapidly, so that individual failures are forgotten, or overwhelmed by success stories. To expand its services, Drishtee is negotiating with a training institute for launching computer education services from its kiosks. It is also exploring the possibility of partnering with nLogue, a technology company that has developed what it hopes is a communications technology that is commercially viable for rural areas of India.²⁰ While Drishtee’s precursor, Gyandoot, was successful with services such as market price information for crops, the structure of grain markets in Punjab and Haryana – greater density, in particular – makes such Internet-based services less valuable.

Ultimately, both Drishtee and TARAAhaat may need to partner with existing buyers, suppliers and intermediaries to shape their mix of services. For example, in other parts of the country, corporations such as EDI Parry and ITC are experimenting with Internet-enabled contact

and information exchange with their suppliers of agricultural products or buyers of their agricultural inputs. Our field interviews suggested that middlemen play a surprisingly important classical role, even in relatively prosperous Punjab and Haryana, acting as channels for a combination of input supply, output buying, and credit provision. Understanding the economic and political roles of these ‘commission agents’, as they are called is important for going forward with market-related services. Possible alternative scenarios include partnerships (at least temporary), and direct disintermediation through partnership with corporate buyers and suppliers of agricultural outputs and inputs. Both avenues involve challenges. In both cases, the existing difficulties of partnering with government administrators will be increased by the direct presence of commercial interests.

5. Conclusions

Despite our cautious preliminary assessment of the projects initiated by TARAhaat and Drishtee in the two districts of Punjab and Haryana, our overall conclusion is optimistic. Both experiments have shown that economic and social change can be effected by information technology. In the case of TARAhaat, this has meant wider delivery of private and public educational services (including piggybacking by the PTU), and in the case of Drishtee it has meant improved access to government services. In the case of Drishtee, in particular, there appears to have been some real accompanying political change, with a new channel for communication between business and government being opened up. At a micro level, therefore, Drishtee’s approach can be viewed as achieving the right kind of ‘embedded autonomy’, to use Peter Evans’ term. Evans uses the term to mean a societal structure with coherent institutions that are autonomous, but nevertheless connected through institutionalized channels for continual negotiation of goals and policies (Evans, 1995, p. 12). Evans notes the lack of a ‘public-private

symbiosis’ in India (pp. 150-151). We are struck with how well the Drishtee model may achieve this symbiosis.

Of course, isolated cases of such successful experiments have existed in the past, including both organizations’ previous successes in central India. What is distinctive about the cases we have studied, and what is are central and closing point, is their attempts at commercial sustainability, absolutely vital for long run continuance of such efforts, and replicability, which supports sustainability through economies of scaling up, as well as encouraging rapid imitation. Imitation may make TARAhaat and Drishtee’s success harder to achieve, but it increases competition, and that may ultimately be to the benefit of the half billion people in the bottom of India’s rural income distribution.

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Endnotes

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¹ See, for example, Arora *et al* (2001), Heeks (1996), Saxenian (2001) and Singh (2002) for surveys and analyses.

² Strictly speaking, the block and *tehsil* are parallel administrative entities, for development administration and revenue administration respectively, but they are very close in geographic scope. See also Gaiha *et al* (2002).

³ The subdivision is an administrative unit somewhat more aggregated than the block. While there may be six or seven blocks in a district in Punjab and Haryana, there are only two or three subdivisions.

⁴ See <http://www.challenge.stockholm.se/challenge.html>.

⁵ We use this term, rather than Internet kiosks, in recognition of the fact that franchisees can provide a range of IT-enabled services, not restricted to Internet delivery. Another term used is cyber kiosk. At the same time, we acknowledge that ‘kiosk’ may be too restrictive for TARAhaat’s somewhat larger ‘kendras’ (centers). We return to these issues in a substantive rather than semantic discussion in section 4.

⁶ These figures are adapted from Khanna (2001). The precise definition of ‘middle class’ is not given by Khanna, but is implicitly a fairly broad one, used by India’s National Council of Applied Economic Research (NCAER), and includes all the non-poor. According to the NCAER, about half of these non-poor are able to purchase modern goods and services ranging from bicycles and radios to TVs and refrigerators. Using this narrower definition would push TARAhaat’s intended market share to 20-25% of that population. TARAhaat’s intended reach also includes towns and even smaller cities, so their definitional dividing line between rural and urban may be fuzzy.

⁷ See Prakash (2001) for a detailed description of TARAgyan.

⁸ Gyandoot and Drishtee information summarized here comes from various Internet sites and personal interviews of the authors with Satyan Mishra of Drishtee.

⁹ This bureaucratic designation in Madhya Pradesh is roughly equivalent to the Deputy Commissioner in Punjab or Haryana. The elected District Council (*Zilla Parishad*) and the state government were also involved in the conception and setup of Gyandoot.

¹⁰ The general literature on this topic is growing: possible references include Dudley (1999), Eggleston *et al* (2002), Kaushik (2000), Kenney (1995), Meng and Li (2002), Miller (2001) Pohjola (2000), Roche and Blaine (1996), World Bank (1996), and the symposium in the *Journal of International Development* (2002).

¹¹ These include Bhoomi in the state of Andhra Pradesh in India, e-seva in the same state, Lokmitra in Rajasthan, and the CHOICE Project in Chattisgarh. See also Bhatnagar and Schware (2000) for further examples.

¹² In some cases, government officials themselves illegally take on these intermediary roles, demanding ‘speed money’ or other payments. We will take up this issue and other impacts of IT on citizen-government interfaces in section 4.

¹³ TARAhaat provided educational materials developed by TARAGyan to the kiosks, with a memorandum of understanding to share the revenues on a 60:40 basis; subsequently, the sharing arrangement was renegotiated to favor the franchisees more, at 75:25. The fees were fixed by TARAhaat, e.g., Rs. 2100 for a six-month course on basic IT familiarization.

¹⁴ The university was established in 1997 by the state government, and acts as an independent provider of technical education, as well as an umbrella for technical education in pre-existing universities and colleges in the state. See <http://www.ptujal.com/ptable.html>.

¹⁵ TARAhaat has relied on a regional manager for field visits and implementation.

¹⁶ This information was collected by the authors in a personal interview in mid-December 2001, and covers only a start-up period of about two months. See the map of Sirsa district in Figure 1 for the location of Ellenabad.

¹⁷ It should be noted here that the TARAhaat educational offerings would not have been possible at the scale chosen by Drishtee.

¹⁸ For example, the kiosk owner at Mandi Kalan (near Nathana, Bathinda district, see Figure 1) said that local people at large distrusted their intentions. Usually the *panchayat*'s support is necessary for developing confidence and trust among the people, but the *panchayat* comprises village elders who considered the kiosk owner to be young and untrustworthy. They were also apparently concerned that local youths who obtained IT or English education would tend to migrate to the towns for jobs, negating any potential benefits to the village. Interestingly, the students we interviewed had such goals, but were not totally convinced that the TARAGyan courses (as opposed to PTU's offerings) would help achieve them – thus TARAhaat's efforts were in danger of falling between two stools.

¹⁹ State legislature elections in Punjab in February 2002 may have played some role, distracting government's attention from initiatives such as TARAhaat's. The elections have resulted in a change in the party in power at the state level, and how this will impact TARAhaat is unclear.

²⁰ The company is trying to market a wireless-in-local-loop (WLL) technology for combined voice and Internet access. The marginal technology cost appears to be attractive, but barriers remain in the form of relatively high licensing fees and interconnect charges. See Jhunjhunwala (2000).