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The Political Economy of the Information Society

IT for Change

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Preface

For the first time in history, a worldwide Market system, based on an unprecedented growth of techno-science and productive capacities, has made it theoretically possible for all humans to satisfy all their needs and aspirations. Yet in practice, the system has acted as a two-face Janus who, on the one hand, has indeed provided the few with all the means necessary for their rule over the others, but on the other hand, has finally emerged itself as main producer of all the socially fabricated scarcities that are today responsible for the mass destitution of the world population. The other face of the Market economy is the real cause of the tragedy now facing this vast number of uprooted and alienated victims of growth. The answer to their plight cannot therefore be in a reinforcement of the machinery that has produced their destitution.....

Majid Rahnema, Eradicating Poverty or the Poor?[1]

This collection of papers is a part of IT for Change's Information Society for the South series. The series is an attempt to build a body of critical work that offers analytical and conceptual tools to understand and engage with the structural changes that Information and Communication Technologies (ICTs) are bringing about in society.

It would not be incorrect to claim that progressive actors involved in development and social change in the South have kept a certain distance from the discourse of these new technologies. Political actors in the development arena seem to have no real grasp of alternative models of practice, and those in the field of practice are largely apolitical. This 'problem' marks the information society arena, ever more strongly in the developing countries, or the global South.

Essentially, we are witness to rapid transformation through a technology-mediated social change paradigm that requires a recontextualisation of development theory. Underpinning the emergent social architecture are questions of political economy that lie beyond the simplistic anecdotal accounts of the ICT miracle we often find in the copious literature about ICTs. In the meta-theories of development and social change there does also seem to be a need for connectors to enable conceptual leapfrogging that can bridge our understanding of new technologies with the politics of development, and provide alternate visions of what kind of information society promotes development ideals. The Information Society for the South series aims to address this need by contributing to building a new vocabulary and precepts about the information society domain that can inform development theory. It is also an endeavour to build linkages between theory, practice, and policy to maximise the development opportunity in the information society.

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[1] From *Asking We Walk: The South As New Political Imaginary*, ed. Corinne Kumar, 2007, Streelekha Publications.

This collection takes a political economy view, examining the interests that shape, and gain in driving, the larger techno-social change processes to their advantage; the hegemonies defining relationships on the local-global continuum; and the normative and institutional frameworks that provide viable alternatives to reshape and reclaim the information society for social justice and equity. Two papers do locate the analysis and arguments vis-a-vis the Indian context, but these are highly generalisable across other developing country situations.

Michael Gurstein's paper, 'Towards a Critical Theory of Telecentres' argues that the new ICT infrastructure completely transforms social organisation, illustrating this with the example of Wal-Mart. The paper asserts that Wal-Mart is less a company than it is an electronic infrastructure for managing the flow of goods from producers in low-cost countries to consumers in higher-cost countries while extracting profit from the 'arbitrage' between the two sides of the transaction. The core of employee relationships and of work activities in the case of Wal-Mart is managed through an elaborate technology infrastructure which, while seemingly vesting greater autonomy in the nodes and peripheries, promotes individuation of employee relationships, eliminating the basis for earlier processes of and drivers for worker organisation and unionisation. The ICT infrastructure is used to centrally organise and control social activity and behaviour in a manner that exploits the consumer economy for aggrandisement of capital interests and to the detriment of social and economic power of the peripheries. Gurstein uses this illustration to examine the telecentre phenomenon – the leitmotif of the ICTs for Development field – and situates it within the network phenomenon, the new structural organising principle of the world. He posits that the telecentre can be externally created points of technology and Internet access within communities, and thus a totalising agency of externally coordinated electronic networks akin to Wal-Mart or in fact be a system that enables local communities to define themselves, providing a means of emergence, of self-organisation, and potentially of resistance. He lays out the policy implications of the 'self-development' approach to telecentres to enable the revitalisation of local citizenship.

Seán Ó Siochrú's paper offers a practical step forward on effecting a pro-development approach to ICT policy. He examines the context of marginalisation of poor communities from the ICT advantage, despite growth in ICTs at the national level, positing 'community-driven networks' as one possible way for the empowerment of these communities. He discusses the nitty-gritties of community-owned networks or cooperatives, arguing how a wireless broadband local network and low cost technologies allow for ploughing back of benefits of ICT enterprise into the local community. This model is contrasted with externally owned, market-driven models which push economic surplus out of the local community. Community enterprises retain all the profits and much of the local expenditure within the area; they build capacities at the technical level but also in terms of enterprise development at micro and macro levels; they generate worthwhile employment within the area; they maximise the ICT benefits through developing services that the communities really need; and they contribute to wider development by building a focus for broader empowerment and development actions. The paper previews ongoing work in Cambodia and Rwanda and presents a cogent case for financial sustainability of such models, based on leveraging

local resources and offering low-cost Voice over Internet Protocol (VoIP) and a suite of other ICT services. The paper also provides an overview of the regulatory and policy issues in the Indian context vis-a-vis the community-driven ICT model.

C.P. Chandrasekhar examines the macro context – the dominant processes – through which the information society is being engineered in the Indian context. Unpacking the National e-Governance Programme of India, he argues how this significant social project has features that make it a substantially top-down initiative. The programme is critiqued for its techno-centric focus on hardware roll-out and its intrinsic limitation to make connectivity useful to serve communities. C.P. Chandrasekhar also points to the connectivity paradoxes in the Indian context – the slow offtake of connectivity and huge underutilised bandwidth. This empirical fact vindicates the notion that connectivity per se does not make for usage. So as to ensure diffusion, access and empowering usage, policy mechanisms need to recast information solutions; making community appropriation possible through developing software in national and local languages, appropriate e-governance services, and content which appropriately exploits the interactive, textual, and visual information transmission capabilities of new technologies.

The last paper by Anita Gurumurthy and Parminder Jeet Singh argues the case for a big leap in feminist imagination, in order to grasp and grapple with the emerging societal context characterised by opportunity for social change, as well as challenges in the form of neo-liberal definitions of such opportunity for the South. The paper examines how feminist assertions for plural and locally contextual media as well as critiques of the hegemony of new ICTs could become a trap that dichotomises the 'traditional' and the 'new' resulting in a disengagement with powerful forces of change that are impacting all social domains. Such a standpoint could also inadvertently submit to and further neo-liberal formulations that, for instance, deem mobiles more appropriate for the South, than the Internet, thus denying the very basis for societies in developing countries to reshape their institutions through digital, networked technologies. The paper builds an analytical framework that takes a big picture view of ICTs, not so much as tools or media alone, but system builders that usher in possibilities for structural transformation. In the new techno-social systems built over the digital networked systems, the latter, as general purpose technologies, bring in far-reaching opportunities for citizenship, women's empowerment and participatory development. A debate about "is it mobiles or the Internet for disadvantaged people in developing countries" obfuscates the more fundamental questions of openness of networks as a precondition to realise the information society opportunity.

This collection is the first volume in the Information Society for the South series. The papers address the 'Political Economy of the Information Society' – a theme of unequivocal import in understanding the rules that shape our emerging socio-political context. The idea, as has been stated, is to enable understating and analysis to contribute to action at practice and policy levels.

IT for Change

1. Towards a Critical Theory of Telecentres: In the Context of Community Informatics

Michael Gurstein

Globalisation and particularly 'globalising' enterprises such as Wal-Mart are driven by their Information and Communication Technology (ICT) infrastructures. The underlying technology processes and infrastructures create the possibility for highly efficient and continuously expanding global enterprises which allow for both centralised control and dispersed, localised decision making. The notion is presented that Telecentres represent a different and community-based approach to the implementation and development of ICTs. By adopting a Community Informatics approach telecentre developments have the opportunity to enable local development processes and facilitate the empowerment of local communities. These developments may in turn provide the means through which local communities are able to resist integration and subordination into globalising and centralising ICT and commercial networks.

Introduction: Globalisation and ICT*

As we drive forward into the 'information society' the overwhelming force of globalisation, not simply as a metaphor but as a defining condition of the dominant structures of the emerging economy, becomes increasingly evident. *Globalisation* in this context means the creation of centrally coordinated, globally distributed networks of producers and consumers, supply chains, and distribution networks. Necessarily and crucially these processes in their late 20th and early 21st century manifestations are enabled and empowered by Information and Communication Technologies (ICTs).[1] The very rapid rise to national and increasingly

* In several places in the following, parallel arguments can be found in Gurstein (2007).

1 'Globalisation' as a term has no standard and universally agreed upon definition. Rather, it can be understood to occupy a general conceptual space and is adapted to particular circumstances as required. A fairly typical definition as applied within the context of Information Systems would be the following: "globalisation of business refers to a qualitative departure from traditional approaches to doing business internationally. An important distinction is the size of the new business entities. Another, and significantly more interesting aspect, is the attempt to set up such entities in various countries functioning as single, 'seamless' business operations. For example, while a corporation's market in the international trade is usually considered to be composed of many, country-defined markets, in the globalised approach it is defined as one, huge globe-encompassing mammoth. Closely related to this notion is the global business corporation's approach to management of business operations in various countries, as elements of a unified system, regardless of the location and the national boundaries. A significant implication of this approach is the expected ease of transfer of goods, services, capital and labor across the globe, unencumbered by excessive local and national regulations" (Mahdavi 2002). A further and more Information Systems (and less 'academic') definition would be the following: "We define globalisation as the responsible development of a geographically balanced network of business units that are fully integrated within both our worldwide business structure and within the local societies in which they operate" (STMicroelectronics 2001).

global dominance of a select number of massively electronically enabled corporations, of which the most visible (and successful) is Wal-Mart (in the retail sector), is the defining example of these processes.

In this context, Wal-Mart is less a company than it is an electronic infrastructure for managing the flow of goods from producers in low-cost countries to consumers in higher-cost countries while extracting profit from the 'arbitrage' between the two sides of the transaction.[2] A defining characteristic of Wal-Mart (and its like) is the efficiency, scope, and depth of its ICT infrastructure and the continuous internal drive to enhance these efficiencies. By creating a relatively seamless supply chain internally and a low overhead relationship linking producers and consumers, it has mastered the central elements of a consumer economy.[3]

Information Systems and Globalisation

One characteristic of Wal-Mart and all of the companies linked into its webs of alliances, suppliers, and sub-suppliers, as well as the companies whose own drives for globalisation emulate or parallel that of Wal-Mart, is the very high degree of centralisation and centralised control which they exert even throughout what are highly dispersed operations.[4] It is this globally integrated reach and control that is characteristic of the modern age and of the role of ICTs in the current globalising economies.[5]

Wal-Mart notably as well is not only a 'globalised' enterprise; it is also 'globalising' in that it is working towards continuous global expansion and including integration of its globally dispersed components into its unified and integrated ICT and other operational systems. This includes the drive to create ever more efficient structures for information flow and information management along its supply and sales chains and of course towards an ever

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2 The technical and management literature on Wal-Mart's supply chain is large and of course extremely laudatory. An interesting example is from Beatty's (1997) piece, which examines what the US Army can learn from Wal-Mart's logistics. The significance of these global supply chains, and specifically Wal-Mart, in the area of Management Information Systems (MIS) cannot be over-emphasised, to the point where a colleague in private conversation suggested that all MIS research now was in one form or another concerned with the management and deployment of the Wal-Mart infrastructure! (siliconfareast.com).

3 There is a very large technical and commercial literature on Supply Chain Management. A useful and accessible introduction can be found at on Wikipedia (2008).

4 This 'control' takes the form of either contracting or not contracting — i.e. either a company conforms to the technical requirements and standards of Wal-Mart or it doesn't do business with Wal-Mart, and given the massive significance of Wal-Mart as a purchaser, this means that conformity is not voluntary but a compulsory aspect of staying in business (Colin Henderson, Internet Changes Everything blog, comment posted 8 September 2003).

5 Much of the conceptual approach concerning the role and operations of Wal-Mart and other electronically enabled enterprises comes from the very useful introduction to e-Business volume by Kalakota and Robinson (2002), although of course, their conclusions following from their analyses are quite different.

smoother integration of the two.[6] Thus not only is the reach of Wal-Mart global and massive, but there is an internal logic of cancer-like growth, and the incorporation of ever larger swaths of retail distribution (because of its highly competitive supply chain driven prices for the consumer) and consumer goods production (because of the size of the markets within which it is the dominant player). Equally, its dominant role in its marketplace allows it to continuously force down its purchasing costs, which in turn allows for reductions in prices to consumers, further fueling increases in market share, and thus closing and continuously driving and tightening the circle.

The very fact of this integration coupled with the intensive centralisation and overwhelming drive to expansion has meant not only that Wal-Mart has integrated its suppliers into its 'value chain', but in addition, it has put significant pressure on its suppliers to integrate *their* suppliers into their value chains as well, similarly using Wal-Mart's designated electronic platform and integrated information systems. The overall effect of this is that a very significant and increasing component of the overall US economy and elements of the global economy are becoming integrated into a single, ever increasing, technologically driven and efficiency seeking electronic infrastructure, including internal processes of cost-reduction and profit maximisation all cascading into the Wal-Mart retail behemoth.[7] Parallel, although not as extensive, electronically enabled supply chains can be found in other industrial segments and particularly the automotive and electronic industries. As well, the banking and financial industries are of their very essence more or less pure electronic infrastructures, lacking as they do of course, a material supply chain as a physical counterpart.

Not surprisingly, these technology drivers at the core of contemporary advanced economies have their organisational, management, and 'human resource' counterparts. At the organisational level, the decision making structures – primarily concerning technology and financial issues – that emerge, as we have already noted, are highly centralised. Contrary to traditional 'industrial' production processes, however, the actual physical (production and distribution) components of the system can be, and are, globally dispersed and decentralised, with the centre maintaining a role as coordinator and standard setter. In practice, this coordination is done less through specific direction and more through the establishment of targets or standards (production, cost, and quality). Local or dispersed 'nodes' are then

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[6] The integration of the sales 'chain' with the supply chain is probably Wal-Mart's most significant single retail innovation. Developing the capacity to directly link sales with supply has allowed it to achieve massive efficiencies by effectively eliminating the need for inventory and warehousing. The 'joke' in the industry is as follows: Q. Where are Wal-Mart's warehouses? A. The US Interstate Highway System. This of course is no 'joke', as Wal-Mart tries to keep much of its inventory on the road in trucks to maintain low costs and flexibility. This is the ultimate in just-in-time delivery, with Wal-Mart keeping only 24 to 36 hours of inventory on its store shelves. Three to four days of inventory are in constant motion on the US Interstate Highway System, moving directly from manufacturers or wholesalers to Wal-Mart stores while Wal-Mart itself avoids the real estate, labour, and carrying costs of maintaining this in warehouses. Many however, are now doubting the viability of this model given the rapidly escalating energy costs of Wal-Marts' 'warehouses on wheels'.

[7] According to widely circulated calculations in 2002, Wal-Mart sales represented some 2.1 percent of the entire US Gross National Product (Bergdahl 2004, 5).

responsible for achieving the centrally established targets or responding to the external standards in ways that are reflective of and responsive to local conditions, opportunities, and resources.

Viewed from this perspective, the technology infrastructure operates more as an 'enabling' than as a 'control' environment, i.e. it enables those at the local or dispersed levels to execute their own responsibilities in the most efficient and effective manner taking into consideration local conditions. At the same time they are ensuring that their actions are consistent with the requirements and standards (including both quality and profitability) established at the centre. This means in practice that local 'nodes' – suppliers, producers, retail outlets – have considerable autonomy in how they achieve their results as long as the results *are* achieved. Equally, the core of employee relationships and of work activities is not necessarily externally coordinated or framed in an aggregated fashion (in contrast of course, to traditional assembly line production where all production staff are treated as a 'mass' and subject equally to external coordination, i.e. management) (Wal-Mart's Position on Unions). This eliminates, and not accidentally or incidentally, the basis for earlier processes of, and drivers for, worker organisation and unionisation.

In this latter case, the central direction is towards support for a process of individuation or particularisation of employee management and of the relationship of the employee to the employer. The 'employees' in these enterprises are not 'workers' (in Marx's sense) or even employees; rather they are 'Associates' (Public Broadcasting Corporation). In this way, at least nominally, the illusion (and to some degree the reality) is presented of employee autonomy within the larger coordinated framework. In the current iteration of course, the overall coordination is administered within an increasingly technological framework (rather than, for example, through direct oversight).[8] In the current formulation, each employee/ 'Associate' has her separate 'Associate's' contract (and output quotas) with the employer maintaining the right to monitor against these quotas (technology giving the employer increased opportunity for such individualised monitoring) rather than, for example, the more traditional collective output requirements leading inevitably to collective labour agreements (Castells 1997).

So what has all of this to do with Telecentres…

An Introduction to Telecentres

Networked communities may take either of two forms. They may be communities that only exist in and through the electronic networks which enable them, or they may be physical communities that are enabled both internally and in their relationship with the outside world with ICTs. In the latter case, among the most common manner in which these 'networked communities' are realised is in the form of Telecentres.

[8] This coordination is done through continuous monitoring of employee behaviour and particularly through the monitoring of employee outputs against norms (Kalikota and Robinson 2002), concerning this type of employee 'management' as being the characteristic form for electronically enabled business.

In the first instance, these communities may also be known as 'virtual' or 'electronic' communities, indicating their origins in the act of networking and of inter-individual communication as between peers. In many cases these communities reflect a deliberate, though frequently resisted (by the owners and managers of these networks), re-purposing of top-down centrally driven e-networks where individuals as end users/participants in these networks begin to bypass the central authority and enter into direct peer-to-peer communication (as for example in the creation of hacker communities or the communities through which open source software has been developed).

Centrally driven networks are almost universally structured (by their implementers) so as to preclude the possibility of peer-to-peer connections, recognising that this type of 'organising' would be of little advantage to themselves and could potentially present threats.[9] Equally of course, this attempt at retention of control at the end user/producer level has created the phenomenon of virtual communities as communities of resistance and of self-organised, self-managed independent production.[10]

In the second case, physical communities are enabled in a variety of ways and for a variety of purposes through the use of ICTs. In these instances, the 'community' as on-going peer-to-peer connections may exist over a long period of time. However, the application or introduction of ICTs as supportive of these processes (as for example through Telecentres) and particularly as supportive of the various outcome-oriented activities of these communities may be relatively new.[11]

Further, as the use of ICTs to support electronically enabled communities becomes commonplace and as experience in enabling physical communities with ICTs is acquired, there is emerging a convergence or an overlap between these. Thus, for example, electronically enabled communities begin to seek out ways of becoming linked more directly into physical interactions and physical processes, and where ICT-enabled physical communities begin to enhance and extend their activities and reach by incorporating elements of virtual relationships as aspects of the on-going physical and face-to-face relationships (e.g. the networking of Telecentres for collaborative development, purchasing, transaction management, and so on).[12]

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9 A number of companies in the DotCom boom and period immediately after created on-line forums giving customers the opportunity to present feedback to the company and with the intention of creating 'communities' around the various products or brands, as is promoted by Hagel and Armstrong in their very influential book, Net Gain: Expanding Business Through Virtual Community (Hagel and Armstrong 1997). Most of these were quickly shut down when the customers began to interact with each other to form groups of customers, many of which were directly critical of individual company offerings. A number of these eventually re-emerged in the 'xxxsucks.com' phenomenon as in http://www.mycarsucks.com/ for example.

10 See the range of independent electronically enabled networks in information intensive areas such areas as news and information (Indymedia), software development (open source and Linux), and publishing (open access) among others.

11 These processes have been quite well examined in Gurstein (2000), and also the variety of articles in the Journal of Community Informatics at http://ci-journal.net.

12 A very interesting and emerging example of this can be found in the iMalls proposal to use local Telecentres, particularly in rural Latin America, as focal points for managing local e-commerce transactions and distribution (iMallsGlobal).

Telecentres and Globalisation

Whether consciously or not, Telecentres[13] have come to be placed in the midst of processes of networked globalisation and the concentrations of control, power, and wealth that they represent. On the one hand Telecentres can be seen as making available to large segments of the population bottom-up opportunities for 21st century employment and wealth creation, innovation, and entrepreneurship. On the other hand they can be seen as ways of extending into ever broader and more remote areas the totalising networks of consumption and the integration into the centralised networks of control, which the Wal-Mart phenomenon so strikingly exemplifies.

However, and for the most part, Telecentres as they are currently introduced are not perceived as either of these. Rather, they are seen as one tool among others in the larger processes of externally supported (and induced) economic and social development. That is they may simply be the newest tool being provided to communities in support of broader strategies of 'development' and of the ongoing attempts to find means for improving the opportunities of those who, for whatever reason, have been identified as the targets and presumed beneficiaries of development interventions.

Most of the academic or research work concerned with Telecentres has been either of a descriptive nature or linked more or less directly to one or another phase of the project cycle (primarily monitoring, evaluation, or impact/outcome assessment). The result has been a somewhat useful collection of case studies and occasional compilations or attempts at syntheses of empirical results, themselves focused on 'lessons learned', 'good' or 'best practices', planning recommendations, and so on.[14]

In this paper, rather than attempting to synthesise the rather vast amount of (often repetitious) case study material I will attempt to pose a set of questions or propositions, which might situate our understanding and broader questions concerning Telecentres into a larger theoretical context, and specifically into those considerations presented by the notions of globalisation introduced in the first section of this paper.

Understanding Telecentres

What is the nature of Telecentres? The Telecentre experience? The longer term significance and impact that Telecentres will have in their local communities and beyond? What are the linkages among Telecentres? Are they in fact externally created points of technology and Internet access within communities or are they part of the process within communities of

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13 Telecentres includes here the range of community-based technology initiatives, and particularly Internet access sites, which go by a variety of names including Community Access sites, Community Multimedia Centres, Telecottages, and others.

14 Google Scholar lists some 3000 'Recent Articles' under the rubric of Telecentre/Telecenter. One useful place to start might be the Special Telecentre issue of the Journal of Community Informatics (2006).

self-definition (through the use of technology) – of emergence, of self-organisation, and potentially of *resistance*?

Central to responding to these questions is the existence or not of a 'dialectical' relationship between the self-organised and locally controlled Telecentre as an expression of community capacity on the one hand, and the extension into the community of telecommunications infrastructures and the creation of Telecentres with their imposition of enforced dependency on outsiders for expertise, training, maintenance, and support on the other. Fundamental to this is the externally structured means by which Internet 'access' is provided into the community, where such access may simply be 'access as passive consumption', i.e. a technological linkage, or whether it represents the creation of a conduit from the local into the centrally controlled network, through which the local can find its voice and other forms of ICT-enabled empowerment. The degree to which the control is local and the Telecentre is a place of production and not simply consumption, of *(effective) use* (Gurstein 2003) and not simply *access,* is the degree to which the Telecentre can be said to be the basis for local 'development' rather than simply the continued extension of the globalising network and the incorporation of more and more of the *local* into the totalising *global.*

The current 'development' approach to Telecentres is that of *top-down push* from the centre; that is, those at the centre with resources determine that there is a requirement (or an opportunity) for introducing ICTs or Internet access into a community with the effect of linking that community into broader external organisational, technology, service delivery, and other systems as determined by the sponsoring agency. The notion is clearly one of providing communities with the means to 'access' the information (or services). Not incidentally, this approach has the effect of ensuring that the end Telecentre user is in this way ascribing to and even affirming the existing structures of power and control which underlie the funding but also underlie the service which is being provided.

The result is that Telecentres for the most part reproduce, in the social structuring of the Internet or ICT access, the ways in which access to any other good or service is structured as it enters into the community. By and large those who already *have* get more, and those with *less* get less based on existing discriminatory structures of education, age, income, gender, and so on. Notably as well, interaction around externally accessed information or services is largely one way, from the outside in.

There is nothing too surprising about this; however, suppose we start from a different perspective, which is not that the Telecentre is the place for passive 'access' to information and services generated elsewhere and as it were 'pumped down the pipe' into the community. That is, suppose that we start from the perspective (and notably one which is quite common among those fully immersed in technology development) that access (including local access) is perhaps most importantly the basis for being a *producer* in the information society. This approach is based on a recognition that the resources being processed are in large part information (or information intensive) goods and services, and the tools being used to forge and process these information goods and information services are in fact Information Technologies. It follows then that through interactive networks it is as technically

simple to produce and distribute information goods and services through Telecentres as it is to use them to consume information goods and services produced elsewhere.

Moreover, increasingly information goods and services are content related, linked to the capacity to create text, image, or sound contents of interest and value to others. The vast and even explosive development of 'You'- (as in Time Magazine's Person of the Year in 2006) based (user generated) goods and services – i.e. those produced not just by those with specialised technical skill but those with a message to express and distribute, a local voice to articulate, or local knowledge to apply and present for broader use – suggests one possible direction in which this may evolve.

This possible shift from centrally developed information goods and services to networked or community-based goods and services is also a process (both a cause and an effect) of very widely distributing the means (tools) for production in an information society. This shift from *access* and *consumption* to *use* and *production* is also in large measure an element in what appears to be an ongoing but by no means unchallenged transfer of power and control from central knowledge agencies to dispersed knowledge (and content) producers. The resistance of the medical profession to use ICTs to support localised medical services as for example through self-ministering or nurse practitioners; the covert reluctance of the educational establishments to creating means for structured self-learning and self-education via Internet access; and perhaps most important, the clear reluctance of governments to shift from the use of the Internet to deliver government services to using the Internet to more broadly include citizens in the act and process of governance; all attest to the degree to which centralised structures of power and control are unwilling to follow the technology affordances down the path of decentralisation, power dispersal, and local empowerment.

The challenge arising from the empirical examination of Telecentres is that so few of them in fact can be approached as (actual or potential) centres of local production, probably due to the fact that most Telecentres are externally funded and thus externally designed and developed. Perhaps inevitably, the specific uses and information and service applications of most are concerned with *access* rather than *use* – *consumption* rather than *production*.[15]

Telecentres and the Characteristics of Networked Communities

Community-enabling Telecentres, as with 'networked communities', have a variety of 'essential' characteristics which differentiate them from other centrally determined networks and networked individuals. In this context, telecentres may act as the hinge linking ICT networks to communities, which may be self-managing, self-directive, and self-propagating and where the ICTs may have the further effect of enabling and empowering with respect to information intensive activities.

[15] In fact, it is quite possible that those who are using the Telecentres (or locally using ICTs) for 'production' may be using them for what might be considered 'outlaw' purposes – for generating scams, for propagating spam, for participating in multi-player games, – with the creation and management of global teams , for example, for undertaking image or sound 'piracy' and so on.

Communities are by their nature bottom-up and voluntary, with goals and processes that are collaboratively determined with the community partners. In addition, they function in an autonomous rather than a dependent manner. Networked community structures may be self-managing and Telecentres, which enable electronic access, supporting this while further facilitating a local capacity for the independent initiation of action. In this context, community Telecentres function as being the 'edge' of the various larger networks in which they are participants. As in the Internet itself, the notion is that the intelligence (and relatedly the capacity for autonomous action and independent, i.e. non-coerced, participation in the network) is found at the edges of the network. This is in contrast to coercive, top-down, centrally coordinated networks, where only the centre is capable of autonomous action while those at the edges are capable only of action within a coordinated centrally determined set of parameters, standards, and code.

Electronically enabled networked communities are 'emergent' in that they come into existence through the creation of various institutional or structural forms (such as Telecentres). These become the temporary physical manifestation of the community rather than, for example, having a formal substantive reality over time. That it is often developed in response to some external condition or circumstance (including a funding opportunity) doesn't meant that the community hasn't persisted over time. Rather it may have lain nascent until called forward into formalised existence by the external stimulus or by internal processes of, for example, 'social entrepreneurship' or self-initiated problem solving or through knowledge and service enrichment by means of the Telecentre.

This approach provides a means to understand the 'sustainability' paradox. While the formal structures of communities may or may not be 'sustainable' (Simpson 2005) over time, nevertheless the 'community' itself is sustaining. Thus it may 'spring to life', i.e. re-emerge in the form of formalised structures at a future but as yet unpredictable occasion. This suggests the obvious but frequently overlooked conclusion that 'communities' are not defined simply by their structures, but rather they are the connections which persist over time as between members of the community, with structures (including of course, Telecentres) being simply formalisations of these connections. In this context then, the creation of a Telecentre may have the effect of precipitating the *emergence* of the community (in the form of various kinds of other formalisations), with the formalised community in turn having the effect of supporting the ongoing sustainability of the Telecentre. Equally, the emergence of a community may find its formalisation (or precipitate) in the creation of a Telecentre, with the Telecentre acting so as to support the sustainability of the community (there are many examples of this in electronically enabled diaspora communities). But it should also be noted that the existence of a community within which a Telecentre is embedded does not necessarily mean that the Telecentre will be sustainable, since the processes for enabling the continued operation of a Telecentre will for the most part operate in parallel with the range of other formalisations present within a community (local governments, NGOs, small businesses, and so on).

Resistance

Ontology has to do with the nature of fundamental 'being' (Gruber), the primordial base from which other phenomena derive or which provides the basis for the continued persistence

of other phenomena or activities. In this context, the question would be what are the ontological foundations for an understanding of the current structure of action/reaction, extension (propagation), and resistance within the Telecentre domain.

Within Wellman and Hampton's (1999) model of 'networked individualism', the only ontological mover (independent agent or source of independent action/agency) is the *network* itself. The *individual* in Wellman and Hampton's formulation is simply the sum of the fragments of her participation in the various externally driven networks (of production, consumption and even socialisation) of which she is a member or with which she has contractual relations. In this world, the *network* is all and everything.

Remembering that the characteristic mode of human participation in information networks is through a necessarily fragmented participation as an individualistic networked electronic 'profile', it is not surprising that the resistance to totalisation through integration into externally driven electronic networks comes from opportunities and frameworks which enable the individual to overcome this fragmentation and to integrate her identity, and more importantly to find the means for entering into collaborative relationships with others. This process of re-integration or overcoming contractually structured and fragmented 'networked' relations in favor of organic and holistic coordinated relationships is in fact what takes place in 'communities' and is in some senses the defining characteristic of communities – where *Communities* are places where others know your 'name' and not just your 'sig' (electronic signature) and where others interact with you as an integrated person and not simply as an electronically mediated 'profile'.

Moreover, in the real world, the externally driven network is only one element of reality. In addition there are the self-initiated (self-organised) and participatory networks which inter-link individuals not on the basis of fragments of identity but on the basis of self-initiated and self-realised identities. These networks function as 'communities' through which action may be undertaken, projects realised, and reality confronted and modified.

At the local level, the question is whether Telecentres function as the electronically enabled basis for these 'communities', challenging the centrally controlled and totalising agency of externally coordinated electronic networks. Alternatively, the Telecentre may be a 'Trojan horse', providing the electronic means by which totalising externally driven networks obtain access to a local community, previously isolated and with a considerable degree of autonomy as a consequence. The result of this is the opening up of a portal through which the local community becomes integrated as consumers into national and global markets.

Thus the structure of 'resistance' to the totalising forces of technology and network-enabled capitalist accumulation as per Wal-Mart is necessarily and theoretically (as well as in practice) the discovery or rediscovery of 'community' and the realisation of organic and integrated inter-individual relationships rather than purely contractual and electronically fragmented inter-networked connections.[16]

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[16] Wellman's references to contractual or 'gemeinschaft' relationships as per Durkheim's notions as the defining characteristic of his 'networked individualism' postulate (Wellman and Hampton 1999).

It is notable that we are seeing manifestations of resistance and even coordinated resistance from community-based networks, resulting from the perceived impacts on individuals and particularly in the context of the impact that these centrally controlled networks are having on physical communities throughout the US and elsewhere. Notably, the most effective resistance to the Wal-Mart juggernaut and including competitive resistance in the marketplace has come initially from place-based communities and in general, integrated relatively small communities which have mounted active resistance to the location of a Wal-Mart store within their immediate environment.

Resistance and Ontology

An argument of this paper is that 'communities', as for example represented by Telecentres, both as physical and electronically enabled 'access points' within local communities, may (or may not) represent an additional (and structurally oppositional) ontology to the 'network' ontology as presented in the current media-supported drama of market and production globalisation. In some instances we are suggesting, Telecentres may provide a foundation or contributing element for the construction of an alternative reality – a set of organisational, economic, and social structures capable of operating autonomously in relation to the centrally controlled networks. These structures have the capacity to support opposition to and the creation of alternative structures (organisations, institutions, and enterprises) as means for resistance to the totalising processes of globalisation.

These structures are then capable of opposing and creating different structures and realities to those being imposed (and forcefully reproduced and extended) through the centralised/individualised networks and which are being realised by such corporate agents as Wal-Mart and Microsoft.

The conclusion is that 'Telecentres', as locally based, electronically enabled ICT access points for communities, may have an independent ontological status. Thus in this context they could and should be seen as potentially free-standing and foundational, as the platform or (from a conceptual perspective) the agent on the basis of which one could and should undertake technical – i.e. hardware and software, and service – design and development as the basis for autonomy and self-determination at the grassroots.

In this way, one can, for example (and this is the conceptual foundation for a 'Community Informatics'), develop information, communications, and networking systems which enable and empower communities to effect action in the world in a manner directly parallel to the use of information, communication, and networking technologies to enable and empower 'corporations' (or 'individuals') through the design and development of the variety of information intensive goods and services.

What this means in practice is that the requirements which reflect community (collaborative) characteristics can and should become an integrating assumption for hardware, software, networking, and service design. In this way community ICT use and application as based in community Telecentres would be enabled – with these processes being designed to reflect a different set of assumptions from those built into management- or corporate-oriented

information and technology systems – and capable of autonomy in relation to, and where necessary, resistance as a response to outside encroachment (Gurstein and Horan 2005).

The Policy Implications of this Approach to Telecentres

Approaching Telecentres within a perspective where the intention is not simply to achieve 'development' (at any cost) but rather to support development within a perspective of self-development and resistance to, or providing an alternative path away from, centralised and externally controlled globalisation suggests a number of policy directions with respect to Telecentre development.

Enabling the Local

A first priority in this context would be that Telecentres should be developed and in the long-term given priority through support for the locally-based and emergent rather than the external and pre-packaged. Thus one should see efforts which are supportive of local initiatives through which Telecentres may be developed or towards strengthening the local element in broader local Telecentre development partnerships.

Networking as Peer-to-Peer

For local Telecentres to be effective and to grow in their usefulness they need to be networked with organisations and other access points outside of the local, including social and organisational networking in addition to (and enabled by) electronic networking. This should be seen as enabling the development of peer-to-peer networks, i.e. networks of equals involved in collaborative development, rather than towards the simple consumption of development support from outside sources. Policies of supporting self-organised and grassroots-initiated networks and peer-to-peer relations would be indicated.

Service Provision through Enabling the Local (for Effective Use)

Outside agencies and particularly governments see Telecentres as vehicles for service delivery. However, in the digital sphere there is the open question as to whether services, as provided to the end user as a consumer of activities and products, must be managed and developed elsewhere or whether users (local communities) can be partners in the development, implementation, and delivery of these services through appropriate design strategies (as for example designing to ensure for local 'effective use').

Partnering with the Local

ICTs have the capacity to dramatically amplify and magnify local capacity for self-management and self-service. Since the development and implementation of this capacity at the local level often involves local empowerment, this is frequently the cause of conflict and competition (even 'struggle') in relation to the distribution of power and control over the deployment and direction of the service or facility. An alternative approach would be for the service provider (in most cases governments) to see local service self-management in a partnership mode, where self-development and self-management (as for example enabled

through the use of ICTs) lead to much more efficient and effective service deployment and availability. An effective stance for government is to see this approach as a potential contributor to overall policy goals and to support such developments, including, for example, through payment of fees for services provided by the Telecentre in service delivery.[17] As well as providing other benefits, this approach to service self-development and management in many cases would almost immediately provide the basis for the 'sustainability' of many community Telecentres.

Conclusion: Telecentres and the Revitalisation of Local Citizenship (Gurstein 2005)

Citizenship in the age of ICTs seems to be visibly eroding, both from the perspective of the citizen and from the perspective of the democratic system of which the citizen is meant to be a part. From the perspective of the citizen, there would appear to be ever diminishing opportunities to influence or even to participate in the central elements of democratic governance. While the individual becomes enmeshed in ever larger networks of communication and interpersonal contact[18] (and with it, senses of personal influence and efficacy), little of this is experienced in relation to the modalities, structures, and instruments of governance.

From the perspective of governments as they attempt to shift over from manual systems to electronic systems, and particularly in their relationship with their larger environment through e- systems, governments increasingly look on their primary 'stakeholders' not as *citizens* but rather as *consumers*. Thus they perceive the end users not as collaborators and co-participants in the process of developing and maintaining the institutions and structures of democratic order, but rather as consumers of the 'goods' and 'services' produced by government as a quasi-corporate entity empowered for these purposes through periodic elections.

If we see Telecentres as potential contact points for ICT-enabled self-development and self-management as above, then they equally can become focal points for self-governance and local empowerment. Thus to a degree, one can anticipate that the necessary role of the citizen in a democracy may shift in its focus, from centralised and more distant institutions to local institutions and locally enabled modalities for aggregating and exerting influence in the larger environment. A result of this process, with potentially great long term significance, is that the focus for the exertion of this influence need (and in all likelihood will) no longer be based simply on the longer standing structures of governance and inevitably on structures with fixed geographical referents. Rather one might expect (and in fact this is rapidly beginning to emerge) that the exercise of this new form of 'citizenship' will be electronically

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17 One example of this among many would be that community Telecentres provide a place for accessing government information. This service provision at the local level relieves governments of some of their obligations and the related costs of providing this information in other, and likely more expensive, ways as well as providing opportunities for making available information in much greater depth than would otherwise be possible. Governments should see this as a 'service' which Telecentres are providing to the public on behalf of government and should be compensate for the provision of this service.

18 For example, through social networking sites such as MySpace and Facebook.

mediated and thus in many parts of the world will be undertaken by means of Telecentres. As Telecentres form themselves into distance (and globe) spanning electronic peer-to-peer networks, this exercise of electronically mediated citizenship is as likely in the longer term to take a global as a national form. The result may be the development of an ICT-enabled sense of 'pan' global citizenship accessible to those even in the poorest and remotest rural regions and thus the formation of a new and grassroots-based process of globalisation, but one which responds to the needs and hopes of the multitudes.

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2. Empowering Communities through ICT Cooperative Enterprises: The Case of India*

Seán Ó Siochrú

Information and Communication Technology (ICT) strategies and poverty reduction strategies have tended to develop in parallel, telecentres being one of few areas of overlap. As a result, poor communities cannot fully exploit the potential of ICTs, and indeed the growth in ICTs at the national level may result in further marginalisation. The Community-Driven Network is seen as one possible way forward – a community-owned enterprise offering telephony and ICT services focusing on the needs of the poor. Its goal is to capture as much as possible of the benefits of an ICT enterprise within the community itself. Using a wireless broadband local network and low cost technologies, this option is being explored in several countries, including Cambodia and Rwanda. A preliminary feasibility analysis of building such a network in rural India suggests financial sustainability, based on leveraging local resources and offering low-cost Voice over Internet Protocol (VoIP) and a suite of other ICT services. This approach merits further investigation.

What is empowerment in the sphere of information and communication? Empowerment means being able, in terms of affordability and capacities, to *access content that you choose*, to *create the content that you need*, and to *gain control of the means of communication* by which these are transmitted. Empowerment means local communities being free to explore alternative ownership, management, and service delivery models to secure sustainable access, where the *for-profit* calculus does not add up for them.

Given the challenges facing poor and marginalised communities, and the importance of access to vital public services and locally relevant content, a variety of models must be explored. In this context, community-driven networks[1] and cooperatives may offer an avenue to such empowerment in underserved rural grassroots communities. Drawing on community resources and labour, they are potentially sustainable in contexts where market-driven options have difficulty. More important, unlike externally owned networks, they have a stake in the

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1 Three identified variations of a community-driven approach are the user/community-owned cooperative, the local authority-owned network, and the hybrid entrepreneurial/community-driven model. See Ó Siochrú and Girard (2005, 14). The following draws from this report.

continued development of the community, a critical factor in an age where many rural communities are becoming increasingly economically and socially marginalised.

This paper outlines the background, ongoing work in the area, and a generic business plan. It is a preview of ongoing work supported by the United Nations Development Programme (UNDP) and International Development Research Centre (IDRC), in which the author is participating, respectively, as Programme Coordinator and Chief Research Advisor. It applies that work to a hypothetical case of a rural village in India.

Introduction: A Meeting of ICT and Development Policy

The community-owned network cooperative represents a confluence of trends, tracing its lineage, and the specific opportunity now offered to us, from at least two policy directions.

First is the ICT sector itself, which has come a long way over the past decade or two.

In the days when ICTs were called telecommunications and value-added services, developing countries were persuaded to regard them not as sectors in their own right generating employment, income and taxes, but as *enablers* of the wider economic and social goals. In the long term a more efficient ICT sector offering cheaper services was good for economy and society, even if it meant an immediate loss of foreign revenue and government income. And so a process of liberalisation began, designed to transform the sector into a dynamic driver delivering innovative low-cost services across the sectoral spectrum.

Although initially a vibrant market was proposed as the core solution, it soon became obvious that some form of universal access policy was needed to bring services to those beyond a market-driven dynamic, and newly created regulators were charged with this function. A further refinement emerged in the late 1990s as ICT services (as distinct from the infrastructure) were recognised as a *horizontal* function demanding a distinct and participatory strategy and high level support. Such a direction was promoted for instance by UNDP's global Digital Opportunities Initiative (http://www.opt-init.org/framework.html), the eSee Agenda Initiative (http://www.eseeinitiative.org/) in South Eastern Europe, and the Asia-Pacific Development Information Programme's (APDIP) work in Asia (http://www.apdip.net/).

Second, in a parallel universe seldom touching the other, twenty years ago the development community, too – donors, policy makers, NGOs and others – was barely aware of the potential of ICTs. A process of experimentation and education began (including the Sustainable Development Networking Programme), until ideas such as telecentres and cybercafés, e-health, e-education, e-government began to be recognised as agents in the fight against poverty. Now, specific applications and services were seen as having the potential to become *enablers* of development and poverty reduction.

The two trends have yet to fully meet and acknowledge one another, at either local or policy levels. Telecommunications and ICT policy too often remain distant from development

policy and poverty reduction strategy. At the local level, there is often little connection between, for instance, universal access measures, initiatives aimed at delivering services, and poverty alleviation enabled by ICTs (Mureithi et al. 2006; Nsengiyumva et al. 2007; Mutagahywa et al. 2006; and WOUGNET 2007).[2] There have been calls for the two to be connected, not least in the World Summit on Information Society (WSIS), but success so far has been limited.

Bringing telecommunications/ICT policy and development policy together does face challenges.

One is that both the liberalisation process implemented and the approach to universal access were, and remain, flawed in many instances.

The liberalisation process rolled out in many countries did lead to dynamic expansion of services but mostly in urban areas and also to new generations of oligopolistic 'incumbents', the giant mobile phone companies that we see today in Africa and parts of Asia (Esselaar et al. 2007). The fixed line networks, shackled with inappropriate regulation and policy and their own internal inertia, failed to build out significantly, resulting in woefully inadequate backbone networks and inflated tariffs for international data bandwidth. This left poor rural communities, in particular, grossly underserved with services and, where services were available, priced well beyond their means.

On the universal access side, the currently favoured approach of lowest-subsidy auctions extends services to the next most viable areas, not necessarily to the poorest ones; and, more seriously, tends to benefit mainly the wealthier sectors and individuals within these areas since only they can afford the tariffs.

On the development side, the telecentre approach, intended precisely to bring affordable and shared access to the poorest, continues with a mixed record, and the issue of sustainability has by no means been resolved, the cost of bandwidth being a key factor. An appropriate 'business model', even incorporating initial donor aid or government subsidy, remains elusive although current moves to aggregate local demand look hopeful. Furthermore, many of the services that have been developed fail to meet the real needs of poor rural communities, and local communities lack the skills and capacity to build their own.

Thus many problems remain, especially in rural areas of Africa and South East Asia:

- Poor people either lack telephony services altogether or face tariffs that limit their use to emergencies;
- Such high tariffs result in a significant proportion of overall rural incomes being extracted from the area by mobile phone companies;

[2] This was the conclusion for instance in the recent policy studies undertaken in Rwanda, Uganda, Kenya, and Tanzania.

- In the absence of fixed lines and low-cost international connections, bandwidth charges remain extremely high for ICT services, usually relying on satellite, limiting the spread of cybercafés and requiring large subsidies for telecentres that few can sustain;
- ICT services, where they are available, are seldom suited to local needs, and relevant local content remains a key constraint;
- Even where services could be delivered effectively through ICT, communities remain underserved due to a lack of awareness of the role of ICT and limitations in the business model pursued;
- Securing access to services is not simply a question of delivering them but also of empowering the community to access, effectively use, and secure broader development benefits from them.

However, drawing on wider development experience, and taking advantage of the latest low-cost technologies, an innovative model is now on the horizon and is being tested in combination with new technologies in Africa and Asia as well as Latin America:

This is the *Community-Owned Network Cooperative*. If implemented successfully, it can *both* underpin development activities and dynamics using ICTs, *and* capture the value-added and profits of ICTs as a sector for the local community. The empowerment comes not just from the use of ICTs to enable development, but from the capacity building and income generated by the cooperative enterprise. The goal is to empower poor communities through the benefits of ICTs *both* as an enabler of a range of development activities *and* as a *sector in itself*. Community-driven enterprises maximise the potential of ICTs as enablers of development activities, and retain the profits and embed the skills and capacities within the communities themselves.

In this respect, ICTs have come a full circle. Governments, having earlier been persuaded to cede proprietorial claims to ICTs as a sector – mainly to foreign ownership – and open it up as a horizontal enabler now have an opportunity of reinventing at least the local network as an asset in itself, one that can potentially contribute to poverty alleviation.

Key Characteristics and Benefits

A community-owned network cooperative is an enterprise built by the community that fulfils local needs for voice telephony, data networking, and Internet, as well as services and development content. It can coexist with other ICTs, such as the mobile phone, cybercafés and so forth; but its combination of activities is unique. The 'ideal type' would:

1. Provide a wireless high-speed network throughout the community, connecting all the major development actors to each other and to the Internet, for data and video conferencing;
2. Offer very low cost local telephony, greatly undercutting mobile phone operators (if present), at multiple points throughout the community;

3. Provide low cost external telephony, nationally and internationally, to fixed line phones and to mobiles at tariffs determined by minimum interconnection costs;
4. Develop content suited to the needs of the community, as determined by the community themselves;
5. Become a distributed and accessible node for e-government services, from local to national level;
6. Deploy other communications technologies, such as radio and video, that can add further value and strengthen the impact of various development activities.

In terms of impact, such an enterprise can:

1. Enhance the networking and knowledge sharing activities of local development actors, both economic and social;
2. Create employment locally through the provision of services, jobs that would normally be located elsewhere;
3. Build the capacity of the local community in enterprise development and institution building, both collectively and individually;
4. Enhance the provision and transparency of government services in the area;
5. Retain income in the area that would otherwise flow out;
6. Harness local, private entrepreneurial skills through a joint community/private service provision;
7. Reinforce overall community development efforts, through reinvesting the surplus.

In other words, it can become a central component in a community's efforts at development, enabling multiple avenues for empowerment and development.

Enabling Conditions

At a practical level, the current potential to create such enterprises is based on the convergence of several factors.

1. The First is the Technologies

- The rapid growth in wireless technologies and ever lower prices means that building local high-speed networks now costs a fraction of what it used to. Such networks can also be built horizontally.
- IP technologies for voice have come of age, including now low-cost VoIP stand alone handsets. Skype and similar companies are not the only evidence of the acceptability of VoIP in terms of quality. More compelling in this context is the fact that a consortium

of Kenyan ICT investors and banks have recently announced that they intend to build VoIP telephony networks within a short radius around rural banking offices, promising to greatly undercut mobile phone companies in voice services.

- These new technologies can be built and maintained with relative ease, as compared to earlier infrastructure, obviating the need for major technical expertise and corporate resources.
- Wireless technologies are small scale and scaleable: they can begin small and grow incrementally as the need arises without huge initial investment or growth redundancy.

The question, it seems increasingly likely, is not whether these technologies will begin to take on established mobile operators, but when.

2. Shifting Regulation and Policy

A second factor is shifts and openings in regulation and policy.

The overall failure to provide poor rural communities with affordable access has led to a search for less simplistic and more effective regulatory regimes. In much of Africa and parts of Asia, the search is on for an indigenous model of policy and regulation suited to local needs and capable of taking advantage of the relatively 'green-field' development potential in backbone and in local connectivity. 'Open Access' is the current buzzword for telecommunications backbone, in which bandwidth and data capacity are made available to all at cost-based prices through dedicated development-oriented companies. An emerging view is that the sector should be horizontally differentiated, so that competition and service provision will happen at each layer, all benefiting from low cost-basic bandwidth. The approach may also be used to extend low-cost backbone into rural areas.

This retreat from the telecommunications behemoths opens the door to small local level licenses. Several countries have already experimented with them, and mistakes have been made, as in South Africa, and lessons learned (Gillwald 2005). In East Africa, such licenses are possible in Kenya (Mureithi et al. 2006) and Tanzania (Mutagahywa et al. 2006), and other countries are looking at the possibility, often strongly encouraged by NGOs and civil society. Furthermore, universal service funds are being brought into the picture with a stronger developmental remit than previously. Overall, then, the experience of failure is bringing more flexibility and more imagination to policy and regulation.

3. Relevant Experience

Local development experience is also pointing in this direction, suggesting that an institutional or enterprise model based around community ownership and control could indeed work in ICTs. This emanates from both within the ICT sector and outside.

In terms of rural enterprise, farmers' cooperatives that produce, process, market, and sell goods to a high standard are common, from coffee to fishing to forestry. Infrastructure

cooperatives include water and irrigation schemes and exist or have existed in all regions. They represent a natural, and very effective, way for communities to collectively address their needs.

Less known is that the standard form for rural telecommunications provision in the USA is the cooperative, of which about 1,000 are in existence today, all receiving a subvention from federal government but operating efficient enterprises and offering a wide range of services. The model has been directly copied with great success in Poland. And there are others: in Pinamar, Argentina a local telephone cooperative has been operating since 1962; and in the Chancay-Huaral Valley, the irrigation Commission representing all farmers in the district also operates a community-owned network which offers VoIP and others services.

India has also recently become a hotbed of experiments and upscaling of community ICT activities, among them the Akshaya experience in Kerala, which combines community oversight and development goals with individual enterprise, underwritten by low-cost, high-speed bandwidth. And the telecentre concept has matured more recently, growing beyond single centres and moving towards supporting local networking and aggregating demand to reduce costs.

Financial Sustainability

This concept requires sustainability of several kinds. As an initiative focusing on poverty reduction, it must be capable of sustaining its social inclusion dynamic and ownership structures. Underpinning these is also an enduring development question of financial sustainability. And achieving financial sustainability can mean a lot more than staving off project closure when donor funding dries up since it opens the door to replication and upscaling and policy, regulatory, and financing support. A financially sustainable business model is thus much sought after.

The generic financial sustainability of the community-driven network is based on a number of factors, the key ones being the following:

1. The possibility of undercutting mobile-phone operators is very real and has huge potential for income generation. Research and experience have shown that demand for telephony is very strong in rural areas, even to a point of significant sacrifice of income. Demand is also elastic: a significant tariff drop leads to a larger growth in telephony. Providing local VoIP is relatively easy, and it might take a while longer to extend to all fixed lines and ultimately full international connectivity. There are no longer any technical obstacles to this.

2. Considerable capital and current cost savings can be made by utilising public and community resources for building the networks. Such resources range from the provision of premises for the hub, to transmission towers and public rights of way, to voluntary labour.

3. Aggregating bandwidth usage between a larger number of social and economic actors within the community, linked together into a network, reduces the cost to each and increases the utility of the network as networking content and exchanges multiply.

4. At policy level, initial subsidy from universal access funds can be provided on the same principles as the lowest-subsidy auction, i.e., a once-off investment is sufficient to launch a service that is sustainable thereafter.[3] A further policy measure, currently possible in Uganda, is to allow rural telephony networks to receive asymmetrical interconnection charges,[4] whereby income to the rural network for each incoming call is larger than what it pays out to completed outgoing calls.

These suggest a sound basis for creating a sustainable and profitable enterprise. Other factors can also add to sustainability. Treating the enterprise as a business from the outset, rather than a development programme that must transform itself into a business, can orient it towards sustainability. Additional policy supports, such as tailored finance packages, could also assist; as could the creation of technical support resources around, for instance, university centres.

An Indicative Business Model

The following summarises an indicative business model for the Community-Owned Network Cooperative emerging from the above discussion. While hypothetical – a 'pure' example does not yet exist – it offers a credible scenario based on work in Cambodia, including equipment costs about to be deployed in two pilots there, as well as the ongoing needs assessment and design in four pilot areas of East Africa. The particular regulatory and services provision circumstances of India have also been considered.

No doubt actual implementation in different circumstances would yield considerable variations to this model. Nevertheless, the purpose here is to present a credible *prima facie* case for the sustainability for the Community-Owned Network Cooperative, as a core development strategy for grassroots rural communities.

1. Basic Characteristics of a Community Owned Network Enterprise

The individual components of the model are:

A Community-Owned Network Cooperative (Co-op): This is a non-profit entity owned by the community (in various possible configurations) that delivers ICT and voice services to promote development, while creating employment, generating economic activity, and building capacity in the community.

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[3] See the preliminary rethinking of universal funds evident in Regulatel et al. (2006). The report puts a strong emphasis on local and community level initiatives including community telecom cooperatives, micro telcos, etc. and on using technologies creatively to make voice and broadband available in rural areas.

[4] Also see Dymond and Oestmann (2002) and the ITU (2003).

Institutional Partners: These are the originating partners of the Co-op, establishing it and holding it on behalf of the community, and they might include local health centres, schools, cooperatives, NGOs, local government, and others. They include non-profit, social and public development actors in the area who can themselves benefit from the services on offer, and who can also deliver ICT-based services to the community. Ownership may be opened out to all groups and even individuals in the community, over time.

The Hub: The Hub provides external and internal connectivity to all Institutional and Service Partners, technical assistance, and overall Co-op management expertise. It may also provide ICT services to the community, as a dedicated telecentre.

Service Partners: Service Partners offer specific services to the community, such as low-cost VoIP telephony, on a contract with the Co-op that specifies how much they charge customers and how much they pay the Co-op for these services. These may be private entrepreneurs, including shopkeepers or simply individuals, or may be non-profit entities and NGOs.

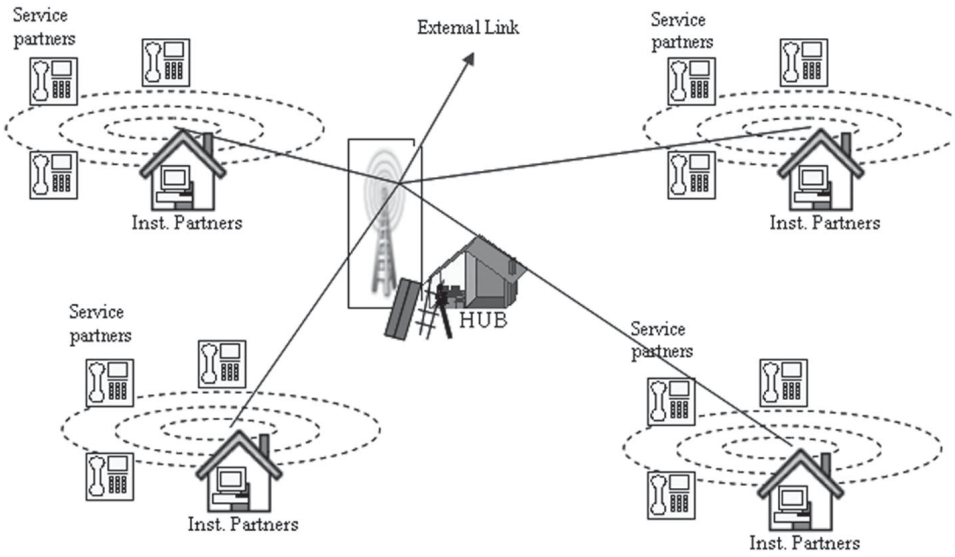
The Co-op is managed by a **Management Board** comprising representatives of the Institutional Partners, of the Service Partners, and of directly elected villagers.

Broadly speaking it exhibits the following characteristics:

1. Bandwidth is aggregated between the various Co-op stakeholders, institutional and entrepreneurial, thereby reducing costs to each;
2. Regular income is generated from core Co-op Institutional Partners;
3. Public services – e-government – are provided by the Co-op and funded by public authorities;
4. VoIP is provided as a low-cost voice service, initially within the area, and later interconnected outside, at affordable rates that greatly undercut the mobile phone operators;
5. VoIP services are sold by micro-entrepreneurs to local villagers, on the basis of a contract with the Co-op which specifies tariffs and fees that enable *both* low-cost telephony *and* private income generation. A VoIP telephony service could in future be offered as a retail service to village families.

Very schematically, it may be represented as follows:

Figure 1: Illustration of Technical Network



In this exercise, we assume a cooperative with the following physical characteristics, though of course these will in reality vary significantly in different geographic and terrain conditions:

- A Hub, equipped with 5 computers as a telecentre, as well as VoIP devices for telephony, and solar energy.
- A local wireless network (802.11g) capable of very high bandwidth for voice and video within the area. For fixed receivers/antennae, the network will extend to a radius of about 10 kilometres from the Hub using for instance an Omni Wimax solution.
- A further 15 Institutional Partners, such as health centres, schools, NGOs, etc., each with a computer, printer/scanner, and VoIP handsets.
- About 120 additional VoIP handsets, clustered within about 500 metres radius of the Institutional Partners, and operated by micro-entrepreneurs and local NGOs.
- A relatively high bandwidth access to the internal Internet, of 2 Mbps downlink and 512 Kbps uplink.

Such a configuration would enable video conferencing from the PCs, local telephony of acceptable quality, access to the Internet including the Web at relatively high speeds (depending on demand), and voice and data interconnection to the outside.

2. Capital Costs

The following tables estimate the income and expenditure, drawing attention also to the initial and ongoing contribution made by the community to the cooperative. These figures are based on actually sourced equipment at current international prices.

Table 1: Initial Network Capital Cost (US$)

Initial Network Capital Cost (US$)			
Description Local Infrastructure	**Number**	**Cost/Unit**	**Total**
Link to external bandwidth (512bits X 2Mbits)	1	4,000	4,000
CISCO 1300 (AP) outdoor	1	1,800	1,800
10bDi Omni antenna	1	5,500	5,500
Ethernet switch, 5 ports	1	70	70
Wireless Lan Router	1	190	190
Mast: 30 metres	1	3,000	3,000
Installation & set up	1	1,500	1,500
Local 'Hot Spots'			
Wireless LAN CPE	15	200	3,000
Wireless LAN Router	15	190	2,850
Local Premises Equipment			0
Computers with Webcams	20	1,000	20,000
Peripherals (printers, scanners etc.)	15	250	3,750
VoIP phones (with hand energy recharger)	150	100	15,000
TOTAL			**60,660**

Thus the total capital cost of equipment and installation comes to just over US$60,000.

Power might prove problematic in many areas, as mains electricity is often not be available. Costs can vary a lot depending on what form is used, and renewable energy is to be preferred. Below an estimate is made for the electricity requirement of the Network Hub, using solar power.

Table 2: Solar Power System for Hub (US$)

Solar Power System for Hub	**Number**	**Unit cost**	**Total**
1200 watt high efficiency sine wave Inverter	1	1,250	1,250
150 watt Solar Panel	6	750	4,500
100 AH VRLA Batteries	8	200	1,600
Charge regulator	4	75	300
DC mixer	1	100	100
48/ 20A volts mains charger	2	450	900
Installation	1	550	550
TOTAL			**9,200**

(Assumptions: PCs have LCD screens, 3 mast lights @ 50 watts)

Total capital costs are thus in the region of US$70,000, for this configuration.

3. Current Costs

Current or recurring costs are also a major issue, especially for bandwidth:

Table 3: Estimated Current Costs Annually (US$)

Estimated Current Costs Annually (US$)			
Description	**Number**	**Cost per unit US$**	**Total**
External Bandwidth			
VSAT 256kbit/2mbit month * 2 (4,400 a month)	12	3,750	45,000
Depreciation			
25% depreciation on capital equipment			15,000
Hub Staff			
Manager, per month (4,000 rupees)	12	175	2,100
Trainer per month (6,000 rupees)	12	262	3,150
Technical Manager	12	200	2,400
Other			
Office needs, transport etc.	12	1,000	12,000
TOTAL			**79,650**

This model assumes just three staff: a manager, a trainer, and a technical manager to maintain the system. Depreciation at 25 percent suggests an average life of four years for the equipment. The bandwidth is based on current VSAT costs quoted by Hughes Satellite, one of the largest suppliers in India. The office costs are an initial estimate that might include for instance insurance, security, office needs, and a means of local transport.

By far the largest single component is the external bandwidth charges. Yet India has a very extensive optical fibre network which, if it can be tapped into more effectively, has huge potential to bring prices down and bandwidth availability up (see below).

4. Community Contributions

One of the advantages of the community-owned model is that it can take advantage of assets of the community itself, in terms for instance of rights of way, premises, voluntary labour, and so forth. The key assumptions concerning community contributions are as follows:

1. A Hub premises, possibly an existing telecentre, IT training centre or underutilised public building, that will include an area appropriate for public access.
2. A location for the transmission mast, including its footprint (which, depending on the type used and the height, can cover quite a large area).
3. Locations at each of the Institutional Partners for computers, etc., including the possibility in some of public access.

4. Staffing of the Institutional Partners, to the extent that the services generate public access and computer use.

5. Basic maintenance and care of the equipment, which would require some initial training and support from the Technical Manager.

6. Billing and fee collection from the VoIP Service Partners, who would also provide appropriate access for the public to use the services.

7. A voluntary Board of Management.

8. The provision of electricity in all centres except the Hub.

5. Potential Income

The goal, in terms of income for the networks, is to combine a number of different potential sources, thereby spreading the sustainability base and avoiding too much dependence on a single source. The proposed configuration opens up a number of possible sources of income. However, the specific combination and the relative weight of each will vary hugely between different settings, both nationally and internationally.

Among the possibilities for income that have been identified as feasible are the following. Each is considered for its specific applicability and potential in a rural area of India.

1. The network of about 20 computers can be utilised for public use, to access the Internet, word processing, and so forth. The income generated is limited, and some competition might be present from cybercafés (if they exist) and so forth. An income is forecast here of about Indian Rupees (INR/Rs.) 35,000.[5]

2. The network of Institutional Partners would each pay a contribution for their Internet access and local networking and telephony and voice use. This is set at about Rs. 1000 a month.

3. The potential income from VoIP services is more speculative. India is almost unique among developing countries (or any country) in having succeeded in driving down the cost of mobile phone use, and also in having an extensive copper, fixed line network. The cost per minute of mobile phone use in much of Africa and many other countries can be as much as a multiple of five or even ten, as compared to India. Thus the potential to generate income from the VoIP local network is accordingly less.

   The assumption here is that the VoIP phones will have interconnection within the local network itself for free (once the above costs are covered), and that interconnection will be possible to fixed lines both locally and globally at a low cost (perhaps Rs. 0.20). (For this exercise we leave aside the possibility of interconnection with the mobile network.) These services are expected to be developed successively, not all at once, and the viability

[5] 1 US$ = INR 41

of each can be tested. The first services will be very low cost telephony within the network of VoIP handsets themselves, and then to fixed lines locally, nationally, and internationally.

Our set of much simplified, though plausible, additional assumptions, are as follows.[6] The current cost per minute, from fixed line, mobile, or public telephone averages Rs. 0.75 per minute; long-distance to fixed lines averages about Rs. 2.00 per minute, and international is about Rs. 8.00 per minute. If each of the 120 VoIP handsets is used for 100 minutes per day for 30 days of the month, the total usage comes to about 360,000 minutes per month. If local calls within the network or to fixed lines could be sold for Rs. 0.20 per minute, national calls to fixed lines for Rs. 1.00 per minute, and international calls at Rs. 2.00 per minutes, and each is sold in equal volume; a total return of over Rs. 385,000 could be achieved every month. Interconnection costs, at Rs. 0.20 per minute, would amount to about Rs. 90,000 per month, leaving net income of Rs. 295,000 for the micro-entrepreneurs.

Assuming micro-entrepreneurs can each earn Rs. 0.50 average for each minute sold (less for local calls, more for international), their total income would amount to Rs. 180,000 between 120 of them, or about Rs. 1500 each (about US$65) each per month. This would leave a net income to the cooperative of about Rs. 115,000 per month, about US$5000.

4. If income from VoIP telephony is likely to be less than in other developing countries, there is now an opportunity in India to generate income from another source: the Common Services Centres (CSC) programme. Launched by the Department of Information Technology as part of the National E-Governance Plan, this programme is open to all States in India to develop a network of 100,000 rural centres – one for every six census villages – at which citizens can gain access to e-government services. CSCs are seen as the front-end delivery points for government, private and social sector services to rural citizens of India, in an integrated manner. The objective is to develop a platform that can enable government, private and social sector organisations to align their social and commercial goals for the benefit of the rural population in the remotest corners of the country through a combination of IT-based as well as non-IT-based services (Government of India 2006).

The operation of the Centres themselves is to be contracted out to entrepreneurs, who will be able to charge for the services an agreed amount. The local cooperative enterprises described here would be in an ideal position to implement such a programme, connecting in to local needs and offering a positive environment in which such services could be offered. The fact that the charges for government services would be invested back into the community enterprise, instead of channelled into private hands, is an added advantage.

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[6] This is based on the Table 3.12, 'Comparison of BSNL's Present Tariffs of Base Service and Cellular Mobile Service', in Singh (2006), and figures supplied to the author.

It is impossible at this point to estimate realistically the amount of income that could be generated. However, given that the CSCs are intended to create the basis for viable enterprises, as service delivery agents, an income of Rs. 5,000 is the assumption here.[7]

The CSC are intended also to develop private services, on the platform of their e-government offerings. The community-owned model has a staff of three and the capacity among institutional members to develop a wide range of additional services. A number of successful models of community organisations, providing a range of services to villagers, and achieving a degree of sustainability through charging for them, already exist in India (Ó Siochrú and Girard 2005, Annex). We suggest these additional services could raise a further Rs. 5000 per month.

These assumptions yield the following estimate of income for the cooperative enterprise.

Table 4: Estimated Monthly/Annual Income US$

Estimated Monthly/Annual Income US$			
Description	**Units Per month**	**Income US$ per unit**	**Total**
Computer and Internet use			
Service Hours 20 PCs * 6 hours * 25 days c. Rs. 35,000	3,000 hours	0.50	1,500
Institutional Partner fees (15 initially, Rs. 1,000 a month each for network services)	15	45.00	675
Available VoIP minutes			
VoIP 120 handsets*100mins*30 days	360,000	variable	5,000
Other Services			
E-government services (CSCs) Rs. 5,000/month			220
Other services Rs. 5,000 /month			220
TOTAL Monthly			
TOTAL Annual			**91,380**

6. The Business Conclusion

Within the context of the assumptions here, a community-driven network cooperative would not only be sustainable, but would generate a profit to expand and reinvest back into the area. With a capital cost of about US$70,000, annual current costs of about US$80,000, and an annual income of over US$91,000, a plausible case for the sustainability of the model is made if some initial subsidy is available to partly offset the set-up costs.

[7] See http://www.mit.gov.in/vol1rfpcsc.pdf for the template for the official Request for Bids for CSCs that individual Indian States will issue. An example to explain how revenue offsetting works (p.53) suggests a revenue figure of Rs. 3000 per CSC per month. As conceivers of this scheme, the authors have an interest in parties bidding low for expected support, to keep the subsidy low. The figure of Rs. 5000 per month we are using is therefore not unreasonable.

The model relies on a number of key factors: It assumes that significant cost savings can be generated through the provision of community assets. The key variable of costs is the price of bandwidth; and the key income generating variable is the potential of VoIP telephony to undercut existing models.

Of course, one could argue that the assumptions are set at a level that deliberately suggests sustainability. There is some truth in this – a few changes here and there to the model would change the final outcome significantly. However the question is ultimately whether or not these assumptions are plausible. If they are, then the model merits further investigation.

Regulatory and Policy Issues in India

A number of regulatory and policy issues arise in relation to community-owned ICT enterprise and the provision of services including VoIP.

1. Licenses for Local VoIP Networks

The cooperative conceptualised here would provide telephony services to a local area, both within the area and interconnecting outside. At present such a category of license does not exist in India (although private networks can be set up using WiFi). However, the regulator, Telecoms Regulatory Authority of India (TRAI), in 2005 recommended as part of a proposed Unified Licensing Regime that niche area operators, with minimum or no license fees and spectrum charges, be allowed to operate in areas with tele-density of less than 1 percent.

To increase penetration of telecom services in rural, remote, backward areas from telecom point of view, niche operators to be allowed in short distance charging areas (SDCA) with fixed rural tele-density below 1 percent, providing fixed telecom services including multimedia Internet telephony and other IP enabled services only in these SDCAs. These operators shall however, be permitted to use only wireline/fixed wireless networks. Definition of niche operators will be reviewed later (TRAI 2005).

Such areas may be particularly relevant to the low-cost cooperatives model since the competition for services would be relatively weak – though of course the available income is probably also low. Although no specific mention is made of community or cooperative ownership, this recommendation, suitably amended, could form an initial basis for appropriate policy and regulatory change.

Regulation regarding the sale of VoIP services is also relevant. At present, VoIP between computers and from computers to numbers outside India is permitted, but VoIP calls cannot be initiated or terminated on landline and cellular system within India. However, VoIP is widely used in practice and the rules are unenforceable: the policy will undoubtedly change. Furthermore under the proposed Unified Licenses Regime, those receiving a license would have all restrictions on VoIP telephony lifted (InfoDev and ITU).

2. Availability and Access to Optical Fibre

Optical fibre is surprisingly widespread in India, owned by a variety of companies and entities. According to one Ministry of IT official, every village in India is within 25 kilometres of an optical fibre cable (Govind 2004). Thus in principle, the backbone infrastructure already exists to provide high bandwidth at low cost (relative to satellite) to every village. This would greatly enhance the viability of enterprises offering IP-based services in rural villages.

Connecting into them seems to be relatively unproblematic. At the technical level, installing the appropriate termination hardware is routine, and operators are eager to sell. The public operator, Bharat Sanchar Nigam Ltd. (BSNL), charges Rs. 17,000 annually for each 5 kilometres it lays to link to the customer premises, and usage charges for 2 Mbits from BSNL are reported to be Rs. 1200. BSNL and other suppliers, such as the public railway company Railtel, are more than willing to sell and are seeking sources of demand since much of the fibre is underutilised. At least one development-oriented project already purchases BSNL bandwidth to supply a mesh Wifi network serving 32 points.[8]

One obstacle to opening up the fibre to a village cooperative might be around resale, which is currently in a regulatory vacuum. The position of the fibre suppliers is not known here but there is reason to hope they would welcome it. However, currently most public sector owned fibre is lying idle due to lack of demand and the absence of a business model to sell. Only a handful of funded projects are currently exploring the potential of broadband.

There is thus almost unlimited broadband bandwidth, owned by the public sector, running very close to most villages. Its use depends on (1) a large number of communities/projects seeking connectivity, which would reduce the cost towards urban levels, and (2) government policy to encourage the public sector to take a proactive role in stimulating demand through, for instance, very low or zero cost provision.

Clearly, the sustainability of the business model proposed here would be considerably boosted with such a significant fall in the cost of bandwidth. Assuming a distance of 25 kilometres from the nearest fibre, the annual cost of the last mile connection is Rs. 85,000 (about US$3750), and the annual charge for 2 Mbits in either direction of Rs. 144,000 (about US$635), a total of just US$4385. This is less than one tenth of the satellite costs used in the model of US$45,000 for 256 Kbps up and 2 Mbps down. Thus, a cooperative could afford to purchase vastly more external bandwidth, and still make huge savings.

3. The CSC as a Cooperative Model

As noted, the community-owned enterprise could in principle take on the role of Common Service Centres, delivering e-government services to the community. An argument can be made that such an enterprise would be a more effective vehicle than a private commercial

[8] Email message to the author from Parminder Jeet Singh, IT for Change. 27 February 2007.

one to develop and deliver these services. Some of the CSC rhetoric lends support such an approach:

> the CSCs cannot be seen as mere service delivery points in rural India. The CSC is positioned as a Change Agent – that would promote rural entrepreneurship, build rural capacities and livelihoods, enable community participation and collective action for social change (Government of India 2006).

However, the Scheme as it stands clearly has in mind an individual private entrepreneur rather than a collectively-owned entity. At the village level it introduces the concept of a Village Level Entrepreneur (VLE) (loosely analogous to a franchisee), 'to service the rural consumer in a cluster of 5-6 villages.'

The VLE is the key to the success of the CSC operations. While content and services are important, it is the VLE's entrepreneurial ability that would ensure CSC sustainability. A good VLE is expected to have some financial strength, entrepreneurial ability, strong social commitment as well as respect within the community. The quality of service at the CSCs would depend a great deal on the quality of VLEs. Selection and proper training of the VLE, therefore would play a vital role in making the CSC Scheme a success (Government of India 2006).

Thus a case can be made to supplement the programme with features that would positively encourage community-owned entities to take the CSC role.

Conclusion

The race is on.

Someone is going to take advantage of the potential of low cost IP-based networks, carrying voice and data. The question is: Where will most of the benefits go?

Private-sector led development, already taking off in Kenya and on the brink elsewhere, will bring tariffs costs and may even challenge the dominance of the mobile operators. Lower tariffs will bring benefits to rural communities.

But going down the route of *community-owned network cooperatives* promises much greater gains for communities and for development. Community enterprises retain all the profits and much of the local expenditure within the area; they build capacities at the technical level but also in terms of enterprise development at micro and macro levels; they generate worthwhile employment within the area; they maximise the ICT benefits through developing services that they really need; and they contribute to wider development by building a focus for broader empowerment and development actions.

This is what ICT empowerment is about.

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3. Aspects of India's Engineered Traverse to an Information Society

C.P. Chandrasekhar

This paper is concerned with the transformation of India into an information society driven by the diffusion in use of information technology. In particular it examines the impact of policies aimed at using the technology as an interface between the government and citizens, between businesses, and between businesses and their customers, with attendant gains in terms of reduced transaction costs, higher productivity, and improvements in the quality of life. It suggests that that the evolving National e-Governance Programme has features that make it substantially a top-down initiative and notes that implementing the programme in haste may result in an excessive focus on hardware roll-out and outcomes that central coordination of a project implemented in decentralised fashion is specifically meant to avoid.

Ambiguity surrounds the notion of an information society. At its most abstract it would refer to a post-industrial phase of development in which the structure of an economy, measured by sectoral gross domestic product (GDP) or employment shares, has shifted in favour of the knowledge and information[1] sectors such as education, research and development, mass media, information technologies, and information services. This is not the situation in the Indian economy, even though services account for more than 50 percent of the country's GDP. Since India is the focus of this paper, the term information society would be used in its more rudimentary form, referring to a type of society in which information and information access play a central role, economically, socially, and individually, and the growth of communication networks facilitate the rapid exchange of information.

The use of the latter definition of the information society, however, does bias the discussion towards one kind of diffusion of information technology: the *diffusion in use* as opposed to the *diffusion of supply*. Developing countries the world over have made the widespread use of Information and Communication Technologies (ICTs) a central feature of their development agenda. To that end, they have devised policies aimed at promoting the use of information technology for development; radically altered their communications policies;

[1] For the purposes of this discussion I go along with Castells in accepting Porat's definition of Information as being "data that have been organized and communicated", and Bells definition of Knowledge as "a set of organized statements of facts or ideas, presenting a reasoned judgment or an experimental result, which is transmitted to others through some communication medium in some systematic form" (Castells 1996, 17).

massively invested in strengthening and extending their ICT infrastructure; and launched numerous e-governance initiatives. Conviction that ICT use can accelerate the pace and improve the quality of development is strong.

As is well known, among developing countries India is a case where the diffusion of supply of not merely of information technology hardware but also of software and information services has also been rapid. Policies in the form of creating and facilitating the private provision of information technology infrastructure, of improving access to cheaper imported equipment and software tools, and of supporting profitability through tax breaks and benefits have played a crucial role in such diffusion of supply, even though there is a misconception that the growth of the information technology (IT) industry has been completely independent of the government. However, those policies are not the concern of this paper. Rather it is concerned with policies aimed at diffusing the use of ICTs, so as ensure easier and more rapid access to information.

This would allow for the use of the technology as an interface between the government and citizens, between businesses, and between businesses and their customers, with attendant gains in terms of reduced transaction costs, higher productivity, better information access, and improved quality of life indicators. The realisation of these potential gains from ICT requires of course, the rather widespread diffusion of the technology through a vertical, multi-level process that delivers access to the technology to all sectors, communities, and individuals.

As has been repeatedly stressed, there are many routes through which the diffusion in use of information technology can impact human development once access to the technology is provided to people, independent of their social and economic standing, and to decision-makers concerned with furthering human development goals. It may be useful to refer to a few.[2]

To start with, the technology and product offshoots of the phenomenon can directly contribute to the creation of new productive employment. Many new products generated by the technology, such as cellular telephones, personal digital assistants (PDAs), and forms of digital infotainment do not displace existing products and jobs but create new ones, releasing new demands because of the felt needs they cater to. The production and distribution of such products obviously create new employment opportunities, and thereby improve economic well-being.

The second way in which ICT use can improve the quality of life is through its productivity enhancing and cost reducing effects that increase the returns accruing to small and medium producers from productive activity. The use of ICT devices in the management of operations of commercial and non-commercial projects also helps ensure transparency, efficiency, and fairness that can have significant implications for the underprivileged.

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[2] For a more detailed discussion on this refer Chandrasekhar & Kumar (2004).

The third way in which ICTs can contribute to improved welfare is to provide access to information as well as help impart skills and develop capabilities. There is no overstating of the value of information that has a significant economic content, e.g. real-time information on prices, weather, and pests; advice on agricultural technology, water use, soil management, livestock management, and livestock diseases (agricultural extension); and availability and conditions of bank credit, micro-credit, and governmental grants and subsidies. In the social domain, health-related information is particularly valuable.

Fourth, ICTs can be used for skill and capability development, with significant effect, through measures like distance education that use innovative ways of conveying ideas in a multimedia format.

Fifth, ICTs can be used for better and more widespread provision of social services such as education and health. Tele-health programmes have many components, such as tele-consultation, mass customised/personalised health information provision, and education and continuing medical education.

Finally, ICTs allow the Government and civil society organisations (CSOs) to obtain, collate, store, and analyse information in ways that improve decision making and facilitate implementation of policies that improve the quality of life of the people at large and the disadvantaged in particular.

Recognising these benefits, the government, business, and various civil society organisations have made progress towards an information society as an immediate goal to be pursued, even though many development goals such as complete literacy, universal schooling, and access to basic health and sanitation facilities have yet to be realised in India. In fact, in the perception of many of these actors, realisation of these development goals would be facilitated and accelerated by the traverse to an information society.

There are many components of the strategy being elaborated to ensure the diffusion in the use of information technology to realise the final goal of a networked society. These include: (i) making available information technology hardware at dispersed locations; (ii) ensuring the availability of hardware in government departments responsible for collating and providing information and delivering services; (iii) building networks of such computers; (iv) ensuring connectivity that links these networks to each other and the Internet; (v) digitising information needed for use of the technology; (vi) devising systems that harness the benefits of the technology for service delivery; (vii) creating new user-friendly and useful content; and (viii) increasing computer literacy.

The government has, as it must for success, clearly taken the lead in this mammoth task. In recent years, a range of policies for accelerated diffusion of IT in use have been formulated by the government. A National Task Force on IT and software development was set up in the Prime Minister's office in May 1998.[3] The Task Force made significant recommendations

[3] Reports prepared by the Task Force are available at http://it-taskforce.nic.in/.

in three information society-related areas, among others. These were: IT in government; IT spread and IT awareness; and Citizen-IT interface. With regard to IT in government, the Task Force recommended complete computerisation (up to viable limits) of government in five years. The objective of such computerisation was to reach service delivery as close to the citizen as possible, with minimal intermediation and at affordable cost. The argument was that unless computerisation progressed significantly in government, it could not spread adequately outside. To that end, it recommended that 2 percent of the budget in every government department should be earmarked for the introduction and use of information technology, including training.

In the area of IT spread and awareness, the Task Force, besides recommending reaching computers and the Internet to every school and college within five years, called upon the government to launch a range of value-added network services. The committee argued:

> While providing delivery of services, use of a variety of technologies and solutions could be explored. These could include home-based computers, ATMs, electronic kiosks, telephones, smart cards, etc. Such networks could substantially promote government's efforts to provide a 'one-stop non-stop' interface with the public. (Government of India, National Task Force on Information Technology and Software Development 1998).

The Task Force also felt that for at least about two decades it would not be possible to provide either telephones or Internet or other information services universally, i.e. to more than 90 percent of households, since many would not be able to afford private subscriptions. It, therefore, recommended that these should be made available on a public access basis, just as long distance services were then available through STD/ISD booths. Since there were more than 600,000 of these booths, with half of them located in villages, it suggested that as many of these as possible should be converted into Public Tele-info Centres.

Finally, the committee called for use of the Freedom of Information Act to make available all official databases online to intensify democracy and increase transparency.

Subsequently, as a follow-up to the work of the Committee, the government set up a Working Group on Information Technology for Masses, on 10 May 2000 (Government of India, Ministry of Information Technology n.d.), The Working Group was mandated to: (i) review various schemes and major initiatives taken by various government agencies for taking IT to the masses; (ii) identify potential areas and applications for deployment of IT for the masses; (iii) recommend development schemes/programmes for citizen participation for taking IT to the masses; and (iv) prepare a comprehensive plan for taking IT to the masses.

The Working Group examined four areas: Infrastructure and Services, Electronic Governance, Education, and Mass Campaign for IT Awareness and came up with a range of detailed recommendations in keeping with the thinking outlined earlier. Thus, it is clear that at least at the level of policy formulation and statement, the traverse to an information society had begun to be incorporated into the policy framework of the government almost a decade back. Further, there was a substantial degree of recognition of the constraints to ensuring

the reach of ICT to the extent needed for it to be a major instrument of development, so that policy did take account of the need for reducing costs and mobilising resources. However, a decisive thrust towards implementing the transition is indeed quite recent.

The National E-Governance Plan (NeGP)

Even if not always stated explicitly, the presumption underlying government policy seems to be that diffusion in use would be driven by a State-led e-governance plan. The idea seems to be that once a host of information and services falling in the government-to-citizen domain is provided through digital communication, the demand for e-literacy and the offtake of e-services are bound to rise. This then would provide the vehicle for the delivery of other services by the private sector and civil society organisations, which may launch experiments of their own, but would not be able substitute the government in driving the diffusion of IT use. However, as has been emphasised elsewhere, e-governance does not merely consist of the online provision of government services (IT for Change, 2008).

In its entirety, the National e-Governance Plan (NeGP) is a mammoth project involving multiple governments, multiple departments, multiple agencies, and multiple stakeholders and players. Announced on 15 August 2002, and having received initial cabinet approval around a year later, the plan gathered momentum when the government approved the NeGP, comprising of 27 Mission Mode Projects (MMPs) and 10 components, on 18 May 2006. The officially stated vision emphasises delivery of services to realise provision of basic needs. It defines the objective of the Plan as being to "Make all government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realise the basic needs of the common man". To this end completed or ongoing initiatives at the central (railways, Directorate General of Foreign Trade, customs, passports and tax) and state (land records, registration, transport, treasury, police, municipalities, etc.) levels are to be integrated into the national plan. But as an official presentation on the issue recognises, while in the developed world the challenge for e-government is building the middleware that gives citizens direct access to a full-fledged network and connecting legacy systems of providers to that network, the problem in India is of building a system from bottom up with work to be done on ensuring access, creating the appropriate middleware, and building the required back ends. While legacy problems would be far less in the Indian case, the task here involves not only a huge coordinated effort but massive investment. While some of this investment (as in the case of the railways, for example) may yield pecuniary returns, it would not in many cases.

Overall, the NeGP envisions a three pillar model for delivery of 'web-enabled Anytime, Anywhere access' to information and services in rural India. These are:

a) Connectivity in the form of National and State Wide Area Networks (SWANs)/ NICNET;

b) Back-ends in the form of a National Data Bank and State Data Centres (SDCs); and

c) Front ends in the form of dispersed Common Services Centres (CSCs).

The other core infrastructure requirements identified by the plan includes:

a) A security Infrastructure and Resource Centre for E-Governance;

b) A national Spatial Data Infrastructure; and

c) A Language Resource Centre.

To this must, of course, be added policies with regard to devolution, standards, systems design, content generation, funding, staffing pattern, and the creation of a management ethos that permits interactivity of a kind that does not reduce the system to a mere passive provider of pre-existing information.

What needs to be noted is that initiatives at the central level have been accompanied by policy initiatives at the level of individual states, financed either out of central, state, or joint funding. At the state level, however, the goal for harnessing IT for development has been combined with (and in some cases overwhelmed by) an emphasis on ensuring diffusion in supply rather than diffusion in use. Initially the concern was with setting up a hardware production infrastructure in the state, resulting in a proliferation of public sector electronics units at the state level. More recently, a growing number of states are attempting to replicate the successes of the states of Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, and New Delhi, among others, in attracting investments in the software services and IT-enabled services areas, to accelerate GDP growth and increase employment opportunities for the educated unemployed. Through provision of land, infrastructure, and tax concessions, states have been vying with each other to garner a share of the IT pie. However, there has also been concern with increasing IT in use, which is often seen as a trigger for diffusion of IT supply. But many of these have been spurred by programmes launched by and supported from the centre. In the decentralisation and devolution inevitable in a quasi-federal structure, the roll-out of the national e-governance platform has been characterised by elements of duplication and inadequate integration of initiatives across states and between the states and the centre.

It must be recognised that creating an e-governance system of this kind cannot be a short-term venture but must involve a prolonged roll-out. There are many reasons that this must be the case. To start with, since there are conflicting financing priorities before the government, at no single point in time can the draft on resources for e-governance be such that it becomes subject to the criticism that it is being implemented at the expense of developmentally more significant programmes. Second, very often the basic information that is sought to be collected, collated, and digitised needs to be cleaned and verified. Digitising customs records or passport offices may be easy. But, in a situation where the perception is that land records in many states are in disarray, it is indeed surprising that the

digitisation of land records is proceeding apace. Third, as has been repeatedly stressed, there are many prerequisites, other than mere access to technology, needed for citizen access. While IT may be put to use to increase literacy and improve school education, its role as an enabling device to deliver a host of other outcomes may be predicated on increased literacy and universal schooling. The success of a technology depends not just on its potential but on how circumstances and the environment facilitate its adoption and use. It may therefore be necessary to first ensure that circumstances and the environment are appropriate to substantially exploit the potential of a technology. Staggering the introduction or diffusion of the technology may ensure that the utilisation of the technology may be much better and more effective. Finally, developing integrated cost reducing standards and relying on open source software may require research and development, training, and time. Rushing to implement a mammoth project of this kind can result in it being vendor-driven.

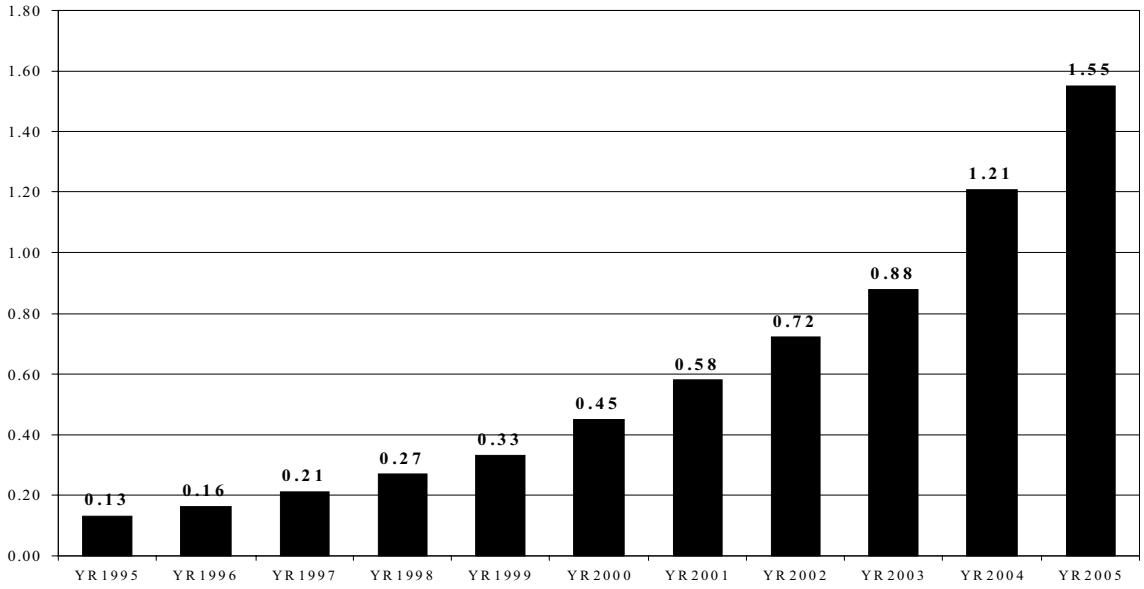
All of these and many other similar difficulties are not without their solutions. But even when such solutions have been experimented with in pilot form, scaling them could take time. This calls for some caution in the pace of roll-out. And when the roll-out has to be paced, appropriate sequencing and inter-temporal integration add to problems of spatial integration. This requires a clear roll-out plan. Unfortunately the official slogan 'Think big, start small, and scale fast' does not make clear the inter-temporal roll-out trajectory being chosen by the government.

What is also crucial to recognise is that the inadequacy of hardware presence required to support the move to the information society does imply that there is a component of the total plan, demanding a large share of resources, which can easily be pursued. Vendors exist who can supply the equipment and offer systems design support. But this can lead to multiple standards and systems, especially if individual state governments exercise choices of their own.

Ensuring Dispersed Availability of Hardware

Viewed in terms of the mere spread of computer access, the spread of information technology across the country has, it appears, been limited. Starting from a low base of around 1computer per 800 persons in the population in 1995, the figure had indeed climbed to exceed 1 computer for every 100 persons in the population by 2004 and stood at 1.6 computers per 100 people in 2006. However, since this average figure is bound to conceal a substantial degree of urban, corporate, and income-wise concentration, the spread of computer access is likely to be substantially limited.

Chart 1: Personal Computers (per 100 people)



Source: International Telecommunications Union, *World Telecommunications/ICT Indicators*, Digital Database.

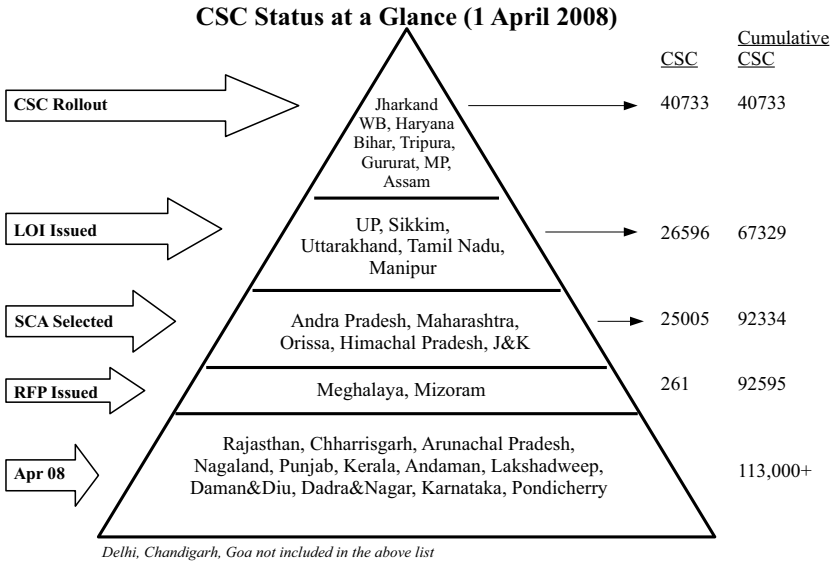
To bridge this digital divide, the government has been focusing on increasing physical access to computers connected to the Internet. This thrust received a fillip through the 2005 policy initiative to establish a hundred thousand rural CSCs – broadband-enabled computer kiosks that will offer a range of government-to-citizen and business-to-customer services, besides providing sheer access to the Internet.

The initiative is based on an entrepreneurship model involving private-public partnerships aimed at generating self-sustaining units, operated by Village Level Entrepreneurs (VLEs), each catering to five to six villages. The emphasis on entrepreneurship notwithstanding, the roll-out of the CSCs would be supported with government grants. Further, since a VLE on his own is unlikely to have either the managerial or technical skills to sustain a CSC and to continuously identify and support various services needed by the local community, an entity at a tier above the village entrepreneur – the Service Centre Agency (SCA) – is envisaged that would provide business and technical support to this activity. This entity is expected to typically support 200 to 500 CSCs in a district or section of a state. In addition there is a state designated agency (SDA) to oversee the implementation of the programme across the whole state.

The CSCs, which are expected to begin servicing all of India's 600,000 villages in the not-too-distant future, was originally estimated to cost Rs. 5742 crore, of which the Central and State governments were to outlay Rs. 856 crore and Rs. 793 crore, respectively, with the remaining Rs. 4093 crore expected to come from the private sector. With the economic

viability of these service centres uncertain, the offtake of the scheme has been uneven, with the performance being bad especially in the poorest regions. As a result, despite efforts to accelerate implementation, this programme has missed its original deadline of March 2008 and will remain incomplete for many years to come. But to the extent it is successful (Chart 2), it does amount to a major step forward from the supply side, to help rural India exploit whatever potential the Internet holds in the Indian context.

Chart 2: CSC Status at a Glance



Source: Government of India, Ministry of Information Technology, http://www.mit.gov.in/download/cscpyramid010408.pdf.

It hardly bears stating that this is primarily a front-end hardware plan. But its success (including commercial viability) would depend on the degree to which supportive hardware and software infrastructure is put in place along with the roll-out of the CSCs. The government has been attempting to ensure a degree of integration in tandem with the roll-out of the CSCs. To exploit any economies of scale in the identification, customisation, and implementation of the physical and digital infrastructure required for the project, and to aggregate at the national level many of the requirements (content provision, for example) of potential citizen-centric services, the Department of Information Technology has decided to create a National Level Service Agency. Between the Service Centre Agency and the National Service Agency is an appropriate state-level institution.

The Connectivity Push

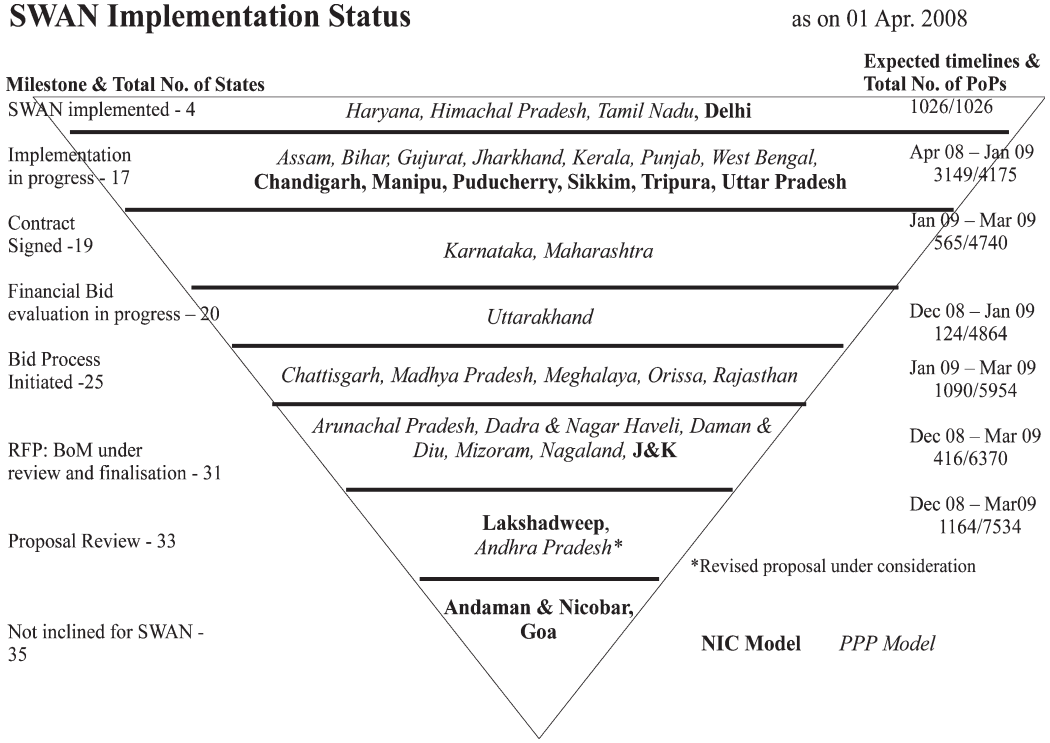
The issue of course is that a substantial part of the supportive infrastructure is also hardware-based. One factor driving the push for diffusion in use of information technology is the increase in the availability and fall in the costs of connectivity. India's communications infrastructure is still limited in size and spread, and though it is witnessing rapid growth in recent times, that growth is much less than in a country like China, which has the wherewithal to undertake huge public investments. But it appears that there is enough to go around and at relatively low cost. The view seems to be that if the government can exploit the opportunity, diffusion in use can expand substantially.

This perception has substantially accelerated the roll-out of national and state-wide networks. States are now required to and are being supported to establish a state-wide area network (SWAN) down to the block level with a minimum of 2 Mbps connectivity. The Department of Information Technology is providing funds on a 100 percent grant basis to cover the establishment, operation and maintenance of SWAN for a period of 5 years. Implementation is to occur through a state chosen public-private partnership model or through the choice of NIC as the principal implementation agency.

With funds available on a grant basis the roll-out has begun and progressed in most states. As shown in the Chart 3, monitoring of progress is close and available in the public domain. Thus this is an area where supportive infrastructure is being created to support the CSCs. The Department of IT has issued directives to the state governments to meet the connectivity requirements of the CSCs, through the SWAN from the nearest block headquarters level Point-of-Presence (PoP) through appropriate wireless/terrestrial connectivity. Usage of SWAN by the CSCs would be free-of-cost for the first five years, though the cost of any terminal equipment and Internet Service Protocol (ISP) charges would be borne by the SCA/VLE.

Connectivity is of course a requirement. But there is a catch. Even if physical access to working computers and connectivity in the form of communications links are established, there is no guarantee this will actually connect India's villagers to the information-rich, interactive world offered by the network. The principal bottlenecks to effective use may lie elsewhere: illiteracy, e-illiteracy, efficacy, and, since the private sector is to be involved, costs. Unfortunately evidence to assess this is not available. But information from the parallel world of the Internet is illustrative.

Chart 3: SWAN Implementation Status



Source: Government of India, Ministry of Information Technology, http://www.mit.gov.in/download/SStatus010408_v2.pdf.

How Much of India is Online

When compared even with the current spread of computing and the Internet, usage in the country appears still limited, despite huge variations in available estimates of the number of Internet users. According to Computer Industry Almanac Inc. (CIAI), an Internet consultancy, India ranked fourth in 2006 (after USA, China, and Japan) in terms of the absolute number of Internet users. CIAI places the number of Internet users in these four countries at 206 million, 123 million, 86 million, and 51 million, respectively. In most cases CIAI's figures are drawn from the International Telecommunications Union (ITU), which collates official data drawn largely from national governments. Thus, going by this respectable source, India is indeed significantly online when compared with the rest of the world. In fact, *Internet World Stats: Usage and Population Statistics*,[4] a data warehouse on the Internet, places the number of Internet users in India in June 2007 at 42 million (compared with 211 million for the US, 162 million for China, and 86 million for Japan).

[4] http://www.internetworldstats.com/top20.htm

The problem, of course, is the limited penetration these high figures imply in relation to India's population. Even if we go by *Internet World Stats*, Internet penetration of the population in India amounts to 3.7 percent, as compared with 69.7 percent in the US, 67.1 percent in Japan, and 12.3 percent in China. This would still give cause for comfort, but for the fact that numbers yielded by independent surveys being conducted in India point to widely varying figures.

For example, two divergent figures have emerged from two such independent surveys. One titled *Internet in India*, (Internet and Mobile Association of India (IAMAI) and Indian Market Research Bureau (IMRB) 2007) conducted jointly by the Internet and Mobile Association of India and IMRB International, has reported that the number of Internet users in *urban* India[5] in September 2007 stood at 46 million, up from less than 5 million in 2000, 16.4 million in 2004 and 32 million in 2006. The 2006 urban users figure of 32 million compares with the 60 million national figure quoted by the ITU for the end of 2005. But if that were the explanation for the difference between the two figures, then India's rural-urban digital divide seems minor – a conjecture that flies in the face of a host of other evidence on the matter.

Another agency that has been tracking Internet use for a number of years now, based on a much larger sample, is the National Readerships Studies Council (NRSC). An autonomous division of the Audit Bureau of Circulation, NRSC (2006) conducts the National Readership Study (NRS), which also tracks media habits of different kinds including Internet usage.

The figures on Internet usage yielded by different rounds of the NRS point to a much lower level of usage and a more modest rate of growth. Its 2006 survey estimates that the number of individuals who accessed the Internet in the three months preceding the date of the survey stood at 13 million, having increased marginally from 10.8 million in 2005. What is noteworthy is that of these 13 million users, only 1.8 million lived in rural areas. Not only are the estimated number of users about a fifth of that cited by the ITU and the estimated rates of growth in usage much lower, but the rural-urban digital divide appears to be extremely sharp, especially when compared to the relative populations of the two sectors. Further, while the growth in the number of Internet users in urban India was 35 percent over the previous year, the number of users in rural India seems to have stagnated.

It is by no means clear what accounts for these sharp differences in the estimates. One reason is of course the reference period used. While the ITU defines an Internet user as a person with access to the worldwide network, without specifying when and for how long she needs to have used it, the NRS specifically identifies those who have accessed the Internet at some point during the previous three months. In fact, the NRS also provides estimates of those who accessed the net in the previous week, which stood at 9.5 million as opposed to the 13 million who accessed the net at some point in the previous three months. As is to be expected, the shorter the reference period, the smaller the number of users.

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[5] The IAMAI-IMRB survey covers 65,000 individuals across 30 cities.

However, the IMRB survey makes a distinction between 'active users', who used the Internet at least once in the 30 days preceding the date of survey, and 'ever users'. According to its estimates, the number of active users in urban India stood at 25 million in September, up from 21.1 million in March. These figures too are way above those yielded by the NRS.[6]

In sum, we have no clear idea about the number of Internet users in the country and their extent of use of the medium. But domestic sources seem to suggest extremely limited usage despite the communications transformation the country is seeing. Part of the reason must be that prerequisites other than hardware for the use of the information-rich Internet are lacking.

Moreover, users are geographically extremely concentrated. NRS (NRSC 2006) figures indicate that besides the urban concentration noted earlier, there is a high degree of geographical concentration even among urban Internet users. A little more than 40 percent of all users were located in the top 8 metros, while another 18 percent were located in other metros/ state capitals, with smaller towns accounting for the remaining. Reaching e-governance to those who need it most may be more difficult to achieve than envisaged. Interestingly, however, while towns with a population of 5-10 lakh and 2-5 lakh accounted for 7.1 percent and 5.4 percent of Internet users, respectively, those with populations 2 lakh and less were home to 12.2 percent. That is, these are signs of some diffusion of Internet use among smaller Indian towns, providing a glimmer of hope to those who see in an opportunity in the new technology.

Such signs of diffusion at the 'lower-end' of the user spectrum are visible elsewhere as well, as in the figures on the place of access. While 30 percent of users accessed the Internet from their homes, 19 percent had access from their place of work, and another 16 percent from their place of study. What is noteworthy was that 32 percent accessed the net through cybercafés. This lends credence to the view that the creation of common service centres and conversion of public call offices and STD/ISD booths, that are indeed ubiquitous across India now, into Internet kiosks could help expand Internet use over time.

This picture of a combination of extreme concentration at the top accompanied by a more diffused access to the technology among users at the 'lower-end' is supported by figures on the distribution of users in terms of hours of usage. Those who had used the Internet for 5

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[6] The problem in India relates not just to the Internet but to the IT sector as a whole, information on which comes largely from interested sources supported by the private sector. This is a major lacuna. China, a country of similar proportion, has for many years now been conducting regular six monthly surveys of Internet usage. The surveys are conducted by the China Internet Network Information Centre (CNNIC at http://www.cnnic.net.cn), which is a not-for-profit organisation under the Ministry of Information Industry administered by the Chinese Academy of Social Sciences. Independence from the industry and a degree of autonomy make this a credible source of information. Definitions are clear and much more stringent: CNNIC defines an Internet user as one who uses the Internet at least one hour per week. It runs a professional survey that is transparent. Even though some may argue that the Chinese government's interest in the Internet is political, this is definitely a model for statistical purposes. India, too, needs to create a state-sponsored autonomous body to track both Internet usage and the information technology industry.

hours or more in a week accounted for 32.2 percent of the total of Internet users, whereas those who used it for one hour or less accounted for as much as 42 percent. That is, there were a large number of users who were using the net to a limited extent, principally for email and restricted surfing. It is likely that this large chunk of low-frequency users belonging to the 'lower-end' of the user spectrum restricted the use of the technology to what were seen as absolutely necessary operations. That is, the Internet is not just concentrated among those who surf the net for entertainment, besides information and communication. It shows signs of diffusion among those whose usage pattern suggests that their use is much more purposeful, even if limited in terms of time.

These features of access are captured in aggregate indices such as network- or e-readiness. The network readiness index computed by the World Economic Forum (2008) is defined as "the potential and degree of preparation of a community to participate in the networked world, participate in and benefit from the ICT development". In its 2007-08 rankings India was placed at 50 among 127 countries (down from 44 among 122), being ranked below a number of developing countries like Singapore, Korea, Taiwan, Malaysia, and Thailand.

Other Experiences with Connectivity

There are many who argued that the entry of private operators made possible by the implementation of the National Telecom Policy statements of 1994 and 1999 promises acceleration in telecommunications infrastructure growth based on private initiative. This view was influenced by the experience with television penetration, driven in significant measure by private investment. Until 1991, the spread of even television in India was limited, with broadcasting reach ensured by the much lower cost radio. Television programming, delivered through terrestrial channels, was dominated by the state-owned Doordarshan. A combination of factors such as the Government's decision to relax availability of television sets in time for the Asian Games in the early 1980s, the availability of a number of free-to-air private channels in English and the Indian languages beamed out of foreign locations such as Hong Kong and Singapore, and the rapid and unregulated growth of local cable operators, helped increase the demand for and reach of television. Yet the progress achieved must not be overstated. In 2002, 32 percent of homes in the country had television receivers. In 2001, only 31.5 percent of rural Indians and 74.1 percent of urban Indians had access through home-based or community TV sets to Doordarshan's network. Figures on cable television access in 1999 indicated that less than 10 percent of rural India's television viewers had access to cable television and the percentage of rural homes with cable television was less than 1 percent. In urban areas figures for cable television access varied from 10 to 50 percent depending on location (Franda 2002, 107). More recent data from the NRS 2006 indicates that 51 percent of households in the country owned a television set and 28 percent had access to cable/DTH television.

In the case of ICT, since connectivity is a core element of the new technology, a simple measure used to assess the degree of such diffusion is tele-density, or the number of telephones per hundred inhabitants in the country. Going by that measure, there is evidence that suggests

that India may be on track to realise the required degree of diffusion even if at a slow (but accelerating) pace. As the increasingly ubiquitous cellphone suggests, over the last few years many, though not most, Indians have indeed been connected in ways they had not imagined before.

Telephone density had touched 18.72 per 100 inhabitants as on 30 April 2007, compared with only 1.39 at the end of March 1994, when the shift to a new, more liberal telecom policy began. Mobile phones that hardly existed a decade back account for more than 80 percent of that capacity. The pace of change suggests that the process is only gaining in dynamism. Tele-density increased from 2.86 lines per 100 people on 31 March 2000, to 5 per 100 as on 31 March 2003, 12.76 as on 31 March 2006, and 18.72 at the end of April 2007.

This growth in connectivity is expected to substantially increase interactive communication between distant centres, permit improved governance through the more efficient delivery of information and a range of social services in rural areas, as well as expand access to the Internet and the benefits it can provide. Assuming that the government is able to put in place the IT infrastructure needed to exploit the benefits of such connectivity, it is argued, the country seems to be well on its way to realising its goal of delivering IT to the masses, to supplement the benefits from the autonomous growth of IT use in the urban areas epitomised by the burgeoning revenues from the 'production' and export of IT-enabled and software services.

The difficulty is that a closer examination of the data suggests that aggregate tele-density may not be a good measure of the extent of diffusion. To start with, the aggregate figure conceals the low penetration of telecommunications capacity and a high degree of urban and regional concentration. Tele-density in rural India stood at 1.5 at the end of March 2003, when urban tele-density was placed at 14.3. By the end of December 2005, urban tele-density had risen to 34.8, whereas rural tele-density had gone up to just 1.8. Further, inter-regional variations were also substantial. As on 31 December 2004 while total tele-density in the state of Delhi was 50.2, that in Bihar was as low as 2.0. Overall, the picture is indeed one of a digital divide driven by asset and income inequalities, such that there are a few at the top who are connected while the majority, preponderantly in rural areas, are marginalised from the communications network.

Further, India does not measure up well in terms of other measures of connectivity. To start with, as of now data connectivity through mobile phones is limited. On the other hand, India still lags far being many other developing countries in terms of the bandwidth (or the pipe) necessary for people to simultaneously access information flow through the Internet. The ITU (2008) estimates bandwidth availability per inhabitant in India in 2006 at 24 bits per second, as compared with 1037 in South Korea, 12,946 in Hong Kong, 194 in China, and 3,294,000 in France. The total number of fixed line Internet subscribers per 100 inhabitants stood at 1.13 in India, as compared with 52.78 in Singapore, 29.27 in South Korea, 38.54 in Hong Kong, 5.84 in China, 25.12 in France, and 27.7 in the UK. Of these broadband

subscribers per 100 inhabitants stood at 0.21, 18.19, 29.27, 25.24, 3.85, and 21.71, respectively. India does not feature even in the top 20 countries in terms of number of broadband subscribers.

However, this point should not be belaboured because there exists the possibility that large scale investment in infrastructure such as bandwidth can result in mere unutilised capacity. In fact the experience in many other parts of the world, including in the developed industrial countries, has been that the expected demand for bandwidth has not materialised. While in India this has not yet resulted in bankruptcies among private operators, it has indeed meant that "thousands of kilometres of buried optical fibre cables remain unlit, and a few are used as one would use copper wires for mere telephony" (Arunachalam et al. 2004, n.p).

The Evidence on Diffusion in Use

In sum, the use of information technology is indeed still extremely limited in India, and diffusion of the benefits of IT that can make a difference to the quality of life must wait, but there are signs of change. Besides being concentrated among a set of top-end users, the technology does seem to be in the process of diffusion among a set of lower-end, low-frequency users.

As of now, the nature of diffusion of Internet technology suggests that there are two routes through which the technology can impact on the quality of life. Elite users, who use the technology to share information and analysis in crucial areas such as the environment, health, corporate practices, and labour conditions, can debate, develop, and contribute to creating international best practice standards in the relevant area. These can provide the basis for national policy and for mobilisation of public opinion, nationally and internationally, to change policy regimes. This would be the top-down, trickle-down means for the technology to influence human development. The other route would be for the technology to be diffused, leading to use by and participation of the relatively disadvantaged in the formulation and implementation of policies, as well to the direct provision of improved services that affect the quality of their lives. This is the more democratic face of the technology and the best manner in which it can be used to advance human development goals. Unfortunately, the current extent and pattern of diffusion of the technology in the country is such that it is the first of these that overwhelmingly predominates and is likely to continue to do so in the foreseeable future.

The government's e-governance programme with the CSCs as its vehicle seems to suggest that it wants to promote the second route. But to do so successfully, it must know where the technology stands, what its rate of diffusion is, and what determines the pace of diffusion. The minimum requirement for that is credible information. When armed with that, it may find that the solution to the digital divide lies not principally in increasing hardware access but in some other area, such as education. That could change priorities, save money, and deliver better results.

Explaining Poor Offtake

It has been argued that slow offtake partly points to the needs to recast information solutions, so as to ensure diffusion and access. Examples of such efforts are those directed at developing software in national and local languages so as to overcome the barrier that language creates, develop content which appropriately exploits the interactive, textual and visual information transmission capabilities, or harness the technology for ensuring effective and cost efficient service delivery. There are many experiments in these and similar areas. Some of them are reportedly quite successful as, for example, the eKrishi programme in Kerala, the Dristi programme in Bengal and the one coordinated by Abhiyan in Gujarat.[7] But many others are in the nature of pilot projects undertaken by a variety of institutions ranging from government bodies to NGOs and private sector firms. Quite a few are of recent origin and there is not much information on their financial profile, their sustainability, or their actual impact. Unless the success and sustainability of these experiments are assessed and the lessons assimilated into efforts to scale up the use of IT, the information society thrust of the government may deliver more unutilised capacity than improved and fair development.

The Case for Caution

This strengthens the case for caution in the pace of roll-out. An interesting development in this connection is the view expressed by the National Knowledge Commission (NKC) that there is much else that is of significance in the e-governance realm than the technology itself. In its view, "e-governance is more about an opportunity for administrative reforms than merely about electronics and information technology and infrastructure". Based on its consultations the Commission seems to have concluded that the government's current e-governance thrust is primarily based on computerising age-old processes left behind by colonialism and subsequently compounded by new layers added on by a post-Independence Indian bureaucracy working within departmental boundaries. This, in its view, amounts to computerising cumbersome processes with limited benefit, since it merely adds an additional layer of expense, complexity, delay, and confusion.

It therefore calls for a an initial step of redesigning of government processes to drastically reduce the number and duration of successive steps required to obtain services, as well as efforts to provide traceable records, improve delivery, and ensure transparency of policies and processes. A concomitant of this view is the perception that it is necessary to unfold e-governance in stages. The exercise should begin by identifying and simplifying a small set (10 to 20) of processes and services, such as the provision of birth certificates, death certificates, proofs of residence, and ration/ID cards. These are services that are currently cumbersome to access and prone to unnecessary delays and even corruption. These in the NKC's view should be processes that are simplified and made available as web-based services and other services added on the basis of that experience.

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[7] See in this connection ICTD (2006) regarding Abhiyan in Gujarat and ICTD (2007) regarding Dristi in West Bengal and eKrishi in Kerala.

This staggered roll-out can help integration across states, since they would be required to implement the same processes in concert and learn from each other. The problem when states implement their e-governance according to their own chosen patterns and processes is that programmes are prone to being vendor-driven and non-scalable. There is no effort to develop common standards, templates, and data formats using the best talent available, at a cost that would be much lower when not duplicated. This is not to say that there is not much of worth that has been done so far. It is to emphasise the fact that the whole process can be made more cost effective and quality intensive by choosing the best of what is available and pushing developments that fill gaps in integrated fashion. This is particularly necessary to ensure cost effective open source software and standards. In the drive by some states successful on the software supply front to collaborate with global software leaders, there is a danger that inadequate attention would be devoted to open source software development using the talent that is obviously available in the country.

Integration and planned development will also ensure that e-governance developments take place in areas that are in keeping with other parallel development efforts and where their externalities are bound to be substantial. Here again the suggestion of the NKC is well taken that development programmes such as the National Rural Employment Guarantee Scheme, Bharat Nirman, Jawaharlal Nehru National Urban Renewal Mission (JNNURM) etc., on which the government plans to outlay thousands of crores of rupees should begin with well-engineered e-governance initiatives that can ensure speedy and effective delivery and better monitoring . Finally, e-governance initiatives should be engineered from the beginning to make the Right to Information Act meaningful in a 'prior' sense and not merely a system that allows provision of information when demanded.

Concluding Remarks

Signs of the necessary devolution and decentralisation of implementation in a quasi-federal structure notwithstanding, it is worth noting that the evolving NeGP programme has features that make it substantially a top-down initiative. This is inevitable when trying to build a common, standardised, inter-operable framework for the transition to an information society in a large, diverse, and quasi-federal country. But political structures being what they are, the ability to implement such a programme stems from the willingness of the centre to provide up front much of the money for the initiative. What needs to be noted is that implementing the programme in haste and one go may result in an excessive focus on hardware roll-out which has as its concomitant the emergence of platform features that central coordination of a project implemented in decentralised fashion is specifically meant to avoid.

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4. Cake for the North and Crumbs for the South? Challenging the Dominant Information Society Paradigm

Anita Gurumurthy & Parminder Jeet Singh

With its neo-liberal agenda and market-centred approach, the dominant discourse of Information and Communication Technology for Development (ICTD) has yet to build an information society paradigm that harnesses these technologies for the goals of development and gender equality. This paper deconstructs the debates between old and new ICTs, as well as between the benefits of mobile telephony versus computer-Internet infrastructure, to make the case for a political economy analysis of gender, development, and ICTs. Through such an understanding of the structural changes wrought by the new ICTs, gender advocates and development actors alike may engage with policy making to fill the existing vacuum in the arena of ICTD, and thus realise the transformative potential of the information society.

This paper was originally written for a seminar on 'Mapping Gender in the Information Society: From Reality to Discourse' in 2005. We are reproducing the paper with a few changes, since the propositions presented in this paper have stood the test of time – a relatively difficult thing to achieve in the fast changing information society context – and, in our view, hold as much value today, if not more.

This paper is inspired by two unrelated events. The first is the publication of an article in *The Economist* (2005) that attracted considerable attention in Information and Communication Technology for Development (ICTD) circles. The article was published at a time when financing mechanisms for ICTD were being hotly debated in the preparatory meetings of the second phase of the World Summit on the Information Society (WSIS). The essence of the article was that telephones, especially mobile telephones, are useful for the poor and that computers and the Internet are of little use. The article also took the view that free markets are the way to bring mobile telephony to people. The article denounced the Digital Solidarity Fund[1] and similar ICTD financing initiatives that commit public and donor money to develop a computer-Internet infrastructure in developing countries on the grounds that such infrastructure is largely useless for people in these countries.

[1] This was a voluntary fund proposed by some countries and city governments during the WSIS.

The second event is an experience that our organisation, IT for Change, had with an ICTD project proposal and our sheer inability to convince the project selection committee about the nature of its empowerment potential for women. The project aimed at addressing the collective empowerment of rural women from marginalised sections, their organisational strength and identity, and their information and communication needs. The project proposal did not fit neatly into typical ICTD frameworks – neither did it offer a straightforward list of services that would be delivered by the project, nor was it built around revenue models. We felt over the protracted period of engagement with the selection committee that the vocabulary to argue the case of ICTs for meeting women's development priorities and collective empowerment is by and large absent.

The problem is that it is indeed difficult to grasp and articulate, within the mainstream ICTD and information society discourse, how ICTs can potentially intersect all at once with poverty, development, and women's empowerment – how *dalit*[2] women's information needs, collective identity, organisational strength and strategies, and engagement with external institutions are important but intangible outcomes that can be achieved through an appropriate use of ICTs. Explaining and understanding an approach that seeks to use ICTs to make change happen at an institutional level – at the level of women's collectives and their social ecology – is certainly more difficult than, for instance, elucidating a media strategy for women using ICTs, which has an existing lineage in development communications discourse.

Also, in developing our project proposal, it was equally challenging for us to dialogue with the women's organisation we sought to work with, and to reach a shared understanding of how its feminist goals would at all be advanced within the context of its grassroots work, if ICTs were introduced to support its existing strategies. One lesson was very clear – that conversations between theory, practice, advocacy, and change are still marked by much discomfort within the discourse of ICTs and development. There also exists a great chasm, in this respect, between the ICTD sector and what by contrast may be called the traditional development sector.

These two events, though unrelated, capture revealing perspectives on the uneasy relationship between ICTs and development. They reflect an inadequate conceptual grasp of the ICTD space and insufficient theorisation of the connections between development and the new ICTs from Southern perspectives, beyond simplistic market prescriptions as offered by the cited article in *The Economist*. They also denote the territory that Southern feminists must map to conceptualise ICTD such that it accounts for the claims of women in the emerging information society.

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[2] The most disadvantaged caste in India.

The Problematique of the South

In arguing for a political economy analysis of gender, development, and ICTs that is South specific, it must be clarified at the outset that we are aware that the categorisation of South and North is strongly debated and even contested, and as pointed out in feminist literature,[3] at times also considered part of a neo-liberal design. While it is true that what primarily defines the boundaries of social exclusion are poverty, discrimination and oppression and not geographic location per se, specific North-South dimensions that have consequences for feminist activism and advocacy must be recognised, especially from a political economy perspective and from the vantage of institutional analysis, which is a central preoccupation of this paper. Geo-political location thus becomes useful to embed analysis within the broader political, social, cultural, and economic environment. Devaki Jain captures this in a simple and hard hitting way:

> Illustrations of similarity [between the North and the South], however, conceal that the poor in Chicago, whose outcome indicators are similar to the poor in Bangladesh, still have a social-security floor, social insurance, or some basic social welfare entitlements. The poor in Bangladesh, on the other hand, could easily die of starvation, lack of clean water, or various forms of pestilence and disease, as they have in the past and continue to do so. In other words, unprotected death is a real, proximate and completely tangible phenomenon among the poor in most of the poor countries, but not so for the poor in the advanced countries … Thus, inequality and poverty, which admittedly exist everywhere, take a different characteristic in the South. The inequality in South countries has a kind of vividness, cruelty and deprivation that offers no reprieve – it has no cushion, no safety net, no umbrella (Jain 2001, n.p.).

This paper does not seek to minimise the global feminist project, which seeks legitimacy across geographies and diversities. Rather, it seeks to explore how the dominant ICTD discourse falls short of adequately unpacking the specific impact of ICT policies and approaches in the South, and of anchoring perspectives that are essentially Southern. The paper argues the need for a Southern feminist analysis of the ICTD landscape and for the articulation of alternative approaches in ICTD through the lens of institutional transformation.

Feminist Critiques of New ICTs

Feminist critiques of new ICTs go back to problematising NGO approaches that informed media advocacy in the Beijing process. One such critique (Cheung 2001) argues that the understanding of information and communication for women's empowerment has been

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[3] Ewa Charkiewicz (2004) argues that among the key instruments of global governance is the division of the world into North versus South and that the metaphors of North and South as techniques of representing the world are crucial for the formation of the global empire. The amorphous spaces, the unnamed territories, tand he multitudes are ungovernable. They have to be named, categorised, calculated and problematised to be ruled.

distorted into a frozen media-technology discourse of 'women and media' plus 'women and new communications technologies' in the Beijing Platform for Action. A similar approach is seen as characterising the WomenAction2000 project, set up by some NGOs during the first PrepCom[4] of Beijing Plus 5, which used a mix of ICTs – print, radio, TV, Internet, email, and fax – to develop a "global women's information and communication net".[5] Cheung's critique also contends that the specific needs of women were not separated from the needs of women's NGOs and that "the static media-technology discourse failed to challenge global digital capitalism and consumerism in mass media and new communication technologies" (2001, n.p.). Adopting the view that the Internet may be a hegemonic project, the critique concludes that in women's groups' engagements with the Beijing plus 5 processes,

> the understanding of IC(T) was limited, and there was inadequate scope for contextualisation of policies because technology was emphasised over the information and communication needs of the women/users. Mass media and new communication technologies, especially Internet, were emphasised at the expense of traditional medium (such as drama, folk songs etc.) and other forms (audio, oral, corporal etc.) of information and communication (Cheung 2001, n.p.).

Even as such analysis provides an important perspective to think about new technologies within the feminist project, it remains located within a media and communications framework, under-emphasising some manifest new realities. Dismissing the Internet as dystopian and labelling it as a new hegemonic project, it reflects a construction of cyberspace as a site of power, where hierarchies operate. While the critique is valid from a feminist viewpoint as far as it seeks to map the wider political context of the Internet, the analytical framework is based on the limiting assumption of the Internet only as a site of communication, characterised by the hegemony of a capitalist globalising discourse. While making a strong case for women's information and communication needs and the contextualisation of the needed interventions, it slips into a dystopian view of technology and is unable to engage theoretically with the opportunities for subversion and transformation that the Internet holds, and the institutional shifts that it makes possible through the paradigmatic 'disruptions' in social structures. Further, such a perspective valorises traditional media, conflating the new with the hegemonic and the traditional with 'subjugated knowledge' seen as appropriate for the subaltern.

Another recent research (Isis 2007) builds on empirical evidence of the use of a range of media by intermediary women's organisations. The study seeks to "determine the most effective communication tools used by intermediary groups to reach grassroots women", examining "whether new ICTs are perceived as more effective and more empowering compared to traditional communication tools". The study concludes that the findings "overwhelmingly support the power of traditional communication tools over new ICTs for

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4 Preparatory Committee

5 http://www.women.or.kr/ehtml/new_win/ewomenaction.html

grassroots women's empowerment". Film or video is reported to have emerged as the top communication tool, followed closely by radio and popular theatre. Affirming the place of appropriate and contextual media and local communication processes, the research findings caution against pushing new ICTs in development projects at the expense of traditional communication tools. High costs, lack of infrastructure, and skill and literacy requirements are identified as obstacles to using computers and the Internet with grassroots women.

While Cheung's critique (2001) of new ICTs focuses on the hegemonistic aspects of the Internet, the Isis research is more concerned with the inaccessibility of computer and Internet technologies for grassroots women. However, the Isis study, like Cheung, also seems to adopt a limiting view of the Internet only as a medium of communication. Further, in valourising the place of video and radio in local communications, the Isis research does not go as far as to unpack the evolving paradigms of these tools in the emerging digital ecology. Its approach to 'traditional' and 'new' implicitly suggests a dichotomy that in many ways is not true in the current digital paradigm that decisively alters the cost, accessibility, and participatory aspects of 'older' tools like video and radio.

Thus, notwithstanding the fact that existing media and communications frameworks in feminist analysis rightly argue the need to reclaim the local and negate the hegemony of the global, they do not connect adequately to the structural aspects of ICT-induced social transformation and women's shifting locations within this.

Civil Society Positions at WSIS

Some early civil society engagements with the Geneva phase of the WSIS highlighted the neo-liberal moorings of the ICTD discourse, describing how the promise of growth through ICTs was by and large a story of digital sweatshops and, in fact, yet another manifestation of the false promises of global capital.[6] The reign of corporate monopolies within the ICT arena, the emergence of monopolistic transnational media, the issue of stranglehold of proprietary regimes in software, and the unbridled deregulation and privatisation of the telecom sector in developing countries and consequent takeover by multinational corporations (MNCs) of markets in these countries were seen as a continuum of issues, all related to corporate globalisation. The absence of adequate ICT infrastructure in countries of the South was flagged in the assertion of a digital divide, bringing to the fore the need for a Digital Solidarity Fund, initially proposed as a kind of taxation on public procurements of ICTs in developed countries, especially to deal with ICT infrastructure investments in Africa. When governments at WSIS adopted the WSIS Plan of Action, some civil society organisations held that the implementation proposals were a "perfect disguise for getting access to new markets, specifically the newly emerging larger markets in regions like Latin America and Asia (particularly India and China)" (Isis 2004).

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[6] These and the following civil society positions are the authors' personal observations of the WSIS processes.

The analysis proposed by these civil society organisations was a considered critique of technology-led changes built within a framework of communication rights[7] as the overarching layer which, conceived within the frame of a free and pluralistic media, upheld the freedom of expression and the right to communication of all peoples, and the need for protection of culutural diversity. The ownership of and control by communities of the new media spawned by the new technologies was seen as an answer to hegemonic ICT models.

Towards a Southern Perspective

These critiques of ICTD and of the WSIS processes, however, do not sufficiently problematise the impact of neo-liberal approaches to ICTD in the South.

The need for engagement with new ICTs in developing countries goes much beyond issues pertaining to freedom of expression, the right to communicate, or a responsive local media. What is as important is an exploration of opportunities afforded by new ICTs for strengthening and revamping multiple social institutions. However, the dominant view, which sees ICTs solely in terms of their potential for commercial enterprise and for economic growth, has meant that there is no serious effort in the direction of such institutional reform. On the other hand, the 'progressive' response in engaging with only the media aspects of new ICTs has not helped an appreciation of the full significance and extent of information society changes and their implications for the developing countries, especially disadvantaged sections in these countries. What is needed is a strong political economy lens to view the structural changes that are taking place across almost all social institutions and the use of such a lens to build a progressive Southern perspective on the emerging information society.

In their dominant conception and application, ICTs have been constructed basically as a market infrastructure, to be put in place by the private sector. The telecom approach of most governments in developing countries has disregarded social and development aspects. Such an attitude is exemplified by the fact that many ICTD projects driven by local governments, for instance in India, have come in conflict with national telecom policies on issues like local wireless connectivity and VoIP[8] that provide cheaper and more appropriate local solutions, because national telecom policies are largely driven by market and business requirements and not by development needs.[9]

On the other hand, whatever markets are able to profitably sell in developing countries, i.e. mobiles, are sought to be placed at the centre of new development and poverty alleviation models, promising, *inter alia*, improvement in gender equality. Southern governments still do not see ICTs as development infrastructure that needs concomitant policy commitment and a translation of such commitment into investments.

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7 See Communication Rights in the Information Society Campaign at www.crisinfo.org.

8 Voice over Internet Protocols, such as Skype, are a tele-voice application over the Internet.

9 See http://www.itforchange.net/projects/#pro-poor for 3 case studies of local ICTD initiatives and their issues regarding connectivity solutions.

The recommendations for relying solely on a market-led ICT revolution to 'bridge the digital divide' have also come with prescriptions for public sector reform, the emphasis here being on making even governance systems market-led. ICTD is also cast invariably in the language of 'applications', reflecting the construction of ICTs as staright-forward tools of efficiency, represented in the 'e's' that may be used as accessories to health or learning or banking or governance. With the 'e', however, also comes the marketisation of all underlying domains to which it is applied. E-governance, e-learning, and e-health all seem quite removed ideologically from how governance, learning and health have traditionally been theorised and practiced.

Much of multilateral aid in developing countries has gone in the direction of resource intensive, unreplicable pilots built on private entrepreneurship models that have not borne out any lessons for the institutionalisation or upscaling of ICT-enabled alternatives to address structural issues of poverty or unemployment, or to provide innovations in health, education, etc. With few exceptions, attempts to address questions of women's access to ICTs have been presented within the framework of such ICTD models, employing initiatives that have sought to bolster women's economic activities through mobile phones or through telecentres based mainly on revenue or profit models. The approach to women's empowerment within the ICTD paradigm is almost identical to donor approaches to micro-credit, where women beneficiaries become the target of an aggressive market expansion strategy that rewards those who can survive in the market (and survive the market).

With prolific instances of failure of market-centred ICTD initiatives, the time for revisiting some basic questions is more than ripe: what is the role of new ICTs in the context of development and gender equality; and what kind of institutional investments in ICTD are required for achieving various development goals, beyond the mere grooming of future workers for a global economy?

Civil society advocacy in the countries of the South does not yet possess a coherent vocabulary to challenge the dominant trends, nor do development sector activists see ICTD issues as directly pertinent to their activism. The inadequate exposition of the ICTD discourse in traditional development terms has meant that there exists little that connects ICTs to development priorities, whether as critiques of the dominant ICT paradigm, and its social and political impacts, or as an elucidation of what ICTs can do for the poor in general and poor women in particular.

Deconstructing the Debate on Old Versus New ICTs

Against the larger landscape of a market-driven ICTD discourse, the alternative discourse on women's empowerment through ICTs is located on a continuum with participatory media approaches. Feminist practice seeks to emphasise women's ownership and control over media, as in the many community radio and video projects in the South that give visibility to women and their perspectives. Gender analysis of the context of women in the South asserts the infrastructural impediments in women's access to new ICTs, like the absence of electricity, connectivity, etc., and of their inability to benefit from the gains of the Internet on account

of illiteracy, restrictions on mobility, and other dimensions of gender discrimination. The analysis of the non-availability as well as the 'inappropriateness' of the Internet in these contexts has led to a simplistic articulation of alternatives to dominant ICT paradigms by development actors in the South. 'Old' or 'traditional' technologies like radio are seen as the answer to women's information and communication needs and the Internet and computers are seen as irrelevant technologies that cannot meet the information and communication needs of poor women.

This formulation is problematic in two ways. It fails to see Internet technologies as much broader development infrastructure, which, while providing information and communication platforms, also essentially transforms the information and communication architecture of social structures. It also hands over the case of new technologies for the South on a platter to neo-liberal interests, as represented in the piece in *The Economist* which spoke of the irrelevance of the Internet to the poor in the developing countries. Interestingly, bottom-up media and traditional practice models, and the neo-liberal stance on technologies for the South find an unexpected convergence in demand-led frameworks of technology choices, in times of far-reaching technology-led societal changes which require strong push or supply-driven models – as, for instance, were adopted for a rapid spread of education – in tandem with localised appropriation models.

If radio and video can appropriately respond to the information and communication needs of poor women, Internet-based technologies can revolutionise the context of their social, economic, and political relationships. And since the market is not going to find the incentives to reach new ICTs to poor women, social policy needs to commit itself to building the physical and social infrastructure for engineering institutional change through ICTs that serves the needs of development and empowerment of women.

Thus, from a feminist standpoint, the Internet is to be seen as new media no doubt, but it is also the foundation of new institutional arrangements. As a communication platform, it offers spaces for resistance, and as a new architecture of social institutions, it offers space for subversion and transformation, paving the way for a new social organisation in which traditional power structures can be challenged. Within an institutional framework, the Internet may thus be seen as a mediator of change, transforming institutional structures, norms and values, and the way social relations are constructed within institutions. Such a shift marking a dislocation of old power structures may be understood as similar to the social transition from a pre-industrial to industrial society. For women and other marginalised social groups, the information society potentially marks a paradigmatic shift in their social relationships as institutional arrangements undergo fundamental changes.

Is the Promise of ICT-Mediated Institutional Change Real?

In order to harness ICTs for development goals, the role of technology has to be interpreted and shaped within institutional frameworks of development. ICTs are required to be deployed in the context of the current limitations of institutions serving women's development needs with the clear purpose of mediating appropriate institutional changes.

Some of the most crucial institutions in the women's developmental ecology are those of the government. The extension machinery of the government's development departments has entrenched bottlenecks in terms of reach, efficiency, and accountability. How can new technologies be used to overcome these constraints?

Even in many developing countries, the state promises a lot of legally enforceable entitlements as a social security net. However, the allocations are so low for these entitlements, as well as leakages so huge, that a good part of the promise remains on paper. Can ICTs enforce responsiveness and accountability in the social security system in a manner that these entitlements cannot be denied to anyone who is legally entitled? But would that raise the stakes in the social security system so much that the entire resource base of the governments will need to be re-worked? How much of the needed resources can be saved through system efficiencies alone, and how much would it mean to re-orient the governance and taxation system to meet the requirements of a truly welfare state? What then are the connections of such a governance system to models of economic development in a globalised world?

There are numerous other institutional bottlenecks that may be possible to address. Women in rural areas have poor access to banking and micro-credit. The issue of transaction costs – low per transaction volume as well as low density of transactions – is the main constraint. Can ICTs be used to re-vamp rural banking in a manner that can bring empowerment to rural women struggling to break traditional norms of male control over economic resources? Can ICTs be used to develop and strengthen institutions of social organisation among rural women who are individually placed in disempowering social contexts and greatly need to use collective strength to forge changes?

These posers are not just concepts or likely possibilities. Some examples from India illustrate the range of these new possibilities. The Akshaya project of the Government of Kerala in South India is attempting to use ICTs to make development delivery more participatory, effective, and cost-efficient. The rural E-Seva project in West Godavari district of Andhra Pradesh state has made information about social security processes like the public distribution system (a food security net in India), old age pension, concessional loans to weaker sections, etc., open and accessible using digital platforms. Such openness gives citizens strong levers to extract accountability from the government. E-Seva community telecentres are managed by women's self help groups, giving local women a new social role in the village community.

In villages of Madurai district of Tamil Nadu state where DHAN Foundation, an NGO, works, villagers interact with government officials through video conferencing. Participating from a village community hall, it is possible for the community to raise questions that may be difficult to bring up inside government offices. The video conferencing throws the entire interaction open to the scrutiny of anyone, including superior officials. In this new digital 'open space', the citizen-official interaction is transformed in a manner that can be empowering to citizens, with special significance for women who may otherwise be constrained by various cultural norms, for instance, in terms of mobility.

Telephone and mobile networks are being used by grassroots women's groups like SEWA in the state of Gujarat to strengthen their organisational systems and processes. In the same state, in Bhuj district, women participate in village resource and people's mapping using digital systems to generate data for developing participative village development plans.

The Piece in *The Economist*: Understanding the Political Economy of the Information Society

The cited article from *The Economist* employs the contrived logic that mobiles are much more appropriate and should be considered key to spreading technology for development, to undermine the value of computers and the Internet for the poor in developing countries. This argument is unpacked below.

Telephone penetration in most countries of the North has been at near-saturation levels for a few decades now; yet it took the development of the Internet for the notion of an 'information society' to be invoked. Social institutions of the North have been changing paradigmatically over the past decade or so. Mediated by the Internet, these far reaching changes are evidenced in every aspect of society – from government to entertainment, media to education, and markets and work organisation to health systems.

The cost-effective paradigms that the Internet has made possible have even altered the technology and economics of telephony, and if a complete replacement of traditional telephony by Internet-based telephony has not taken place, it is mostly on account of regulatory reasons, that may be over- protective of existing business interests.

The argument that the digital divide is just a symptom of deeper divides like income and literacy erroneously labels poverty and exclusion as causes, when they are in fact the results of entrenched institutional barriers and biases that need urgent attention. As discussed earlier, the formulation that access to computers or the Internet is meaningless in developing country contexts is also as problematic, when the real meaning of the digital divide to people of the South is in being left behind even more than before as the Internet mediates far-reaching institutional changes in societies of the North. Further, Internet-based global systems are being shaped by dominant interests to build rent seeking positions, and consolidate their economic and social power.

The placing of telephony, computers, and the Internet all on the same continuum reflects the problematique of an insufficient conceptualisation of the information revolution contained in the new paradigm made possible by digitalisation and the Internet. The dismissal of the Internet and computers as inappropriate for the South and the push for mobile telephony through free market and pro-big-business telecom approaches, as the most appropriate technology option, celebrates neo-liberal ideology – 'you get it if you deserve it' – even as it hands down an apology of an information society to the South.

The technology revolution in the North, it is believed, has by and large been led by private sector innovation, whereby markets followed demand and technologies have found appropriate use in this process. The political economy of the information society in the North thus follows from the assumption that the market knows best and is guiding institutions in their mutation, leading up to an information society. The role of the government is in providing an enabling environment for the market to function effectively and in addressing specific socio-cultural externalities of information society changes.[10]

By this logic, the verdict for the South, as argued in *The Economist*, is that the meteoric rise of mobile telephones is proof enough that these must be the appropriate technologies for the South, at least at for the present. And conversely, the failure of ICTD projects using computers and the Internet illustrates the inappropriateness and irrelevance of these technologies.

There is no doubt that several development and governance innovations are now possible using mobile phone devices, particularly because of the relative low cost of mobiles in developing counitres, the simple interface and usability features they offer, and their high mobility compared to other new technology options. Since mobiles present an undifferentiated service, of equal use to everyone with speaking and listening capabilities in any language, and accordingly requiring little or no skill requirement, they work very well for markets both on the supply and the demand side. On the supply side, after basic infrastructure is already laid to cater to the more remunerative markets, the marginal cost of extending connectivity to low-end users is very small. And, on the demand side, as already discussed, a simple tele-voice application can be used by almost anyone who has someone with a mobile phone to speak to, and therefore finds high demand easily.

However, it is important to view new ICT innovations also in the context of wider systemic possibilities provided by computer- Internet-based services. In fact, instead of computers and the Internet, as the new technologies are generally seen, it is better to speak of them as networked digital technologies, or simply, as Internet technologies. Digitalisation and the Internet constitute two paradigms around which the whole complex of new ICTs is built. These digital technologies are potent 'general purpose technologies' which pervade most social systems and mutate them. In fact, networked digital systems promise much cheaper mobile voice-applications than present day mobile systems (further comparison of Internet and mobile technology systems is undertaken in the next section).

Since the chief role of Internet technologies is as system builders, they initially attract only low levels of direct demand from individuals till relevant techno-social systems delivering specific values get built. Such systems can range from simple content in local languages to language interfaces, search engines, social networking applications, to higher services like e-banking, e-governance and e-health. Such digital systems are very contextual and need be tailored to different needs of different people, sections, and social groups, including women.

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10 This dominant perception obscures a considerable role of public investments in technology research, innovation, and diffusion in the North.

Markets do not have the incentives to build such systems for sections with low-purchasing power, and if anything, they will seek to offer low-marginal cost extensions of systems that are already built and appropriate for dominant sections.

In the North, the relationship between market, technology, new techno-social systems, and change needs to be understood in the context of how the conditions for the 'triumph' of the new ICTs, which mark the information society, have evolved since the 70s in these societies. Seán Ó Siochrú (2004) traces this history and argues that the role of knowledge and information in society was already being recognised as central in the North in the early 70s, and thus the stage for the rapid technology innovation and diffusion that have taken place since the 90s was already set in the social environment.

The new ICTs were thus born out of a more complex dialectic with social developments than technology determinists would like us to believe. This dialectic implies a certain sync of the markets with socio-economic needs and context of the society. Under these conditions, the market may be seen as well poised in the North to lead institutional transformation towards a new paradigm — that of the information society.[11]

However, the context in which the new technologies are sought to be applied for development in the countries of the South is entirely different. The new technologies do not have an existing dialectic with institutions in the South, yet the opportunity that these technologies open up for institutional changes and transformation is real. Developing countries do not have the luxury to wait and watch for this dialectic to develop entirely through demand-led processes of the market. The process of development involves conscious public policy design for applying technology towards institutional change. In fact the term 'development' essentially signifies such an institutional, and corresponding technological, leapfrogging over what may historically be constructed as linear stages of social and economic change, through relevant public policy support and directions.

The incentives for developing countries to seek technology-induced institutional transformation is captured in an UN ECLAC (2003, 34) document.

> Immature institutions and inefficient organizations are a serious obstacle to development. The digitization process in the different e-sectors of an information society constitutes a form of institutional reorganization ... When people have less experience with the old solution they will more readily accept a new technological solution that offers them an opportunity to, first of all, tackle the old problem (satisfy their needs) and, secondly, even to bypass the previous top performer once the new system is in place (Brezis, Krugman, Tsiddon, 1991) … For example, whereas the 2002 presidential elections in Brazil were held entirely through electronic voting machines, this is an area in which the United States is still facing

[11] Many northern civil society groups do have grave concerns about the directions in which market-led information society developments are headed, especially in relation to communication rights, information monopolies, etc.

> formidable problems. In the areas of income tax payments and e-voting as well, Brazil through strong public sector leadership – has 'leapfrogged' certain developmental stages. In times of normal, incremental technological change, increasing returns to scale tend to strengthen developed countries' leadership positions. However, when a new innovation arises or major structural changes occur, a temporary window of opportunity opens up for less developed countries to catch up (Perez, 2001).

However, as the ECLAC document also points out, developing countries will need to seize this window of opportunity in these times of flux by creating their own development paths, and obviously, through their own interpretation of the information society.

> It should be pointed out that the ongoing debate in Latin America and the Caribbean regarding the transition to an information society and to the digital era is often based on 'stylised facts' and theoretical constructs deriving from developed countries. There are various reasons to believe that such facts and constructs are ill-suited to an exploration of the region's position in this process. Firstly, the industrialised economies' macroeconomic fundamentals have been kept within a reasonable range of equilibrium, and economic growth has been modest but steady. This fact provides a basis for projecting the transition to the digital era along a given path, and the macroeconomic 'backdrop' for that transition does not generate any major degree of uncertainty. Secondly, in developed countries the provision of public goods by the State and the existence of fairly mature regulatory systems and agencies creates an adequate institutional and market environment in which to examine the transition to the digital era (UN ECLAC 2003, 9).

Developing countries need to claim their share of the cake not by resigning to prescriptions of what is appropriate as defined by a neo-liberal agenda of the North, nor by succumbing to skeptics in the South who reject new technologies as necessarily irrelevant. The absence of Southern perspectives on what do new technologies mean for the South has meant an unchallenged domination of the information society paradigm as defined by the North. In meeting the needs of the poorest and the most disadvantaged, the old and the new (technologies) will both need to be claimed. Such a claim will be directed not just at addressing their information and communication needs, but also appropriately employing new technologies for institutional change that leads to gender-just and equitable social transformation. In this context it needs to be mentioned that some development actors,[12] both in the North and the South, prefer the term ICD instead of ICTD, since ICD is seen as reflecting a greater emphasis on people and social processes over technology. However, from a Southern perspective, the 'T' in ICTD represents the remaining agenda of technology appropriation by development actors in their effort for social change.

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12 For instance, this term is used by the 'Building Communications Opportunities Alliance' comprising three bilateral donors and seven NGOs.

Mobile Telephony versus the Internet: Seeing Below the Surface

We discussed above how simplistic demand-led notions of technology diffusion are problematic in the case of technologies which serve as the very basis of new systems designs, and the means of participation in these new systems. The issue of appropriation of Internet technologies at a societal level needs therefore to be addressed in terms of seeing these technologies as a basic social and developmental infrastructure, and not just as an economic issue of resource distribution.

The proposition that mobile phones are the most appropriate technologies for the majority of people in developing countries, and that the Internet may be premature, has some other more insidious implications that are mostly overlooked by development actors.

The democratic qualities of the Internet, which have given rise to many a claim or dream of a new equalising technology that can challenge entrenched social and economic inequities, stem primarily from its open and end-to-end technical architecture. The Internet presents an equal face to all its users, so that an NGO can upload and send out 'content' across the world as easily as an MNC. An NGO website opens as quickly as that of such a company. Anyone can request information or services from anyone else on terms negotiated entirely between the two parties. And anyone can build new applications on the Internet and others can use these applications subject only to the terms laid by the application and/or service provider.

This present architecture of the Internet, potentially, facilitates a greater social, economic, and political participation of all. It allows for freer flow of information, interaction between entrenched institutions and their constituencies on more equal terms, co-constructive knowledge systems and collaborative production systems, and also more open markets with relatively equal opportunity for everyone.

The present architecture of mobile telephony, on the other hand, is of proprietary networks. A service provider can provide service only after entering into an agreement with the network provider and paying sufficient rent. All applications available on the mobile networks are decided by the network provider. Unlike on the computer format, where software comes unbundled from the hardware, mobile hardware comes with locked-in software. Mobile companies have begun to provide more and more Internet-like services — for example, banking, ticketing, specific information on demand, and even social networking, and also development services (agriculture information for farmers) and government services (m-government is a fashionable new term). Yet, there still is little or no policy effort to enforce the Internet's open architecture on the mobile telephony platform of new applications and services. One key reason for this is that dominant telecom regulatory paradigms are constructed in the North, and the Northern companies' interests are heavily vested in the mobile markets of the South.

It is in fact widely feared that the mobile services architecture on one hand, and Internet Protocol (IP) based video distribution on the other, will kill the open and end-to-end character of the Internet. These contentions are represented in the 'network neutrality' debates that

are raging in some developed countries. The South is invariably absent from these debates. Under the circumstances, technology policy paradigms that get decided in the North will then simply be exported to the South.

The above casts the mobile versus Internet arguments in an entirely different light. It is important that while feminists look for more appropriate technology choices, they do not miss the wood for the trees. The structural implications of such 'choices' need to be kept in clear view. The virtues of the inexpensive, small, mobile, easy-to-operate, voice-enabled interface as represented by mobile phone hardware compared with the costly, heavy, immobile, complex text-based interface of the desktop computer are self evident and cannot be argued against. But 'mobiles and not the Internet for developing countries' is a much deeper structural issue with respect to the information and communication architecture, as well as the broader structural and systemic configurations, that will underlie the emerging information society in the South.

In fact, it could be both easier and cheaper, than existing mobile services, to have simple handheld devices working over the Internet, with VoIP as the major application. In addition, the Internet could be provided through community-owned peer-to-peer wireless networks that are not difficult, nor expensive, to install. However, if the technology choices of incumbent telecom providers have worked in a different direction, towards more controlled networks with centralised operations, this has had to do mostly with exploitative business models and not with catering to the real demands and needs of people. Southern governments have primarily worked to help these business models, and there are many reasons for their connivance. Threat of capital flight is a major reason, as is poor in-house technology knowledge. Moreover, governments too prefer centralised networks that are easy to control for surveillance and censorship. This represents a dangerous conflation of market and state interests to the detriment of progressive possibilities.

The above discussion points to the need for taking a more nuanced view of technology options and policies rather than succumbing to simple prescriptions provided by the markets and other dominant interests. It is not to deny the importance of any empowering option – mobile telephony in this case, which does have a very important value for disadvantaged groups in the South. However, understanding the real implications of technology choices will enable feminists to advocate for appropriate policy changes. Though it is not the intent of this paper to provide detailed policy prescriptions, in order to illustrate the need for appropriate technology policy level engagements, a few policy issues related to the dominant mobile architecture are mentioned below:

1. Mobile hardware manufacturing companies should be required to embrace open platforms and make provision for undifferentiated access to all possible services, as well as for the ability to modify, delete, or add to existing software and applications based on user/community specific needs and priorities.[13]

[13] See, for example, the Open Handset Alliance, http://www.openhandsetalliance.com/.

2. Similar to the way in which access to the Internet is charged, mobile service providers should be allowed to set tariffs only on the basis of quantity of data transfers (i.e., the bits transferred each month) and not to indiscriminately enforce charges for different kinds of applications and services accessed by users. Telecom regulators can play a central role in creating this kind of an open mobile ecology.

3. Finally, mobile devices should be developed in such a way that connectivity is not reliant only on tapping into the GSM/CDMA networks of large companies, but is also made possible through local community-based wireless networks.

Appropriating the Information Society: A New Feminist Agenda

The context and opportunity for women in the South to engage with empowering possibilities of the new ICTs and the structural changes constituting the emergence of an information society, as well as to meet the attendant challenges, is caught in an uneasy trap of two very different standpoints. We have described in some detail the market standpoint of a tiered information society – both in respect of devices and digital systems one gets access to and the structural dominations that are being built on these systems. We have also briefly discussed how feminist approaches to new technologies have mostly come from local and pluralist media frameworks, focusing on existing communication practices and the high skill and cost requirements of new ICTs. Such a position is important with respect to the possible threat that a growing stress on new ICTs in donor programs may mean cutbacks on support for traditional and existing communication practices. It is also pertinent, as a cautionary note, in respect of what is understood as the inherently alienating and hegemonistic characteristic of the dominant new ICTs model.

However, the downside of such an approach is that it may blindside feminists from understanding that engagement with new ICTs, and the emerging information society, means much more than merely choosing from among a set of media and communication tools. It is equally about finding an empowering space for women in a fundamentally changing social systems landscape. New ICTs represent general purpose technologies and not any particular set of artifacts with which they are often associated. Non-engagement with these general purpose technologies, which have system wide application, would imply women's exclusion from the far-reaching opportunities of the information society.

For instance, in terms of media choices, video and radio are often cast in opposition to computers and the Internet, which represent the new networked digital technologies model. However, in characterising video and radio as more empowering to disadvantaged women, one also needs to nuance such characterisation by examining the different possibilities with video and radio in the context of empowering development communication. The typical development video model comprises relatively expensive videos created by professionals. Most current radio models are also not very participatory. However, digital technologies allow possibilities for very simple and inexpensive video making that can enable participatory media in grassroots processes. Participatory and inexpensive 'community radio' has been made possible only by digital technologies, in the same way that they make 'community

video' possible.[14] Small digital recorders have revolutionised program production, making it possible to easily record programs in remote areas. Similarly, editing of programs can also be done in the field with laptops, which are much less expensive and cumbersome than traditional editing equipment.

A hands-off approach to new ICTs will also further distance feminists from important discourses and policies shaping the contours of the emerging information society. Even as it underlies a capitalist (and even statist) consolidation, the information society also privileges values such as collaboration, and institutional forms and mores that promote greater openness and inclusion. And therefore what is at one level a capitalist transformation may also be characterised as a democratic transition (Gurumurthy 2007). This tension characterising the ecology of change is in fact the window of opportunity for feminist radical action. The emerging public sphere is not only constituted by the multiplicity of publics made possible by the Internet, and hence affording spaces for the articulation of radical feminist agenda, but in another sense, is also defined by fluidity and porousness of the public and the private spheres that can potentially make political claims-making towards feminist ends a reality.

For Southern women, ICT appropriation in the information society further needs to address their poverty and inequality through institutional transformation, so that in the emerging institutional realignments, women can forge new relationships within their social and economic contexts.

It is imperative for national governments to have policies that enforce public service commitments from communication corporates. As Sasha Costanza-Chock[15] puts it, "the communications industry relies on access to what should be considered public goods (spectrum and satellite orbits … state investments in research and infrastructure, and … copyright and patents.) Private communication firms exist and are able to make money hand over fist because governments offer them huge swaths of valuable common resources, and then enforce (using more public funds!) private monopoly control."

Also critical is the role of public finance towards communication infrastructure and other technology areas for reaching spaces that markets avoid, and a public policy vision of what ICTs can do for women beyond instrumentalising gender within pre-existing and flawed frameworks that do not answer to basic development priorities and the rights of the poorest women. Countries of the South need to direct public investment towards research to promote innovation and appropriate technologies, provide communication infrastructure for universal access, develop community-level institutions and capacities, and lead institutional transformation, especially in relation to the institutions that touch the lives of the poorest women – governance, health, social security, education, and livelihoods.

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14 Such 'community radio' and 'community video' processes using digital technologies are employed in the *Mahiti Manthana* project of IT for Change, which works with *dalit* women's collectives.

15 Posting on the WSIS CS plenary mailing list (mailto:governance@lists.cpsr.org) on 5 March 2005. The message is archived at http://mailman-new.greennet.org.uk/pipermail/plenary/2005-March/005057.html.

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IT for Change (ITfC) is a non-profit organisation based in India.

ITfC seeks to interpret the context and the opportunity of the new ICTs, and broadly, the emerging information society, through the lens of the global South. Our approach is guided by the ethical cornerstones of development – equity, social justice and empowerment.

We strongly believe in the need to emphasise the political narratives that are often sidelined in debates on the information society, which is largely being shaped by neo-liberal ideologies.

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