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The global digital divide in the Internet: developed countries constructs and Third World realities

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Abstract.

Defined as the differential degree to which rich and poor countries benefit from new information and communications technologies such as the Internet, the global digital divide is widely measured by international institutions in terms of the number of persons with individual access to those technologies. Yet, while this measure makes sense in the rich countries, where individual ownership is widespread among the population, it makes very little sense in poor countries. For, in the latter, what we find is that although individual access is indeed very limited, a remarkable number of local innovations ensure that the benefits of the Internet are made available to at least 10 million people throughout the Third World. Many such persons are illiterate, unskilled and resident in the rural areas of developing countries. These findings directly contradict the commonly held notion that there are few, if any, local innovations in the applications of the Internet outside the rich countries and those parts of poorer countries with close connections to the former (most typically through multinational corporations). From a policy point of view, we suggest that foreign aid donors and national governments pay less attention to providing individual access facilities such as so-called telecentres and focus instead on ways to foster indigenous rural innovation systems devoted to finding relevant and cost-effective applications of the Internet.

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1. Introduction

Even a cursory glance at the literature on the subject reveals that use of the Internet is generally accepted as the measure of the divide in this technology, between rich and poor countries [1]. 'In digital divide studies' for example, 'Internet usage numbers are most often cited to describe this divide' [2]. Normative, as opposed to positive studies that merely measure the divide in these terms, tend to be no less focused on the Internet use measure. In the year 2000, for example, the Millennium Declaration[1] called upon its adherents to 'make available the benefits of new technologies, specifically information and communications'.

Three indicators were chosen to measure ICT availability in countries and the indicator pertaining to the Internet is defined as the number of users per 100 inhabitants.

It is no less clear that most international aid donors *react* to this way of measuring the digital divide. For, under the heading of so-called 'telecentres', one finds attempts in many developing countries to provide shared access to the Internet to those who would otherwise be derived of the benefits of this technology.

It is not our intention below to suggest that this

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measure is inherently flawed or devoid of any useful comparative information. Our point, rather, is that the use indicator applies selectively across and within different countries. In particular, it makes most sense in developed countries and the formal (or modern) sector of developing countries and least sense in the rural sector of the latter countries, where the majority of the population (and especially those living in poverty) usually reside. We shall argue that the Internet use indicator applies poorly to the latter sector, because there it represents the illegitimate transposition of a developed-country concept to an entirely different and inappropriate institutional setting. Such a proclivity has long existed in the field of development economics, as described perhaps most forcefully by Myrdal whose 'main point' was that:

> While in the Western world an analysis in 'economic' terms – markets and prices, employment and unemployment, consumption and savings, investment and output – that abstracts from modes and levels of living and from attitudes, institutions and culture may make sense and lead to valid inferences, an analogous procedure plainly does not in underdeveloped countries. There one cannot make such abstractions; a realistic analysis must deal with the problems in terms that are attitudinal and institutional and take into account the very low levels of living and culture. [3]

In order to bring out the specifically Myrdalian character of our analysis, we now seek to identify the assumptions that, we believe, render the existing use measure of the digital divide inappropriate, mainly, but not exclusively, to the rural areas of developing countries (as noted earlier, it is precisely those areas that conform least closely to the institutional and other relevant characteristics of the developed countries). It is inappropriate, we believe, not merely to the way in which we think about and measure the global digital divide, but also to the way in which we respond to it.

2. Western concepts and developing country realities

Myrdal [3] argues persuasively in his *Asian Drama*, that the transfer of Western concepts and theories to developing countries could pose serious problems for the measurement of and policy towards a range of issues in the latter group of countries. One example of this general danger arises 'from the neat division of income into two parts, consumption and saving', which is clearly plausible 'in Western societies where the general levels of income and a stratified system of income redistribution by social security policies and other means have largely abrogated any influence on productivity' [3]. In developing countries, by contrast, this neat conceptual distinction does not hold over wide segments of the groups living in poverty. Put simply, the reason is that those living in poverty often suffer from malnutrition which affects their work capacity and productivity (indeed, 'The labor of the poor is often physical labor, and physical labor requires significant amounts of energy' [4]. Depending on the strength of the relationship between malnutrition and productivity, expenditure on food can and does exert an influence on productivity and growth that needs to be taken into account in policy-making at micro and macro levels of analysis. At the level of the individual firm, for example, one could conceive of altering the composition of wages in such a way that the worker spends a higher proportion of his or her wages on food.[2] If, on the other hand, policymakers continue to retain the conceptual separation of savings and consumption, the extent of the Myrdalian bias (measured in terms of foregone growth) might be considerable, especially in poor countries where the gap between the required and actual nutritional levels of workers is highly pronounced.

What parallels, then, exist between the example just cited and the measurement of the digital divide in the Internet, according to a comparison of the numbers of users in rich and poor countries? Most fundamental, in our view, is the fact that in both cases one finds an invalid assumption about how those living in conditions totally unlike the developed countries actually behave. In the case of the digital divide, there are of course many reasons why Internet use is so rare a phenomenon in the remote, rural areas of developing countries (not the least of which is an acute lack of the user capabilities required by the technology, as shown in Table 1).

If one were then to assume that individual use of the Internet is indeed the *only* way of deriving benefits from this technology, it is clear that no biases of the Myrdalian kind would crop up. For, in their extraction of benefits from the Internet, the non-modern parts of developing countries would behave no differently from their developed-country counterparts (as would be predicted by precisely the type of economics that Myrdal sought ultimately to replace). In reality, however, and in analogy with the previous example, behaviour differs sharply between rich and poor and there are, in particular, numerous forms in which the latter derive benefits from the Internet other than through individual use.

Table 1
Capability levels required for operation of contrasting user technologies [5]

	No literacy	Basic literacy	High literacy/ language skills	Computer literacy	Technical competence
Oral communication	*				
Radio	*				
Television	*				
Fixed line					
Telephone	*				
Mobile telephone	*				
Public phone	*				
Newspapers and printed sources		*			
Fax machine		*			
E-mail			*	*	*
Internet			*	*	*

What is common to most of these different institutional forms, however, is their reliance on local knowledge, local participants and locally relevant innovations. For, as Sood [6] has rightly emphasized:

> Non-elite, rural, artisanal and Adivasi communities of South Asia do not and will not use information and communication in exactly the same ways as either elites from the same region, or industrialized and massified populations nations elsewhere in the world. In order to find ways for emerging technologies to truly benefit these groups we must invent and innovate from the ground up, working always, in partnership and dialogue with local communities. Far from replicating the online behavior of highly networked societies, we must conceptualize and design products, services, and technologies to meet local needs and solve local problems.

The following sections seek to describe and classify projects that embody such local characteristics; projects which, in combination, impart a bias to the way in which the digital divide is usually thought about, measured and responded to.

We begin our study of these issues by focusing on India, a country where more (and also more diverse) attempts have been made to derive benefits from the Internet, other than by individual use, than anywhere else in the Third World.[3]

2.1. Institutional alternatives to Internet use in India: the role of rural kiosks

One of the two major institutional mechanisms, through which benefits of the Internet accrue to the rural majority in India, occurs via so-called rural Internet kiosks. Indeed, 'Many analysts and practitioners agree that the possibilities of digital development hit the rural landscape at the site of the information kiosk' [7]. Although there are many characteristics that distinguish one type of rural Internet kiosk from another [7], what is most important for our purposes is the role of an intermediary, who, in one way or another, inserts himself between the technology and the community. The intermediary, in other words, is someone who uses the Internet *not* for his or her *direct* benefit, but rather for the purpose of making relevant knowledge available to illiterate consumers with few, if any, of the required technological capabilities (see Table 1), in the context of rural kiosks.

Table 2 contains a summary of the mechanisms of intermediation that occur in most of India's best-known rural Internet kiosks, accompanied, in each case, by an estimate of the numbers of beneficiaries (although, from the footnotes to the Table, it is clear that the estimates are anything but precise). When they are aggregated, we find, tentatively, that the total number of indirect beneficiaries from the Internet is in the range of five million people. This number, one should emphasize, represents the extent of the bias that would follow from adopting a purely developed-country concept of how Internet benefits are elicited. Given the ITU [8] estimates that there were some 16.5 million Internet users in India during 2002, more than twice the figure of seven million in 2001, it does appear that the extent of the estimation bias (in the Myrdalian sense) cannot simply be ignored.

Table 2
Internet intermediation in rural (and some urban) kiosks; selected cases from India [9]

Project name	Year begun	Project description (summary)	Numbers of users thus far
ESeva	Late 2001	Beginning first in the city of Hyderabad and extended subsequently to rural areas of Andra Pradesh, eSeva allows clerks at computer terminals to help clients with a wide variety of transactions with the government.	800,000 per month[a]
Drishtee	2000	'Drishtee is an organizational platform for developing IT enabled services to rural and semi-urban populations. . . . The services it enables include access to government programs and benefits, market related information, and private information exchanges and transactions. . . . Drishtee's business model is driven by a village entrepreneur who is suitably trained to handle user-friendly software.' (executive summary, www.drishtee.com)	0.2 million[b]
e-choupals	2000	As one of India's leading private firms, ITC has started a network of e-choupals (roughly defined as a high tech version of a traditional meeting place) throughout India. Each e-choupal is managed by a local farmer who is trained for this purpose and in whose house a computer with Internet access is installed. 'The farmers can use the computer to access daily closing prices on local mandis [markets], as well as to track global price trends or find information about new farming techniques – either directly, or *because many farmers are illiterate, via the sanchalak*.' (*Digital Dividend*, 2003, executive summary, emphasis added).	Up to 1.8[c] million farmers
Bhoomi	1991	Bhoomi was launched by the Karnataka state government in order to computerize land records on a massive scale, and to make them available to farmers for a small fee. No fewer than 20 million records have been computerized, and in the form of computerized kiosks, can be securely called up. Such records are crucial to farmers because they are used for other purposes, such as loan requests.	1.25 million farmers[d]
n-Logue	2002	n-Logue is a spin-off of work carried out at the Indian Institute of Technology, Chennai, which is specifically concerned to find low-cost solutions to the problem of bringing information technology to rural and certain relatively backward urban areas. Central to the n-Logue model is corDECT WLL technology, an innovation that emerged from IIT, which is substantially cheaper than standard WLL technology. CorDECT enables n-Logue to sell low-priced village kiosks to local entrepreneurs, who are well-placed to deliver services that meet the needs of the local community. See www.n-logue.com	A maximum of 3,500,000 persons. Actual use unknown[e]

Notes
(a) One cannot of course say how many users in a given month are the same as in a subsequent month.
(b) Estimate provided by Mr. Satyan Mishra of Drishtee in correspondence dated April 6, 2004
(c) *Times of India*, April 13, 2004. The figure here refers to the number of farmers 'served' by the project (i.e. the potential number of users) rather than the actual number of users.
(d) From Stockholm Award, contest website, 2002.
(e) Estimate provided by Mr. Varadarajan of IIT, Chennai. Here too the figure is a maximum number of users as opposed to an actual total.

2.2. *Internet intermediation at a distance*

All the schemes contained in Table 2 involve a close geographical relationship between the intermediary and the beneficiaries, which, in its most common form, involves a face-to-face encounter between the parties. Yet, it is important to recognize that intermediation can also take place at a (long) distance and that this possibility is especially relevant to a country such as India, which is well endowed with at least some of the rural institutions that are likely to be needed for this purpose.

With regard to rural telephones, for example, Table 3 shows that the vast majority of Indian villages and almost the entire village population have access to this form of telecommunications (consisting, as it almost always does, of rural payphones). The Table also shows that some of the other South Asian countries are far less well prepared to use rural telephony as a mode of connectivity to the Internet.

Not until 2004, however, has the vast potential for this form of long-distance intermediation begun to be exploited on a large scale in India. The initiative has come from the Ministry of Agriculture in the form of so-called 'Kisan Call Centres', which essentially aim to bring high technology to bear on agriculture extension services via the telephone. 'Farmers are able to dial a toll-free number in order to pose a question that is directed to the nearest call centre and answered, in the first instance, by a graduate student of agriculture in the local language'. [9, 11] It is inevitable that such a scheme will confront a range of initial problems, the most important of which are likely to include a lack of awareness, a new and unfamiliar way of using the telephone (as a means of gaining information about farming problems), and an overall scepticism by the farming community towards high technology. These formidable problems notwithstanding, in the first five months of their existence the Call Centers had (by the end of May 2004) received some 340,000 queries,[4] or over 800,000 on an annual basis (with the potential, over even a few years, for this number to rise well into the millions).

Whereas the previous example refers to the potential for Internet connectivity afforded by the widespread availability of pay-phones in India, a second example is based instead on the pervasiveness of post offices, especially in the rural areas of that country. In particular,

> India Post's network is one of the best and quickest ways to take technology and its benefits to the rural population in India. Across India 154,000 post offices reach the people in an intense and intimate network of knowledge and service. No Indian is more than roughly a mile or so from the nearest post office and 137,000 of them are in rural areas. Beyond that, the last mile is traversed by the postman on the cycle. [12]

Again as in the previous example, however, nationwide efforts to use these post offices as an indirect mode of bringing the Internet to the rural majority only began in 2004 (where 'indirect' in this context means that benefits from the Internet are made available to those living in rural areas even without any individual use of this technology itself). Prior to 2004, 'e-post' had undergone trials in five states for a period of three years. Initiated by the Indian Postal Service, e-post in effect provides low-cost e-mail services to people who are not in a position to use these services themselves. In brief, the idea is that customers drawn heavily from this pool,

Table 3
South Asia's villages and phone access, 2002 [10]

	Villages			Village population		
	Number	Number with phone service	% with phone service	Total (000s)	Total with access to phone (000s)	% with access to phone
Bangladesh	86,000	12,568	15	103,441	31,420	30
Bhutan	6,000	N/A	N/A	636	N/A	N/A
India	607,491	468,016	77	741,660	726,827	98
Maldives	200	200	100	196	196	100
Nepal	3,914	1,761	45	19,457	8,754	45
Pakistan	125,083	12,000	10	97,855	29,357	30
Sri Lanka	23,000	2,475	11	13,113	9,834	75
Total	851,688	497,020	58	976,358	806,388	83

Source: Minges and Simkhada (2002).

> . . . hand a postal worker a message meant for a snail-mail address. The postal worker types the message into a computer and e-mails it to the post office nearest the intended recipient, where the message is printed out, placed in a sealed envelope and delivered by a carrier.
>
> Since its introduction [in 2001] . . . the service, which costs 10 rupees [21 US cents] a message, has become popular in relatively remote locations . . . where home computers and Internet access are not common. [13]

In 2004, the experiment that had begun in just five states was massively scaled up to the national level. Regardless of where they happen to reside, that is to say, the people of India can now send and receive e-mail messages in every Post Office in the country. At this national level, the relatively low cost of the service means that even modest rates of usage would give rise to large absolute welfare gains. Actual rates of usage will only become known, however, once the project has had time to overcome the familiar problems that occur when an experiment conducted on a small scale is extended to cover a much wider area of application.

3. Beyond India: the role of radio as a bridge to the Internet

The reader may well have been struck by the fact that none of the impressive Indian examples cited in the previous section had anything to do with radio, surely the most pervasive form of mass communications. The absence of radio is all the more striking, moreover, when one considers that this medium:

> has several comparative advantages over the other media as a tool for social change. It is cost-efficient, for those who run the station and the audiences. It is ideal for the huge illiterate population that still remains marginalized, especially in the rural areas of the third world. Its language and content can be made most suited to local needs. It is also relevant to local practices, traditions and culture . . . Yet, in South Asia and more specifically in India, this is a medium which has been kept gagged [14].

The problem is not the lack of change in India's broadcasting system. It is rather that the changes are not conducive to blending the radio and the Internet, so as to bring the benefits of the latter to the vast number of those in rural areas who are known to possess the former. The point is that:

> Indian radio is changing from being a government monopoly to highly commercialized broadcasting. But the media needs to be democratized too. *Privatization and total deregulation will hardly help, if the media becomes irrelevant to the vast majority of Indians*. India has so far given step-motherly treatment to public service, community, educational and development broadcast networks. [15]

As a result, it is to developing countries other than India that one needs to look for cases where the benefits of the Internet are made to accrue to listeners of rural community radio (persons, that is to say, who possess few, if any, of the requirements for Internet use via a computer). In fact, there are many such cases and following Girard [16], it seems useful to divide them into two main categories. On the one hand, there are projects that have

> sought to introduce more diversity and a democratic environment into radio programming by using the Internet as a *distribution network* among independent broadcasters for news and programmes. . . . Others, . . . seek to address the problem of the growing gap between the info-rich and info-poor by providing collective access to the knowledge resources available on the Internet – using the radio as a sort of *people's gateway* making the Internet's resources available to rural and marginalized communities. [16]

Of the two mechanisms, the latter has more affinity with the discussion in the previous section, in large part because it is conducted at the same level of aggregation, namely, the level of the community, as opposed to relationships *between* different community radio stations. This matters, we feel, because technological blending within a community brings out the specifically local component of the blend, a component which, because of the type of behaviour it incorporates, tends to invalidate the unthinking extrapolation of developed-country concepts and measures to rural areas in developing countries. Let us begin, therefore, with the best-known and most replicated example of how a blend between radio and the Internet can deliver benefits to the local community. I am referring here to Kothmale Community Radio in Sri Lanka and in particular to the way in which it 'uses community radio as an interface between the community and the Internet through a pioneering "Radio-browse" model, thereby introducing an indirect mass access to cyberspace through a daily one-hour interactive radio program' [17]. The interactive nature of these programmes, involving listeners on the one hand and broadcasters on the other, is evident from the following description of what actually occurs. In particular,

> The daily programmes respond to queries from listeners. Presenters first select relevant, reliable websites and broadcast the programme with local resource persons as studio guests (e.g. doctors for a health programme) who discuss the contents of the mostly English-language sites directly

in the national languages. They also describe the websites and explain how they are browsing from one page to another. Thus, listeners not only get the information they requested, but they understand how it is made available on the web. They can respond to the programme and they know that essential data will remain available in the community database if they wish to make individual use of it. With this daily radio programme, there is continuity within a common learning process encouraging greater inter-activity with and by the community. [18]

Readers wishing to know the details of this simple but ingenious idea can refer to Hughes [18]; Pringle and David [19]; or the description by the Stockholm Challenge Award that was awarded to Kothmale in 2001 (www.Challenge.Stockholm.se). In the remainder of this section, dealing as it does with the 'gateway' function of combining community radio with the Internet, we shall concern ourselves partly with the 'numerical' impact of the radio-browsing formula, where impact includes both the original (direct) beneficiaries and those who may have gained from the subsequent replication efforts [20]. For want of any better (survey) data, the estimates of beneficiaries, in terms of both types of mechanisms, refer simply to a maximum possible audience. In some cases, this measure will severely distort the estimate of actual listeners, whereas in other cases, such as Kothmale itself (where more than 80 per cent of the potential population actually listened to Internet broadcasts), the degree of overstatement will be relatively slight.

3.1. The global impact of the original Radio Browsing model at Kothmale, Sri Lanka

At a figure of around 250,000, Radio Kothmale has by no means the largest number of potential listeners compared to similar types of blending projects in developing countries. In Nepal, for example, Radio Sagarmatha and Radio Lumbini each have a coverage of over one million listeners. What makes Kothmale so special is rather that it has been replicated on an unusually large scale (for a pro-poor innovation that emerged from the Third World). Even the figures cited above, however, appear substantial when they are compared with the number of Internet users in the countries concerned, as shown in Table 4.

When one adds to this illustrative data the results of the concerted replication effort, moreover, many other developing countries may by now also exhibit a pattern of Internet use, such that the number of beneficiaries from blending community radio with the Internet exceeds the number of individual users of the latter technology (and in some cases by a very wide margin).

Table 4
Potential beneficiaries from radio browsing vs actual Internet users in two developing countries [21]

Country	Maximum potential listeners	Actual Internet users
Sri Lanka	250,000	150,000
Nepal	2 million (based on two stations)	60,000

3.2. The replication effort

Although numerous organizations were involved in the original pilot project at the Kothmale Community Radio Station, one of them, UNESCO, was subsequently charged with the task of replicating the successful radio-browsing component of that project. Very little time elapsed before concrete results of the replication effort manifested themselves. By 2001, a pilot programme had been established, and not long thereafter, no less than 40 pilot 'community multimedia centres' (CMCs) were running in some 15 developing countries (where the CMCs 'combine local media, especially radio, by local people in local languages with information and communication (ICT) applications in a wide range of social, economic and cultural areas'). Unfortunately, even a rather extensive search of the topic yielded scant information about the coverage of any of these pilot projects and it is hence impossible on this basis to venture even a crude estimate of their overall impact. If, however, we assume for the sake of argument that the average maximum audience per project is equal to the figure reported for Kothmale Community Radio (of around 250,000), then the impact of the pilot projects as a whole would be in the vicinity of 10 million persons (who would otherwise have been excluded by the individual use measure of the global digital divide). It is to be hoped, therefore, that far more information regarding impact will be made available during UNESCO's most ambitious attempt to replicate the radio-browsing model, which, as announced in late 2003, consists of a collaborative endeavour with the Swiss Agency for Development and Cooperation, to create 50 new CMCs in each of three African countries, namely, Senegal, Mali and Mozambique[5].

In any event, however, these concerted efforts undertaken by UNESCO underscore a crucial policy issue in overcoming the digital divide by means of blending community radio with the Internet. The point is that even when local circumstances vary widely from one location to another (in terms, for example, of crops,

language and culture), the original radio-browsing formula can still be widely replicated. For the whole purpose of that idea was to create a policy framework for engaging wide segments of each society in a joint and intensely local endeavour to solve its own particular problems. We cannot overemphasize how much of a departure this approach represents from the early notion of a simple top-down transfer of Western plant and machinery to even the most remote areas of developing countries. Much maligned though this latter view has been (not least by Myrdal), it has nevertheless reappeared in the guise of so-called telecentres. Often funded by Western donors, these institutions may be defined as rural-based community facilities providing a range of services in ICTs. The underlying idea, therefore, is to promote the *individual use* of ICTs in general and the Internet in particular, among those who would otherwise be excluded, mainly but not exclusively in rural areas. As if nothing had been learnt about technology transfer in the past 30 years, telecentres have been established in many parts of the Third World, with predictably poor results in most cases. Among those who *have* absorbed the lessons of history, it comes as no surprise that in areas most lacking in capabilities such as sub-Saharan Africa, telecentres in rural areas have gone largely unused, especially in the case of the Internet (recalling to mind the many 'white elephants' that an unthinking transfer of Western technology has produced over the years).

Finally, we turn to a more aggregated level of analysis at which blending of radio and the Internet can spread the number of beneficiaries (in this case listeners) vastly beyond the number of Internet users.

3.3. Networking as digital multiplication

Whereas the gateway model uses a combination of radio and the Internet to reach an audience within, say, 20 kms from the station, networks multiply the number of listeners by using the Internet to connect different radio stations and whereas the gateway model relies heavily on the involvement of local inputs, in the case of networking the role of community interaction is less clear and probably also less substantial. Yet, there are cases of networking which do provide information that is tailored in some way to the needs of listeners in particular regions.

One such possibility arises in network projects that offer listeners the opportunity of exposure to alternative networks and hence alternative perspectives. A project in Latin America, for example, has attempted to change a situation where

> international news, including news from neighboring Latin American countries, usually reflected North American and European priorities rather than Latin American outside Colombia, for example, news about that country rarely dealt with its internal tensions, its relations with its South American neighbors, or even its economy. News was more likely to be concerned with the relation between Colombia and the USA's domestic drug problem. [22]

The project in question, Ecuador's Agencia Information Púlsar, is based at least partly on the potential afforded by the Internet for accessing news about the region, for setting up and maintaining a network of correspondents, and for distributing news and information to radio stations – and enjoys the distinction of being 'the first major initiative to link independent radio stations via the Internet' [22]. These factors alone, however, do not impart a countervailing influence on the biased nature of the news that was described in the previous paragraph. What was also required was a deliberate effort to collect and disseminate 'information from and for Latin America and the Caribbean' [23]. By means of policies that varied from searching for alternative as well as mainstream news on the Internet, to establishing a regional network of correspondents, Púlsar made great strides towards overcoming the pre-existing developed-country sources of news and information. Indeed, by 2001, just five years after Púlsar had been inaugurated, at least one prominent observer was able to claim that:

> For the first time, *millions of listeners* of Latin American local and community-based radio stations had access to a non-commercial independent news and commentary service that was rooted in the social, political and geographic reality of the region. [22]

If, in this example, the blending of radio and the Internet may have altered the perspective of the listener, by offering him or her an alternative, less developed-country-based view of reality,[6] our second example of networking offers listeners in different regions much more specific and practical information. In particular, an enterprise known as the *observatoire du Marché Agricole (OMA)* in Mali provides the farming community with up-to-date prices of crops and livestock. This occurs in the following sequence:

> Every week officials from OMA descend on 58 [now 64] markets around Mali and record the high and low prices for grains, crops and livestock. They enter these on Dell laptops and e-mail the information . . . to other regional offices. There the data are compiled and sorted by producer in specific areas of the country; a rice farmer along the Niger River, for example, would get a very different price report from a herdsman near the arid Timbuktu. Radio

> stations under contract with OMA broadcast market reports in French and the dominant local languages. About 70% of Mali's 11 million inhabitants tune in to the market report with the loyalty of a soap opera audience. (Besides price information, the stations offer advice on vaccinating cows and storing cereals . . .) [24]

If the previous example shows that the multiplicative possibilities of Internet radio networking can run into the tens of millions, our final example, Indonesia's Radio News Agency 68H, provides a further and no less compelling illustration of these possibilities. (Indeed, it is well to take note here of the fact that both the Mali project just discussed and the Indonesian Radio 68H were cited as two of the eight finalists for the prestigious Petersberg Prize in 2004. This prize is awarded to contributions in the use of ICT for development that have generated benefits for large numbers of people). The Petersberg Prize Committee explained their choice of Radio 68H as a finalist in the following summary form:

> Radio News Agency 68H . . . is Indonesia's first and only nationwide independent radio news agency. It uses a low-cost mix of satellite and Internet technologies to gather, exchange and disseminate information among local radio stations. It is the first to provide people living across 17,000 islands timely, independent national and local news and public service programming via radio. As a result, more people have been able to play a role in Indonesia's democratization and development. 68H also provides programming to educate listeners about government, health care, technology, and the environment. . . . 68H *has 20 million listeners via 340 radio stations*, and provides 18 hours of programming a day. [25, my italics]

In analogy with Table 4, which compared the gainers from the gateway function of the Internet with Individual Internet users in Nepal and Sri Lanka, Table 5 compares the beneficiaries of the Internet radio networking projects described above, with individual Internet users in each of the countries concerned.

Table 5
Listeners induced by Internet-radio networking vs actual Internet users in three developing countries [21]

Project/Country	Number of listeners	Actual Internet users
Pulsar/Ecuador	In the millions	333,000
OMA/Mali	7,7 m	20,000
Radio 68H/Indonesia	20 m	4 m

Figures such as these more than justify the attempt we have made in this paper to move beyond the Indian case, which, important as it is for showing some of the most imaginative indirect mechanisms through which the Internet benefits rural areas, generally excludes the use of local or community radio as a policy instrument.

4. Conclusions

In a methodological style described many years ago by Myrdal in the *Asian Drama* [3], the global digital divide is usually thought about, measured and acted upon, on the basis of a crucial assumption that reflects developed-country realities rather than the conditions prevailing in the rural areas of most developing countries. The assumption in question is that the Internet (like other ICTs) confers its benefits on society solely by means of direct access to the technology itself. It is on the basis of this assumption, for example, that aid donors have sought to redress the divide by providing individual access to the Internet in the form of telecentres, which can be found in large numbers throughout the rural sectors of many developing countries.

We argue, by contrast, that while the assumption in question may well approximate reality in a context where most members of society actually own a computer with an Internet connection, it fails to capture the relationship between access and welfare across a wide range of circumstances in developing countries. For, in that latter category, what we find is a wide variety of indigenous innovations, ranging from the use of e-mail in post offices and digital extension agents to rural radio networks, that break the assumed link between individual use and welfare and that, in combination, appear to benefit tens of millions of often poor, illiterate and unskilled inhabitants. (Since we have made no effort to be comprehensive, moreover, the actual numbers of 'indirect' beneficiaries of the Internet will quite possibly run into the hundreds of millions).

It is not our purpose here to trace out all the implications of these findings, but they seem to us to bear perhaps most heavily on the need for supplemental measures of the digital divide in the Internet; on the nature, scope and replicability of indigenous innovations in ICT in developing countries and relatedly, on the potential net benefits of designing policies to use the Internet in ways other than through individual use throughout the rural areas of such countries. Our examples suggest that aid donors might often do much better by fostering such initiatives than by financing telecentres at high cost and more often than not with relatively low benefits. National governments, for their

part, should take more seriously than they mostly do the potential for using the Internet in ways other than expanding access to this technology. And where relevant, they should provide an environment which does not restrict the use of older technologies (such as community radio), which provide the basis of many such opportunities.

Endnotes

(1) A statement of the goals of the 'Millenium Declaration' can be found at www.developmentgoals.org/.
(2) See Ray [4] for a discussion of ways to bring this about.
(3) This section draws heavily on James [9].
(4) Over the past four months, the number had grown to 560,000, according to Dr. M.N. Reddy of the National Institute of Agricultural Extension Management.
(5) The best available evidence is contained in Etta and Wamahiu [26]
(6) A point made by Girard in a personal communication dated 6 August 2004.

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