

The Internet and rural development

James, M.J.

Published in:
International Journal of Development Issues

Publication date:
2004

[Link to publication](#)

Citation for published version (APA):
James, M. J. (2004). The Internet and rural development: Elements of a new paradigm. *International Journal of Development Issues*, 3(2), 93-108.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright, please contact us providing details, and we will remove access to the work immediately and investigate your claim.

The internet and rural development: Elements of a new paradigm

Jeffrey James

*Tilburg University, PO Box 90153 5000 LE Tilburg, The Netherlands
M.J.James@uvt.nl*

Abstract

The prevalent approach to providing the Internet in rural areas of developing countries takes the form of 'telecentres', where, it is assumed that 'access to' this technology will confer benefits on the target groups. The purpose of this paper is to show that this approach diverts attention from the many variables that determine whether and to what extent, access is translated into well-being. During this part of the paper we draw on Sen's analysis of the complex relationships between consumption and welfare. The second part of our critique is concerned to show that excessive concern with access, has led to the neglect of an alternative type of model in which knowledge rather than technology is the main concern.

1. Introduction

Defined somewhat broadly as donor-funded community access points offering a wide variety of information technologies, including the internet and located in rural areas, telecentres have been widely used throughout the Third World (manifest, for example, in the well-known Acacia Initiative of the IDRC, which, beginning in 1997, has supported a total of 35 telecentres in seven sub-Saharan countries).¹ Indeed, according to two authorities on the subject, "Telecentres have been hailed as the solution to development problems around the world because of their ability to provide desperately needed *access to* information and communication technologies (ICTs)" (Oestmann and Dymond, 2001, p. 1, emphasis added). It appears that the idea underlying such optimism is that since ownership of such technologies is all but impossible by single households in poor rural areas, the alternative is to provide *communal* access instead. This 'access to' the derivation of benefits from ICTs has recently been reaffirmed at the World Summit on the Information Society, held in Geneva at the end of 2003. In the Summit's Plan of Action, for example, one finds a clear statement of the need for the world's inhabitants to have '*access to* ICTs within their reach' (WSIS, 2003, p. 2, emphasis added) and for policies that will help to

bring this about. "Governments, and other stakeholders", for example, "should establish sustainable multipurpose community public access points, providing affordable or free-of-charge access for their citizens to the various communication resources, notably the internet" (WSIS, 2003, p. 4).

The purpose of this paper is to argue, first, that such widespread attention to the provision of 'access to' ICTs diverts attention from other factors that bear heavily on the ultimate welfare effects of these technologies on the target groups of individuals in rural areas.² More specifically, our argument is that these relatively neglected factors bear (positively or otherwise) on the mechanisms through which the *potential* gains available from individual access to ICTs (and the internet in particular) are translated into actual welfare gains. In formulating this part of the critique, we shall draw partly on Sen's analysis of the relationships between incomes, commodities and individual functionings.³

The second part of our critique aims to show that the excessive concern with access to ICTs also misses an alternative type of model, in which the target group *itself* makes no use of computers and internet connectivity. What occurs instead is that access to these technologies is left in the hands of a third party. This third party is responsible for extracting and presenting such information from the internet as is needed in the specific, local context. Examples of this alternative approach can be cited which indicate that it has a far greater degree of potential for delivering the internet to rural areas than is recognized under the current international policy framework, with its undue emphasis on providing 'access to' this particular technology.

The organization of the paper follows the two-fold critique that has just been summarized. The first part is devoted to the notion that the welfare effects of providing internet access to rural areas in a communal form such as telecentres are conditioned by multiple socio-economic variables in a sequential process that, as far as one can tell, has thus far produced generally disappointing results. The second part of the paper then turns to an alternative approach, which circumvents many of the problems that beset the prevailing model of delivering the internet to rural areas of developing countries.

2. The conditional impact of access to the internet on individual well-being

In formulating an analytical framework within which to appraise the 'access to' technology approach, we shall draw on two of the most important ideas in Sen's analysis of the relationship between consumption and welfare (1985).

The first idea is that, contrary to what is assumed in traditional theory, consumption does not take place at the point where goods are purchased. Rather, and more realistically, Sen argues that the utility derived from a good depends on how it is actually used. For, while a good may embody a number of objectively measurable characteristics (such as calories or proteins in the case of food products), the extent to which these available characteristics are actually obtained depends on how the good is used or prepared (food nutrients, for instance, can be quite sensitive to the way food is stored, prepared and served). More generally, therefore, 'In getting an idea of the well-being of the person, we clearly have to move on to 'functionings' – what the person succeeds in *doing* with the commodities and characteristics at his or her command' (Sen, 1985, p. 10, emphasis in original). In the most extreme case, individuals may be totally incapable of using the goods at their command (goods, which, for instance, may be supplied by governments). Sen alludes to this possibility when he emphasizes that 'bicycling has to be distinguished from possessing a bike', a distinction that is most forcefully exemplified in the case where the person possessing the bike happens to be crippled (Sen, 1985, p. 10).

Even if the same good is used in exactly the same way by two different individuals, the welfare effect may vary widely between the two users (a recognition which constitutes the second theme from Sen's work on which we shall rely in formulating our conceptual framework). Consider, for instance, a medicinal drug that is taken by two individuals in precisely the manner that is recommended by the manufacturer. The benefits, and hence the welfare effects, will, however, tend to vary according to the age, gender, genetic inheritance, body-weight, and the overall state of health of the individuals concerned. Table 1 lists these and other variables and provides examples of the mechanisms through which they operate.

These detailed examples are useful precisely because they illustrate how the welfare effect of the same good is conditioned by differences in personal attributes. But these are far from being the only differences that are important in this regard. Much may depend, for instance, on social rather than personal differences. Some societies place a heavy emphasis on status-intensive goods while others do not (or, to a lesser degree). In the same vein, the value attached to a particular good is likely to be associated with the relative position of the individual (as measured, say, by income) in the society at large. Or again, the contribution of a telephone to an individual's well-being will presumably depend on how many members of society also possess this particular mode of communication.⁴

Let us now bring these recognitions to bear on the nature of the process by which communal access to the internet culminates in a particular welfare effect

on the individual who resides in the rural area of a developing country. The sequential nature of the process is made explicit in Figure 1, which relies on three key phases to reflect the conceptual discussion above.

Table 1
Selected variables conditioning the benefits of medicinal drugs

Source	Mechanisms/examples
Age	'The main reason that age affects drug action is that drug metabolism and renal function are less efficient in babies and old people, so that with some exceptions, drugs tend to produce greater and more prolonged effects at the extremes of life' (Rang, Dale and Ritter, 1995: 785).
Genetic factors	'Genetic variation is an important source of pharmacokinetic variability' (i.e. variability due to altered handling of drugs by the body, which leads to differing concentrations of the drug at the site of action) (Rang, Dale and Ritter, 1995: 789). Genetic variation can also cause differing physiological responses to the <i>same</i> drug concentration and some such responses may often be harmful (e.g. allergic individual responses even at low dosages).
Disease	'Disease can cause altered handling of drugs by the body (pharmacokinetic variation) and/or altered sensitivity to drugs' (Rang, Dale, Ritter, 1995: 42). Vaccines given to those suffering from protein-energy malnutrition may be ineffective, or less effective than vaccines given to those with adequate amounts of these nutrients (Silverman, Lee and Mydecker, 1982).
Physiological individuality	Pregnancy, weight (the therapeutic function of a drug may often be inversely related to the weight of patients), sex (female patients tend to react more strongly to most medications and to suffer from a higher incidence of adverse effects) Martin, 1979).
Psychological	The placebo effect: "It has been found that a placebo can potentiate, attenuate, or negate the active ingredients in a drug (Wickramasekera, 1985: 256).

Source: James (2000, p. 67).

Panel 1 captures the basic idea underlying the telecentre approach to delivering internet access to the rural areas, namely, that access is communal rather than based on individual ownership of the technology. Let us assume then that access to the telecentre is free of charge to an entire rural community, whose members can make as much or as little use of the internet as they desire.

For the sake of simplicity, Panel 2 contains just two possibilities in this respect: either the internet is used (even if the amount of use is barely above zero) or it is not. In the latter case, the process is aborted and no welfare gain is associated with even free access to the internet. Assuming, however, that some use of this technology is made, Panel 3 becomes relevant and it seeks to capture individual

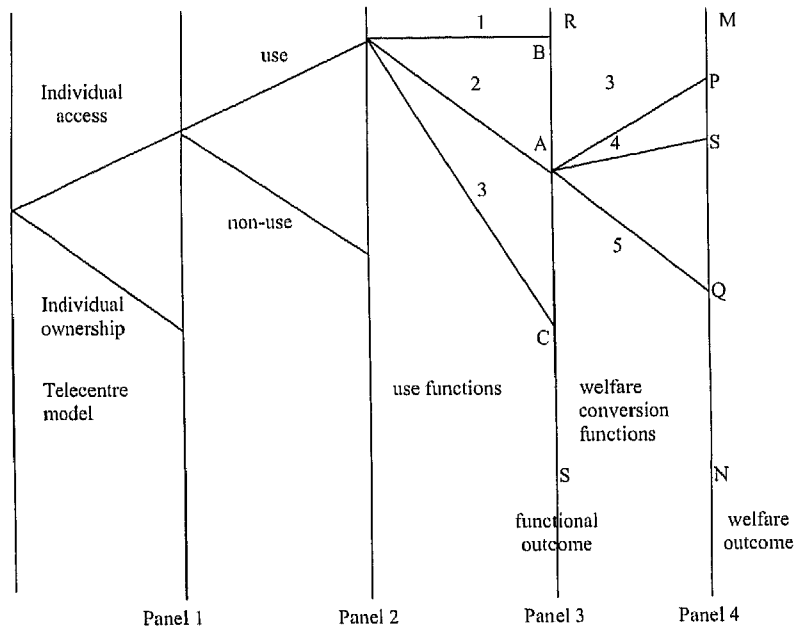
use patterns. One would like to know, for example, if only the e-mail function is used or whether the internet is exploited for more complex purposes, such as acquiring information or engaging in interactive functions of one kind or another. There are, of course, many other dimensions of use that could be cited in this regard, but they would not help us to convey the purpose of this phase of the diagram, which is to isolate purely the observable use patterns of an individual, without making any inferences about the subjective effects of his or her behaviour. One reason why it is important to separate the objective and subjective elements of internet use is that the former requires one to focus on the role of the technical capabilities of the individual.

In certain extreme circumstances, information gathered from the internet may even have a negative impact on welfare. It can occur, among other circumstances, when information is misunderstood with severe consequences: It is easy to imagine people taking matters into their own hands, if access to, for instance, medical advice is available online. A visit to the doctor or the veterinarian is costly, and maybe there is no one close by. In such a case it is tempting to try a treatment based on advice from the internet, but this can easily become an outright invitation to quackery. Even if someone can identify the exact symptoms displayed by the sick family member or neighbour, it is a huge leap from there to identify the actual disease and hence also the right treatment (Dalsgaard, 2001, p. 15).

In this phase too, of course, a multitude of possible examples could be cited. But the general point is that the subjective evaluation of the same internet experience (denoted by point A) can lead to a variety of different welfare outcomes, as shown by the points P, S and Q on the line MN (which can be thought of as an ordinal measure of well-being).

In certain extreme circumstances, information gathered from the internet may even have a negative impact on welfare. It can occur, among other circumstances, when information is misunderstood with severe consequences: It is easy to imagine people taking matters into their own hands, if access to, for instance, medical advice is available online. A visit to the doctor or the veterinarian is costly, and maybe there is no one close by. In such a case it is tempting to try a treatment based on advice from the internet, but this can easily become an outright invitation to quackery. Even if someone can identify the exact symptoms displayed by the sick family member or neighbour, it is a huge leap from there to identify the actual disease and hence also the right treatment (Dalsgaard, 2001, p. 15).

Figure 1
Internet access and individual well-being



What this framework implies for the 'access to' approach to ICT in general and the internet in particular is that if it is to serve as a viable model, with a generally favourable welfare effect, the mechanisms described in Panels 2, 3 and 4 need take a particular form. And in order to assess whether this is indeed the case let us turn to examine the experience with Telecentres (representing, as they do, the most prevalent form of this approach).

3. Telecentres, the internet and well-being

Although telecentres have been widely dispersed across the developing world, evidence regarding the outcome of these initiatives is somewhat scant for most regions. Probably the most extensive evaluation has been conducted by the International Development Research Centre in sub-Saharan Africa where, between 2000 and 2001, more than 3,500 respondents from 5 countries were sampled in 36

telecentres and cybercafes (Etta & Wahamiu, 2003). One of the major findings of the study is that only a small percentage of the total population was actually using the telecentre facilities, with the number of daily visitors ranging from between 8 to 20. Moreover, "Users [were] shown to have been disadvantaged on the basis of age, gender, education, literacy levels, and socio-economic status" (Etta, 2003). When one disaggregates telecentre use by type of service (such as photocopying, facsimile transmission, telephony and the internet), there is a clear tendency for users to focus on the less complex activities, as illustrated in Table 2 for the case of Mozambique (and more specifically, for the telecentres located in Manhiça and Namaacha).

Telecentres in rural areas seemed to be especially prone to the problem of low internet usage. In particular, "Low or non-use for some services was reported, for the internet and e-mail in the more rural MCTs [multipurpose community telecentres] in Uganda, Mozambique and Mali" (Etta, 2003). Translated into the framework of Figure 1, what these results imply is that the process is aborted very early, in Panel 2 (along the non-use fork) for the vast majority of potential users (who, being illiterate, uneducated, female and otherwise disadvantaged, are most in need of the benefits that the internet is capable of delivering). And even if the number of users can be made to include more of these disadvantaged groups, we have shown in the discussion above that major problems may be encountered in phases 3 and 4 (not the least of which has to do with the relatively complex level of capabilities that are required in order to exploit the opportunities that the internet potentially affords).'

Note that sub-Sahara is by no means the only region where Telecentres have experienced highly disappointing outcomes, for there also many similar examples in Latin America and Asia. One of the most publicized cases in Latin America, for example, concerns the LINCOS project, associated among other institutions, with the MIT Media Lab (Amighetti & Reader, 2003). In the form of a Telecentre with four internet enabled computers and other equipment in a rural area of Costa Rica, the project is said to have benefited mostly coffee farmers from outside the region, in contrast to the local community which exhibited scant interest in the possibilities made available to them (who, in fact, were the target group of beneficiaries identified by the project).

The problem is ultimately that merely making access to the internet a communal rather than an individual possibility is insufficient by a wide margin, in overcoming the fact that this technology was designed in and for developed countries. I am referring here, most notably, to differences in education, user capabilities, literacy and individual modernity (as defined, for example, in the work of Inkeles).⁵ Although these and other problems associated with the import of technology from the developed countries have been recognized since

the 1970s – mainly in the literature on inappropriate technology⁶ – they appear to have been overlooked by those seeking to use Telecentres as a model of delivering the internet (and to some degree other forms of ICT) to remote rural localities in the Third World.

Table 2
Frequency of Use of Telecentre Services (Mozambique)

Telecentre Services		Frequency of Use										Total	
		5 d/w		3 - 4 d/w		1 - 2 d/w		2 d/m		1 d/m			
Manhiça	Gender	M	F	M	F	M	F	M	F	M	F	M	F
	E-mail	4	0	0	0	9	0	2	0	2	0	17	0
	Internet	4	0	0	0	3	1	3	0	0	1	10	2
	Use of computer	13	7	11	2	8	0	3	0	4	0	39	9
	Telephone	6	3	9	2	10	2	2	1	1	1	28	9
	Fax	1	0	1	1	0	1	1	1	0	0	3	3
	Photocopies	6	1	11	0	6	1	5	2	7	2	35	6
Namaacha	E-mail	3	1	2	0	2	2	1	0	1	1	9	4
	Internet	1	0	0	2	1	1	1	0	1	1	4	4
	Use of computer	9	2	1	2	5	5	1	0	1	0	17	9
	Telephone	12	10	16	8	11	9	3	0	0	1	42	28
	Fax	2	1	0	0	1	2	0	0	0	0	3	3
Photocopies	12	4	3	6	27	4	4	5	2	9	58	38	

Key.

d = day w = week m = month M = Male
F = Female d/w = days per week d/m = days per month

Source: Etta & Wahamui (2003)

In the short to medium run it is difficult to conceive of a solution to the problems of illiteracy, education, capabilities and the lack of modernity (a factor which bears heavily on attitudes to science in general and information technology in particular).⁷ And if one is concerned to deliver the benefits of the internet to more than a tiny fraction of the rural population within a reasonable period of time, it seems clear to us that an alternative paradigm needs to be introduced. It is to this crucial issue that the following section is devoted.

4. An alternative paradigm

The paradigm we envisage entirely eschews the concept of 'access to' ICT and by extension the use of telecentres as a means of bringing the benefits of the internet to rural areas. What the new paradigm proposes instead is the idea that what is crucial is the transmission of useful knowledge from the internet to

recipients, *rather than access to the technology itself*. Using the concept of technological blending⁸, for example, such knowledge can be transmitted over community radio, without any need for recipients to come into contact with computers or the software that accompanies their use. Since the radio is owned by a relatively high proportion of rural inhabitants in developing countries⁹, blending this 'old' technology with the internet can potentially result in benefits for a vast number of people. Such a possibility contrasts sharply with the limits imposed by the Telecentre model, as Girard (2003, p. 11) has emphasized:

In the same way that a single cyber café or telecentre with a few computers can be an efficient way of increasing the number of people connected, providing access for dozens of people with only a few computers, a radio station with thousands of listeners that makes active use of the internet can address the problem of access to the internet's wealth of information with a tactic of *digital multiplication*, multiplying the impact of its internet connection (Girard, 2003, p. 11, emphasis in original).

This tactic will only be successful, however, if the information gleaned from the internet is transmitted to the listeners in a form that they find comprehensible and relevant. After all, many radio owners will tend to suffer from the same disabilities that inhibited their use of the Telecentres, as described above in regard to sub-Saharan Africa (disabilities such as a lack of even basic education, an adherence to traditional values and attitudes, an inability to understand the English language and to translate information from the internet into actual welfare gains). What matters from a welfare point of view, is of course, the effect of any particular blend on the owners and users of radios. Fortunately, an example exists which is widely regarded as an innovative and successful attempt to bring the resources of the internet to bear on local circumstances, by means of a programme known as 'radio browsing', which forms part of the 'Kothmale Internet Project' in Sri Lanka. As described by Pringle and David (2002, p. 5-6):

Radio web browsing has opened a window onto the internet for the local community ... After researching their topics and choosing websites to feature, Kothmale's programmers browse the internet live on the radio using a computer in the studio. The content of each programme focuses on specific information within a different topic: health, legal issues and ICTs themselves. Staff, volunteers and guest experts provide interpretation and translation of well-based information for the local audience. A huge amount of information becomes accessible, firstly because *it is explained in simple terms, secondly because it is contextualised to suit the local environment and thirdly and most importantly, information is presented in the local languages* ... ICTs and the web become the focus of the programme in terms of both content and format – the shows are essentially live web-browsing telecasts. (emphasis added).

If this description conveys a strong sense of community involvement in making the internet relevant and accessible to the radio audience within broadcasting range from the studio, so too does a flow back from listeners to the web-

browsing programmers, in terms of a steady supply of letters, calls and drop-ins. The station, in turn, would provide answers to these questions during a designated portion of the daily broadcast. It is these specifically local aspects of the attempt to blend old and new technologies at Kothmale, rather than the general idea itself, that seem to account for what many observers regard as a successful outcome of radio browsing.

Viewed from the perspective of Figure 1 above, the radio-browsing model can be said to have overcome or mitigated the very problems that tend to undermine the 'access to' technology approach, as embodied typically in Telecentres, whose presence in the developing countries is already so pervasive. For one thing, the difficult problem of illiteracy in many of the poorest regions of developing countries, is overcome by the oral (as opposed to written) transmission of information from the internet (which, also, by definition eliminates the need for user capabilities with respect to operating computers and navigating the internet). Because the radio programmers belong to and are familiar with the needs of the community, they are well placed to select relevant web-sites. And the value of the information contained on those sites is sharply enhanced by the expert volunteers on the programme, who are able to interpret, simplify and translate it (each of which activity would tend to enhance welfare in terms of panels 3 and 4 in Figure 1). Indeed, some of the available anecdotal evidence indicates the manner in which listeners gained from the information provided on the radio-browsing programme. In one case, a villager used the information from one such programme to devise a new, more effective mosquito coil based on local inputs. A second example recounts how a radio presenter passed on information to his listeners from an Indian web-site about tealeaf crushing (information which he first had confirmed by local experts). In yet another example, "new uses for bamboo were introduced to Kothmale after a programme browsed a website in the Asia region and found new crafts using bamboo" (Hughes, 2003, p. 11).

What is remarkable about the Kothmale case, then, is not only that it managed to combine 'old' and 'new' technologies, but also and perhaps more importantly, that ways were found to offset the developed country orientation of the internet and in the process make this technology useful to a markedly different group of people – it is precisely those mechanisms, we should stress, that are absent in the basic Telecentre model and without which mere access to ICT will prove inadequate to meet the goals set by its proponents. Such innovations as occurred at Kothmale were, moreover, of indigenous origin; a project feature that may, more generally, turn out to be of critical importance in finding potential alternatives to Telecentres. For, if these are to turn out successfully, intimate knowledge of the local context would often seem to be essential (as the radio-browsing initiative at Kothmale illustrates so clearly).

And it is infinitely more likely that such knowledge will be available to and embraced by, local rather than foreign (developed country) institutions.

5. Blending telephones with the internet

Relatively little has been written about the blending opportunities afforded by the other major mode of mass communications, even though, when public payphones are taken into account, the sheer numerical possibilities are considerable in many developing countries (even in rural areas).¹⁰ No less telling are the functional possibilities of combining telephony and the internet in such areas, beginning, as Richardson (2000, p. 19) has rightly emphasized with basic extension activities:

Is an area where the telephone can be married with internet tools very effectively ... For example, a handful of trained extension experts, backed by agricultural researchers and networks of input suppliers, marketing organizations and others ... could provide prompt and accurate voice answers to questions they receive from farmers over the telephone. Initial agricultural knowledge and information needs assessments could determine key information needs and knowledge gaps that would generate frequently asked questions. Well-researched answers to probable frequently asked questions could be present in an on-line web-based database available to the extension experts, regardless of their physical location. As such a service develops, frequently asked questions can be tracked and additional researched answers added to the database. Very specific questions with answers not in the database would be referred to other extension experts or the agricultural research community for follow-up and reply to the information requestor. An on-line list of experts, their specific fields of expertise, availability for fielding questions, email addresses, fax numbers and telephone numbers would be instantly available to information providers through the database.

What do exist, however, are telephony-based innovations that are designed to bring the benefits of the internet to rural areas through other means than the behaviour of extension agents. Perhaps the most promising of these can be described as 'browsing the internet by telephone'. As in the case of radio-browsing described earlier, the idea is to deliver the benefits of the internet to anyone in possession of, or access to an 'old' technology, regardless of whether that person is illiterate, unable to understand English or use a computer. Telephone browsing, however, is more heavily based on technological complexity and in particular on technological change in interactive voice response (IVR) systems, which has given rise to an entirely new generation of such systems (the older generation was capable merely of responding to digits punched on the telephone with recorded prompts). The new generation of IVRs, by contrast, are capable of being used as a way of interacting with users, for the collection and delivery of information, on the basis of speech recognition and text to speech engines. These newer IVRs, moreover, are being designed with the ability to run the same kind of query scripts through which the internet runs

via programming languages. Such features, in turn, enable the design of an IVR system that effectively operates as the telephonic equivalent of an internet browser. Quite literally, therefore, users can access information by speaking their requests into a telephone and receiving the answers in speech form via the application of a text to speech engine – in India an indigenous text to speech software programme has already been introduced. It permits the translation into speech of Indian text in 18 Indian languages.¹¹ Although the applications of this software programme have yet to be worked out in rural areas with access to a telephone, its potential as another alternative to the Telecentre approach is difficult to overestimate.

6. Conclusion

The dominant mode of delivering ICTs to rural areas in developing countries is through the establishment of telecentres or communal access points. The idea being that since ownership of these technologies is impossible for all but a tiny percentage of rural inhabitants, communal access needs to be provided instead. This idea is sensible enough as far as it goes. The problem is the additional notion (often left implicit) that access of this kind will give rise to a relatively large number of users, who, furthermore, will be able to derive in practice, the benefits that such technologies (and especially the internet) potentially afford.

For, as we argue in the first part of the paper, this assumption neglects all the variables that *actually* intrude on the welfare effect of granting even free access to the internet (and in varying degrees, to ICTs more generally). Our critique is centred around a simple diagram that seeks to highlight the sequential nature of the relationships involved in the transition from 'access to' ICT and the ultimate welfare impact experienced at the level of the individual him-, or herself. At particular phases of this process, our analytical framework draws on Sen's work in the area of consumption and well-being. This framework is then used to interpret the recent assessments of the highly disappointing experience with telecentres, mainly, but not only in sub-Saharan. Indeed, as we see it, the problems associated with these institutions are so acute that, at least in the medium term, nothing less than an alternative paradigm is required; a paradigm that better accords with the situation prevailing in developing as opposed to developed countries (where the telecentre concept first arose).

The second part of the paper suggests that in fact an alternative of this kind already exists, although it is as yet far from fully developed. The distinctive feature of the alternative paradigm is that information from the internet is made available to rural inhabitants in various ways that do not require them to have access to computers. As shown in the examples provided, these alternative

modes of delivering information are able to overcome the problems of illiteracy, lack of English language skills and user capabilities that undermine the telecentre model so forcefully. More specifically, our examples involve the blending of 'old' communications technologies, such as the radio and the telephone (which, when public payphones are taken into account, are widely available, in most developing countries), with a 'new' and much more complex information technology. In the one case, relevant information from the internet is conveyed in a meaningful way to listeners via so-called 'radio-browsing' programmes, while in the other case, advances in interactive voice response (IVR) technology have already led, in one developing country (India), to the possibility of 'telephone browsing of the internet'; that is, for anyone with access to a (public) telephone to have relevant information converted from text to speech in a variety of local languages.

Notes

1. The details of the Acacia Initiative are available at <http://www.acacia.org>
2. Parts of the paper draw on James (1994).
3. As set out primarily in his *Commodities and Capabilities*, North-Holland, 1985.
4. Douglas and Isherwood (1979) provide an interesting anthropological perspective on this type of issue.
5. Inkeles (1983) contains a detailed and empirical analysis of the factors that seem to contribute to individual modernity.
6. Perhaps the best-known work in this area is by Stewart (1977).
7. Inkeles (1983) is also at pains to stress the time needed, to acquire the traits of 'modern' man.
8. Blending is discussed at length in Bhalla and D. James (1988).
9. See the figures in the VARIOUS yearbooks of the UNDP, ITU & UNESCO.
10. This is very clearly shown in the Asian case estimates in Minges and Simkhada (2002).
11. As described in Prologix Software (2002-3). See, also the less technical article by D' Souza (2002).

References

- A. Amighetti and N. Reader (2003). 'Internet Project for Poor Attracts Rich', *Christian Science Monitor*, July 24.
- A. Bhalla and D. James (eds.) (1998). *New Technologies and Development*. Boulder, Lynne Rienner.
- F. Etta (2003). 'The Trouble with Community Telecentres', Acacia Programme, IDRC. Available at www.acacia.org.za/telecentres_etta.html.
- S. Dalsgaard (2001). 'An Essay on ICT in Development', mimeo, University of Aarhus, Denmark.
- M. Douglas and B. Isherwood (1979). *The World of Goods*, London, Allen Lane.
- B. Girard (2003). 'Radio and the Internet: Mixing Media to Bridge the Divide', in B. Girard (ed.) *The One to Watch: Radio, New ICTs and Interactivity*. FAO, Rome.
- S. Hughes (2003). 'Community Multimedia Centres: Creating Digital Opportunities for All', in B. Girard (ed) *The One to Watch: Radio, New ICTs and Interactivity*, FAO, Rome.
- A. Inkeles (1983). *Exploring Individual Modernity*, New York, Columbia University Press.
- J. James (2000). *Consumption, Globalization and Development*, Basingstoke, Macmillan.
- J. James (2004). *Information Technology and Development*. London: Routledge.
- M. Minges and P. Simkhada (2002). 'Telecommunications in Asia: a Closer Look at South Asia', ITU. Available at <http://www.itu.int/itunews/issue/2002/10/southasia.html>.
- S. Oestmann & A. Dymond (2001). 'Telecentres – Experiences, Lessons and Trends' in C. Latchem and D. Walker (eds.). *Telecentres: Case Studies and Key Issues*, London, The Commonwealth of Learning.
- Prologix Software Solutions (2002-3). 'Vaachak: the Indian Language Text to Speech Software', available at <http://www.prologixsoft.com/vaachak.htm>.

- I. Pringle (1999). 'Radio Sagarmatha: a Case Study from Nepal', Canadian Centre for International Studies and Co-Operation.
- I. Pringle and M. David (2002). 'Rural Community ICT applications: the Kothmale Model', *The Electronic Journal on Information Systems in Developing Countries*, 8(4).
- A. Sen (1985). *Commodities and Capabilities*, Amsterdam, North-Holland.
- R. D'Souza (2002). 'When Your PC Converses With You', *The Times of India*, December 7.
- F. Stewart (1977). *Technology and Underdevelopment*, London, Macmillan.
- D. Richardson (2000). 'Rural Access: How can Connectivity Contribute to Social and Agricultural Development', *TechKnowLogia*, March/April.
- World Summit on the Information Society (2003). *Plan of Action*, Document WS 15-03/Geneva A/DOC5/5-E.