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i-Development not e-Development:

Special Issue on ICTs and Development

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Arrival of the Internet in the late 1990s as a ‘global’ phenomenon has sparked many changes. One has been a change in terminology. Where before we talked simply of information technology (IT), we now talk of information and communication technology (ICT). This reflects the convergence of digital computing and telecommunications. Computers were largely focused on the processing of information. ICTs undertake both processing *and* communication of information, with recent interest tending to highlight the latter.

These changes have also affected development. e-Development – use of electronic ICTs like the Internet to support development – has arrived. Donors, attracted by a combination of the hype and hope generated by ICTs, have altered their funding priorities and pushed ICTs up the development agenda. Within that agenda has begun to appear the idea that ICTs lead to the ‘death of distance’, create a ‘level playing field’ in which the small and the new compete on equal terms with the large and the well-established, and permit leapfrogging to an ‘information economy’. If ICTs are thus seen as critical to development, then great concern must be expressed about those who lack access to ICTs. Hence, the creation of bodies like the G-8’s DOTForce to combat this ‘digital divide’: seen by some as a key target for development action.

Like sharks drawn to blood in the ocean, a whole host of consultants, academics, vendors, and development organisation staff have been drawn in to the e-development arena by the scent of money. Others – like the serial divorcees convinced the next

marriage will be the one that works – are drawn in by the hope that, this time, a real answer to the problems of development has been found.

The result has been an explosion of activity and writing, much of it poorly thought out and with little understanding either of history or of development realities. An enduring theme of such work has been over-emphasis on the technology itself, to the exclusion of other parameters.

This current collection of papers – written by dolphins rather than sharks – aims to move beyond the current enthusiasm for derivative description and technological determinism. It aims to introduce a deeper and more balanced understanding of the relationship between ICTs and development.

The papers were chosen to present a broad range of approaches and topics related to ICTs and development. At one end of the continuum of approaches, the work of Schech and of van der Velden provides conceptual analysis of the role of knowledge and ICTs in development. At the other end, papers by Odendaal and by Boyle are reflections on ICT use in practice within individual development projects.

In between, there are papers by Arun & Arun, Chepaitis, Duncombe & Heeks, and Kiraka & Manning. These provide much-needed survey data – valuable evidence of the realities of ICT and ICT-related applications at a time when anecdotal vignettes and armchair comment have tended to dominate. Finally, approaches used elsewhere in development research are starting to be applied to ICTs and development. Two

examples are provided here. McMahon & Bruce use phenomenography to better understand the perceived skills needed in ICT projects. Tschang et al. bring an economic perspective to bear on ICT project sustainability and externalities.

Topic coverage is equally differentiated: from infrastructure (Chepaitis) to individual skills (McMahon & Bruce); from the public (Boyle) to the NGO (Kiraka & Manning) to the private sector (Duncombe & Heeks); from impacts of using ICTs (Odendaal) to impacts of making ICTs (Arun & Arun); and from the role of technology (Tschang et al.) to the role of knowledge (Schech, van der Velden).

Despite these differences, however, there are many similarities, particularly in looking beyond the technology to a broader understanding. A number of common themes and overall messages can therefore be summarised, as indicated below.

Information (and Knowledge) at the Core

Most application of ICTs in developing countries has been ‘intensive’; that is, applied to pre-existing processes and outcomes (Narasimhan, 1983). To understand this application, we can ask “What do ICTs do?” They handle information in digital format. That’s all. Therefore ICTs cannot be understood unless one understands the pre-existing role of information within development.

This role can be divided into two main parts – processes and outcomes. The most important processes are:

- Processing: changing data with potential value into information with actual value.
- Communication: the movement of data from source to recipient.

Electronic handling of these processes – i.e. digital data processing and digital data communication – represents the main contribution of ICTs (electronic data capture and storage are relatively minor contributions).

The outcomes that actually contribute to development are:

- Learning: the metamorphosis of information into knowledge as part of the learning process.
- Decision making: the input of information into decisions.

It is ICTs' support to learning and decision-making that constitutes their 'intensive' contribution to development.

Because an understanding of information needs to be the starting point for much ICT-related work, a number of the papers focus on this. Chepaitis sees the contribution of ICT-based systems to development being undermined by the poor quality of information that goes into them. Duncombe & Heeks analyse the role of information in the lives of poor entrepreneurs as a precursor to understanding the potential role for ICTs. McMahon & Bruce investigate the components of 'information literacy' that are a prerequisite for effective use of ICTs in development projects.

Schech and van der Velden take the analysis one stage further, emphasising knowledge as a key product of information. Van der Velden differentiates two things. First, the view of knowledge deriving from the recent corporate craze for 'knowledge management'. Second, the requirements for knowledge in development. Schech, investigating the sociology of knowledge in development, identifies its relation to power. Both authors use this background to help understand more about ICTs. They also remind readers that communication is not just about delivering information *to* the poor and oppressed; it can also be about transmitting information and knowledge *from* these groups to a wider audience.

Approaching the topic in this information-/knowledge-centred way gives a sense of continuity more than radical departure. This is true in historical terms – current ICTs are seen merely as a present stage in digital evolution that has been going on for more than 50 years. This promotes the idea that we can learn from the long-standing literature on IT and development, rather than ignoring it.

The sense of continuity is also true in technological terms – ICTs should be set alongside other information-handling technologies rather than separated from them.

These technologies can be classified:

- Digital technology (ICT) that handles data as 1s and 0s.
- 'Intermediate' technology, still based largely on analogue information held as electro-magnetic waves, such as radio, television and telephone.
- 'Literate' technology, based on information held as the written word, such as books and newspapers.

- 'Organic' technology, based solely on the human body, such as the brain and sound waves.

Again, this promotes the idea – as in Schech's paper – that work on ICTs can learn from prior work on radio, on TV, on other mass media, on telephony, on 'oral culture', and so forth. It also promotes the idea that development initiatives – in placing information first and technology second – can choose from a range of possible technologies that best meet current information needs. As Duncombe & Heeks indicate, this may well mean pushing use of telephony and other intermediate, literate and organic technologies back up the poverty alleviation agenda. They have tended to be pushed out of that agenda by ICTs in recent years.

The Impacts Associated with ICTs

Viewpoints on ICTs and their associated impacts can be classified according to the following framework of two continua (Heeks, 1999). First, a continuum of *technology impacts*, from optimism to pessimism. Some people – optimists – associate ICTs with largely positive impacts like wealth creation and improvements in service quality. Others – pessimists – associate ICTs with largely negative impacts like unemployment and alienation.

Second, a continuum of *impact causes*, from technological determinism to social determinism. Some people – technological determinists – believe that it is mainly

inherent features of the technology which determine impacts of introducing ICTs; for example, that computers cause job losses. Others – social determinists – believe that it is mainly human choices within social structures which determine impacts of introducing ICTs; for example, that any job losses from computerisation arise when managers decide to exploit employees.

Each continuum has a midpoint of, respectively, neutrality about impacts and contingency about the causes of those impacts.

Figure 1: Framework for Analysing Different Views About ICTs and Their Impacts

Such a framework necessarily simplifies a complex reality, but it can be used to understand differing positions on technology and development. For example, several papers in this collection emphasise the current prevalence of positive and technologically determinist viewpoints. In some parts of the development community, such views – lying at position A in the diagram – have even come to dominate.

This has particularly been the case for outputs from some – not all – international development agencies. A number of factors among agency staff may explain the emergence of this viewpoint. They include naïvety about ICTs, desire for career advancement, pressure from ICT vendors, a lack of alternatives to the trends/fads of the Northern private sector, and pressure from political masters for quick solutions to development problems. The viewpoint also emanates from those seeking funds or guidance from the development agencies. They tend to mimic the views and messages of those agencies.

The papers in this special issue present a view that is somewhat different and, we would contend, more realistic in three ways. First, it sees a more limited current impact of ICTs. Tschang et al. note that some ICT applications in development are now moving beyond the pilot project stage. However, Kiraka & Manning's and Duncombe & Heeks' work is a reminder that, in the main, ICTs have not yet diffused very wide or very deep. Overall, as the latter authors note, we need a reality check that ICTs are not used by the majority of the world's poor, and will not be used by them for the foreseeable future.

Second, the views expressed in this special issue are less optimistic. Boyle and Chepaitis cite examples of the failure of ICT-based systems to achieve their intended goals. To these total and partial failures may be added the sustainability failures, described by Tschang et al, of most telecentre initiatives. In addition, Odendaal notes the way in which ICTs, even if they work, can bring disadvantages to the lives of some. The viewpoint here is therefore more neutral than optimistic about ICTs.

This, at least, is the case for the ‘intensive’ uses of ICTs described above. However, ICTs can also be used in an ‘extensive’ role (Narasimhan, 1983) to develop new processes and, hence, new products and services. Areas of new economic activity produced through ICTs include:

- ICTs as an enterprise output: production of hardware, software and telecommunications products.
- ICTs as a primary, processing technology: provision of data entry services, ICT-based business services, software customisation, ICT-based distance learning, etc.
- Other ICT-related support activities: provision of computer training, consultancy and other services.

In extensive applications, there is a much clearer link between ICTs and the creation of jobs, incomes and skills than is the case for intensive uses of the new technologies.

One may therefore have grounds for optimism. However, as Arun & Arun indicate in their study of software production, even here one must recognise that there are both positive and negative impacts for various stakeholders.

Arun & Arun’s work also points to the third departure from other views on ICTs.

They describe the way in which traditional gender roles and issues are reproduced within ICT-based workplaces. Why does this happen? Because those workplaces sit within a socio-cultural context in which those traditional roles and issues still dominate. Their work therefore highlights the way in which social contextual factors have a significant effect on the impacts associated with ICTs. Odendaal’s work similarly

describes ICT impacts that were the result of a broader socio-political and institutional environment.

Does this mean we should swing to social determinism, seeing ICTs merely as a tool for reinforcing existing social, cultural and political ‘faultlines’? It does not.

Technology is the central force in most notions of economic development, and it also plays an important role in social development. Many of the authors provide examples of the way in which technology, of itself, makes a difference. Schech notes the new possibilities for interaction between centre and periphery and from periphery to periphery that ICTs bring. Duncombe & Heeks identify the opportunities ICTs offer the poor to break out of their current constrained, insular information systems. Tschang et al. describe the economic externalities that ICTs can deliver.

But the keywords here are ‘possibilities’, ‘opportunities’ and ‘can’. Technology provides the world with new opportunities, with new potentialities. The ways in which those opportunities are harnessed, though, and the actual impacts that arise are more systemically determined by contextual factors: the political, the economic, the socio-cultural, and the institutional. Technology itself must also be seen as socially-constructed; as an artefact of a particular environment, created by particular stakeholders for particular purposes. Therefore, in acknowledging the balance between the social and the technical, the views here will nonetheless tend more toward the former.

In all, then, the views expressed in this special issue cluster more around position B in Figure 1; far removed from position A. Indeed, they suggest the dangers of position A, with its many opportunity costs. Position A views tend to draw attention, resources, even ways-of-thinking away from other possibilities – neutralising discussion before it takes place, to paraphrase Boyle. They lead to the construction of development problems in terms that assume ICTs are the answer. They turn use of ICTs into an end in itself rather than a means of achieving other development goals.

The papers here disagree and, summarising findings so far, they come to an integral and systemic model of ICTs, as shown in Figure 2. This presents an information-centred approach, with ICTs sitting alongside other information-handling technologies, as an integral part of an overall factoral and institutional environment that will significantly shape ICT-related impacts.

Figure 2: An Integral, Systemic View of Information and Communication Technology

Implementing ICT-Based Systems

What are the implications of these findings, and others in the special issue papers, for the implementation of ICT-based systems within development projects? Four main guidelines will be offered here.

Integrate ICTs into Development Objectives

One can identify a number of approaches to ICTs in development projects. In some cases, ICTs are *ignored* by those who are ignorant or fearful of the technology. In others, ICTs are *isolated*: treated as an independent factor that can be viewed separately from the rest of the project. Alternatively – as noted above – ICTs are *idolised*: placed centre-stage and regarded as the main solution to development problems. Some of these three are illustrated in the papers by Boyle and by Kiraka & Manning. None of these three represents an adequate approach, and they must be changed if the potential of ICTs is to be realised.

Instead, an *integrated* approach is required. This sees ICTs as a means to an end, not as an end in themselves. In very simple terms, this approach has three steps for a development project (or other initiative):

1. Identification of the development objectives for the project.
2. Identification of the new and/or reengineered information requirements needed to meet those objectives.

3. Identification of the role that ICTs and other information-handling technologies have to play in meeting those information requirements.

In this way, and this way alone, ICTs can be integrated into the project, driven by development objectives rather than by technological concerns, but understanding the potentialities that ICTs present. Of course, as shown above, the realisation of those potentialities will depend on the broader institutional and factorial context. That, too, must therefore be taken into account.

Intermediate Access to ICTs

As already indicated, the majority of the world's poor will not own ICTs for the foreseeable future, and most will not be direct users of ICTs. Thus, despite the disintermediating potential of ICTs, for many development projects a key task will be the identification of 'ICT intermediaries'. As discussed in the work of Duncombe & Heeks, these are organisations (or individuals) who own ICTs and who can act as gatekeepers between cyberspace and the organic, informal information systems of those on the wrong side of the digital divide.

The identity of these intermediaries is critical. They must be in direct face-to-face contact with those whom they serve. They need to demonstrate a 'fit' of context and purpose with these clients. Where this is not the case, as Odendaal argues, those clients are unlikely to benefit.

Even if the right ICT intermediary is in place, as Tschang et al. describe, they often struggle to sustain themselves. They face sustainability pressures on at least four fronts. Perhaps the most difficult is financial. However, intermediaries must also be able to sustain their human capacities, the technology they use, and their purpose.

Yet, even this is not enough. As described next, intermediaries must be able to push beyond just providing access to ICTs.

Interconnect All Information-Related Divides

The notion of a digital divide has, in many ways, been unhelpful. It has given too much emphasis to the technology. It has drawn attention away from the other divides and inequalities that hamper development. The papers in this collection redress that balance. They identify and highlight all the other resources required to make an ICT-based system effective for development (see, for example, van der Velden, Odendaal, Tschang et al. and McMahon & Bruce)

These ideas have been encapsulated in the notion of the information chain (Heeks and Duncombe, 2001). As shown in Figure 3, the chain represents the interconnection between data – its start point – and effective action for development – its end point. It also represents the interconnection of all the resources required to make that chain work.

Figure 3: The Information Chain

To make the chain work, four resource categories are required by those making use of data:

- *Data resources*: they need relevant data to be available in the first place.
- *Economic resources*: they need the money, the skills, and the technology in order to access the data.
- *Social resources*: they need the motivation, confidence and knowledge to access, assess and apply the data, and they must trust the source.
- *Action resources*: they must be able to act on the learning and decisions made with the information. This will require action inputs (e.g. money, skills, technology, raw materials) plus resources like empowerment.

This is a reminder that the disadvantaged remain disadvantaged because of divides and inequalities in a broad range of resource endowments – knowledge, skills, money, power and others – regardless of whether they can access data using ICTs. At most, access to data and access to ICTs might be necessary, but they are far from sufficient conditions to enable effective development.

This brings several lessons.

The ICT intermediaries described above, if they are to be truly effective, must provide as many information chain resources as possible. More generally, all those involved with ICTs must adopt an interconnected approach that ensures an ‘information chain package’: not just technology but also the data, economic, social and action resources that are required to turn data into learning, decisions and actions of value.

One resource deserves particular attention, according to Boyle. That is motivation. Too often projects assume motivation is present; too often it is not. In designing ICT systems within development projects, it is critical to have an answer to the “Why should I?” question for all stakeholders. Why should they provide good quality data for ICT systems? Why should they learn ICT skills? Why should they access ICTs? Why should they use ICT-borne information? If there are no good answers, then the information chain will not function, and the ICT investments will be wasted.

Another resource deserving more attention is knowledge. A number of writers in this collection (van der Velden, Odendaal, and Boyle) argue that development should be seen more in terms of learning and of questioning assumptions and frameworks. It should be seen less in terms of the traditional instrumental, project achievement approach. ICTs may then play a different role. They would not be used so much as managerialist tools for the production of functionalist outputs. They would be used instead more as holistic development tools under the control of project clients for self-development, for political awareness-raising, and for knowledge-building. In this way,

ICTs would themselves contribute to development of the kind of social resources identified above.

Finally, the information chain model also suggests ways in which ICTs may be a divergent rather than convergent technology. As ICTs are introduced, those who already have information chain resources are likely to benefit. Those who do not, will not benefit. Notions of level playing fields and leapfrogging are therefore largely fanciful. Other things being equal, ICTs are therefore likely to increase the gap between the haves and the have-nots. This divide and this divergence have typically been classified in national terms, and Kiraka & Manning give an example. But divides go beyond this. Within nations, too, there are information-/ICT-related divides across class, age and gender (Arun & Arun discuss the latter).

Indigenise Development of ICT-Based Systems

Many ICT-based information systems fail in developing countries because of design—reality gaps. This is the gap between a system's design conceptions and the realities into which it is introduced (Heeks, forthcoming). The larger the gap, the greater the chance of failure. The smaller the gap, the greater the likelihood of success.

Most ICT-based systems implemented in the South are designed in the North. This typically brings a large design—reality gap, and helps explain the significant failure rates. Some elements of the gap are fairly straightforward. Kiraka & Manning, for

instance, discuss the more limited technological infrastructure and the higher technological costs found in the South compared to the North.

Harder to cope with are the more implicit Northern assumptions inscribed into ICTs, which often mismatch Southern cultural realities. These underlie much of the analysis provided in Boyle's paper. They are also exemplified by Kiraka & Manning, in terms of notions of status, the perceived value of information, and the perceived value of different communication methods.

All of this points to a need for more indigenous development of ICT-based systems. This is not a panacea: Southern designers can also be ignorant of Southern realities. However, there is a greater chance of adaptation of ICT-based systems to Southern values, processes, skills, and structures. Hence, there will be a greater chance of ICTs successfully contributing to development objectives.

Conclusions

For those with any length of service in development, it is easy for a jaundiced sense of déjà vu to set in; a feeling reinforced by Schech's analysis of a continuity of ideas. We have been here before and we will be here again, seeing 'magic bullets' proclaimed for development that eat up funds, eat up energy, spew out words and then fail to deliver.

And yet.... And yet.... Something is going on here. ICTs are worth a second look, and are worthy of more than patronising cynicism and disregard. In the Northern private sector, as the fog of the dot.gones and the hype of the new economy starts to clear, something has changed. The same is true in development: ICTs do make things different.

At the very least, there are new opportunities. These are best illustrated in the extensive application of the technology. ICT-based enterprises are springing up in every town and city; not just in the high-tech citadels of development like Bangalore. They make a rapid and direct contribution to development, and deserve better than the current neglect or disdain they receive from most of the development community.

Intensive applications of ICTs raise more questions than answers. The development benefits they bring are indirect; there are many failures; there are what many see as negative outcomes. Yet even here there exist pockets of genuine excitement and opportunity: giving voice to the poor; interconnecting poor communities; providing new opportunities for economic and social development.

For many developing countries, ICTs have come along like a runaway horse. Their choices seem stark. Jump on and be led who knows where. Or watch as the horse gallops off into the distance without them. The advice from this collection of papers is – try to throw a harness onto the ICT horse. ICTs do offer genuine possibilities. However, those can only be harnessed to achieve development objectives if ICTs are approached in the right way.

To do this, we need to move away from concepts of ‘electronic development’ that place ICTs centre-stage. Instead, as described above, the approach to ICTs must be information-centred, integral to its environment, integrated with development objectives, intermediated, interconnected, and indigenised. Above all, it must be intelligent. Our development priority for the future must therefore be i-development, not e-development.

References

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Web Links to Online Materials on ICTs and Development

General Pages

<http://www.iconnect-online.org/> - iConnect (DFID-funded ICTs and Development site)

<http://www.cityu.edu.hk/is/itdc/itdc.htm> - IS World's IT in developing countries page

<http://www.cityu.edu.hk/is/ejisdc/ejisdc.htm> - Electronic Journal of Information

Systems in Developing Countries

<http://is.lse.ac.uk/ifipwg94/> - IFIP working group on IT and development

<http://members.aol.com/kabjian/itindev.htm> - Information systems in developing countries

<http://cyberatlas.internet.com/> - Data on Internet growth trends

<http://www.man.ac.uk/idpm/ictdev.htm> - Development informatics papers

Specific Organisations/Initiatives

<http://www.infodev.org/> - World Bank's Information for Development programme

<http://www.undp.org/info21/> - UNDP's Information and Communications Technologies for Development programme

<http://sdnhq.undp.org/> - UNDP's sustainable development networking programme

<http://www.comnet.mt/> - Commonwealth Secretariat IT project

<http://www.bellanet.org/> - Bellanet: using ICTs to foster inter-agency development

<http://www.unites.org/> - UN Information Technology Service

<http://www.un.org/esa/coordination/ecosoc/itforum/ict.htm> - UN ICT Task Force

<http://www.bellanet.org/partners/aisi/> - African Information Society Initiative

<http://www.usaid.gov/alnk/> - AfricaLink: technical infrastructure for information sharing

<http://www.usaid.gov/regions/afr/leland/> - Leland Initiative on ICTs in Africa

<http://www.idrc.ca/acacia/> - IDRC's Acacia programme: ICTs and community development in Africa

<http://www.iadb.org/ict4dev/index.cfm> - Inter-American Development Bank's Latin America/Caribbean ICT programme