ICTs and the World's Bottom Billion

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While celebrating the emerging markets of Asia and Latin America, let's spare a thought for the world's "bottom billion". These are the citizens who inhabit the Fourth World that sits beneath the Third World; some dozens of countries that, in the words of economist Paul Collier "are falling behind, and often falling apart"[1].

As informatics professionals, why should we care about these countries? And how might information and communication technologies (ICTs) best be used to help them?

The bottom billion – a population akin to that of the US and Europe combined – live overwhelmingly in Sub-Saharan Africa or Central Asia. Life expectancy in these countries is just fifty years. One-in-seven children dies before the age of five. They missed the globalisation boat that sailed with many other developing countries in the 1980s and 1990s. While those other countries have grown steadily richer, the Fourth World of the bottom billion was actually poorer in 2000 than it was in 1970[2]. Thanks to the credit crunch, they could soon be poorer still. These aren't emerging markets, they are fading markets: the whole of Sub-Saharan Africa has an economy the size of Belgium's.

Should we be concerned?

Simple ethics says we should: developing an e-business solution to squeeze out a few extra ounces of profit or time-saving for the world's privileged living in the global North pales in ethical importance compared to applying new technology to the mega-problems of the bottom billion. And self-interest says we should: the bottom billion – countries like Somalia, Afghanistan, and North Korea – are key sources of global instability and risk including drugs, piracy and terror.

Not surprisingly, the bottom billion nations have been among the least digital. But that is changing. Official figures may indicate an average of only three internet users per hundred population[3] but that greatly underestimates the true reach. Information technology in the Fourth World is a communal, not individual resource. As a result, many times more are casual users; and many times more again have indirect access to internet-based data and applications through friends and relations. Internet connectivity is also growing fast: by 42% per annum in the bottom billion, compared to 18% in Europe.

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[1] Collier, P. (2007) *The Bottom Billion*, Oxford University Press, Oxford, UK
[2] *ibid.*
[3] ITU (2009) *ICT Statistics Database*, International Telecommunication Union, Geneva
http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx

Beyond the internet, comes even more of a bottom billion phenomenon: the mobile phone. Ten years ago, Manhattan had more phone connections than all of Africa. Today, thanks to the mobile phone, Africa has more phone connections that the US and Canada combined. Roughly one-fifth of bottom billion citizens are subscribers (up from around 2% at the start of the century)[4] but, as with the internet, the effective penetration – i.e. those who could access a mobile phone from neighbours, relatives, or local call sellers if need be – is higher; likely more than half the population.

Subscriber growth rates are also high – 50% per year compared to less than 20% in Europe – and sometimes highest for the most-afflicted countries. Three bywords for the worst of insecurity and instability in the bottom billion – Afghanistan, Democratic Republic of the Congo, and Somalia – have high investments and an average 100% annual growth rate[5]. Those rates are likely to sustain: in sub-Saharan Africa, for example, by 2012, 90% of the population will be within mobile phone coverage, up from 60% today[6].

We are still a long way from North American rates of ICT usage but it is well past time to move from talking about vague future possibilities, to talking about actual current priorities.

The first priority should be engagement. Hands-up if you're working on an informatics project in a bottom billion country. If not, most likely because we work far more where the money is than where the problems are.

In terms of information technology, the three key priorities are mobiles, mobiles and mobiles. As indicated above, mobile phones are now reaching far down into the bottom billion. At present, development solutions will need to be based around voice and text. But other possibilities are rapidly opening up.

One set of these lies around integration of mobiles with other information technologies. These could be radio and television, converting these high-penetration but broadcast-only media into much more interactive forms, as currently being achieved in the growing number of "community radio" projects. Or we can think of integrating phones with telecentres and kiosks. Pilots already underway suggest this can multiply the impact of web access many times[7].

Talking of which, how will the web and internet reach the bottom billion? The GSM Association estimates that 80% of internet delivery will occur through mobile[8]. However, mobiles are not the only way forward. WiMAX-plus-netbook systems can offer high-quality, low-cost internet access. Even more intriguing is the potential use of "white space": the unused parts of the TV broadcast spectrum. For the bottom billion, it will be many years before digital switchover and release of analogue

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[4] *ibid.*

[5] Konkel, A. & Heeks, R.B. (2008) *Challenging Conventional Views on Mobile Telecommunications Investment: Evidence from Conflict Zones*, Development Informatics Group, IDPM, University of Manchester, UK http://www.sed.manchester.ac.uk/idpm/research/publications/wp/di/short/di_sp09.pdf

[6] Denton, A. (2008) Policy priorities to connect Africa, paper presented at 1st international *Mobiles for Development* conference, Karlstad, Sweden, 11-12 December

[7] Donner, J., Gandhi, R., Javid, P., Medhi, I., Ratan, A., Toyama, K. & Veeraraghavan, R. (2008) Stages of design in technology for global development, *IEEE Computer*, 41(6), 34-41

[8] Denton, *op. cit.*

spectrum space, but new technology could be developed to identify and use existing white space spectrum gaps[9]. This could offer wide-reach broadband internet at a fraction of the cost of other solutions.

In all these areas, though, we need more, better and cheaper technological innovations that focus on the particular conditions and resource constraints of bottom billion customers.

Beyond hardware and software, what application priorities do the bottom billion demand?

Analysis of the problems of the Fourth World may help provide an answer. The key problem is that of exclusion: the average bottom billion citizen lives a life that is more fourteenth century than twenty-first century because their countries have been excluded from the benefits of globalisation and because, within their countries, these citizens are excluded from the services, opportunities, and resources that we in the global North take for granted.

Social exclusion has prevented the bottom billion from accessing basics like health, education, and government services. Many of these are information-based or information-enabled. ICT therefore has a central role to play. For example, it can disintermediate the sometimes-corrupt gatekeepers who stand between poor citizens and the meeting of their social development needs.

Political exclusion has helped perpetuate bad governance in bottom billion countries. Our Western mentalities have tended to simplistically condense the solution into elections. But Paul Collier argues these have been the least effective part of the governance armoury in the most-troubled nations. Instead, he says, we should be shooting for greater transparency: helping citizens hold their governments to account.

Transparency is all about information flows, so ICTs are crucial, and we already have some pointers about new ways in which it can be used. In West Africa, the notion of government surveillance has been turned on its head to create citizen "sousveillance": monitoring democratic processes and reporting on them using SMS and taking mobile phone pictures as evidence.

In East Africa, open information systems are being used to publicise how much government spending should be getting through to the "front line" of development. Combined with citizen report-back, in one case this raised the amount reaching schools from 20% of allocation to 90%[10].

And ICTs are integral to a new form of openness and engagement: e-participatory budgeting. This provides online citizen discussion and decision-making on how part of the government budget will be spent. Projects so far find thousands of people participating, and many more involved via friends and other ICT-savvy intermediaries.

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[9] Bahl, V. (2008) White space networking and the commoditization of pervasive internet access, paper presented at *Wireless4D 2008*, Karlstad, Sweden, 11-12 December
[10] Collier, *op. cit.*

Perhaps most important of all is *economic exclusion*. It should be axiomatic that the main difference between the world's poorest and everyone else is . . . they have less money. We need to ensure, in harnessing ICT for the bottom billion, that a strong priority is given to applications that help create wealth. To do this, ICTs must address the exclusion of poor individuals and poor nations from markets.

ICTs can generate new market opportunities. Flying somewhat under the radar of government and donor agencies, ICTs can help directly create new microenterprise for the poor. Ongoing research at the University of Manchester suggests this is one of the fastest-growing sectors in the bottom billion: it involves those who set up their own internet kiosks, those who stand on street corners selling mobile phone calls, those who sell pre-pay cards and phone covers, and many other business ideas.

ICTs can offer access to new sources of finance. Organisations like Kiva use web microfinance portals to make a direct link between individual sponsors in the global North, and microentrepreneurs in the bottom billion. In a less organised way, individuals in poor communities are turning their cell phones into mobile wallets. Relatives overseas remit money in the form of airtime. This is increasingly accepted by storeowners, colleges, health centres, etc. as an alternative currency.

And ICTs can improve opportunities for trade. By offering access to prices in different consumer markets, ICTs can increase incomes for the poor. We now have evidence that, the more remote the farmer or microentrepreneur, the greater the benefit of ICTs[11]. As the ICT base diffuses into the bottom billion, it also offers the prospect of digital trade; something especially valuable given that these nations are disproportionately landlocked. One small but fast-growing element of this is "IT social outsourcing": the offshoring of IT services work like digitisation and data entry with a combined commercial and developmental intent. Evidence from initial projects suggests this can furnish not just new incomes but new skills and confidence to those involved[12].

Perhaps we can best summarise all this by pointing to the *psychological exclusion* that we in the global North sometimes practice. We tend to exclude the bottom billion countries from our worldviews and from our informatics work. We tend to, wrongly, assume that ICT has little or no role in these countries. In fact it does already and will in future have much to offer. And we tend to conceive the bottom billion citizens as non-users. In fact they are not only increasingly-active users but they are in some sense innovators; constantly developing new applications and new business models with the technology but also looking for ideas and support from global partners like us.

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http://www.manchester.ac.uk/cdi
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[11] Muto, M. & Yamano, T (2008) The impact of mobile phone coverage expansion on market participation: panel data evidence from Uganda, *Journal of JBIC Institute*, 37, 48-63
http://www.jica.go.jp/jica-ri/publication/archives/jbic/report/review/pdf/37_05.pdf

[12] Heeks, R.B. & Arun, S. (2007) *IT Social Outsourcing as a Development Tool*, Development Informatics Group, IDPM, University of Manchester, UK
http://www.womenictenterprise.org/IT%20SocialOutsourcing%20Kerala%20Paper.doc