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APPLICATIONS FOR EMERGING ECONOMIES

“What can we Learn from the Developing World?”

Impact of Mobile Applications from developing Markets on Mature Economies

Prof. Gary Marsden, University of Cape Town, South Africa

Abstract

In this presentation we will explore designs that move from the developing world to the developed.

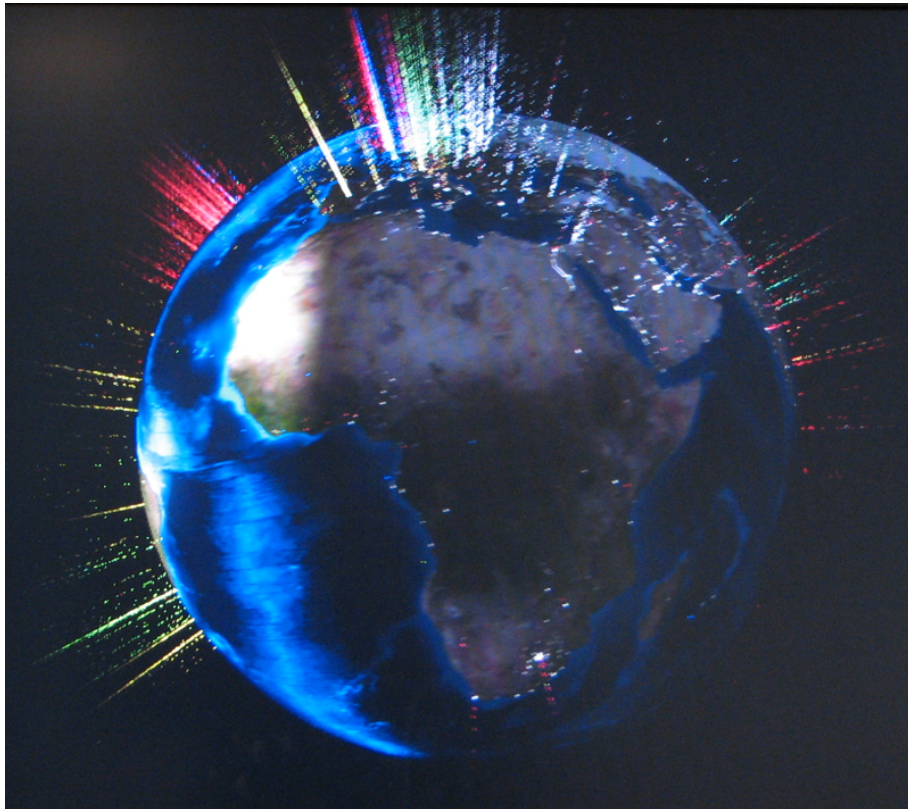


Figure 1: Google searches happening around the world

Context

A lot of people they see Africa as in Figure 1; some kind of technology wasteland. This is an image taken from a foyer in a Google building; the length and the intensity of the coloured lines represent how many searches are happening at that instant in that place in the world. And most of the time Africa is dark.

Despite this perception, technologically, Africa is an interesting place. As various other sections of this report present, Africa is not a technology wasteland. There are lots of interesting initiatives going on there. GSM networks, for instance, are highly prevalent, as can be seen in Figure 2. But does anything that happens there have any relevance back in Europe or America?

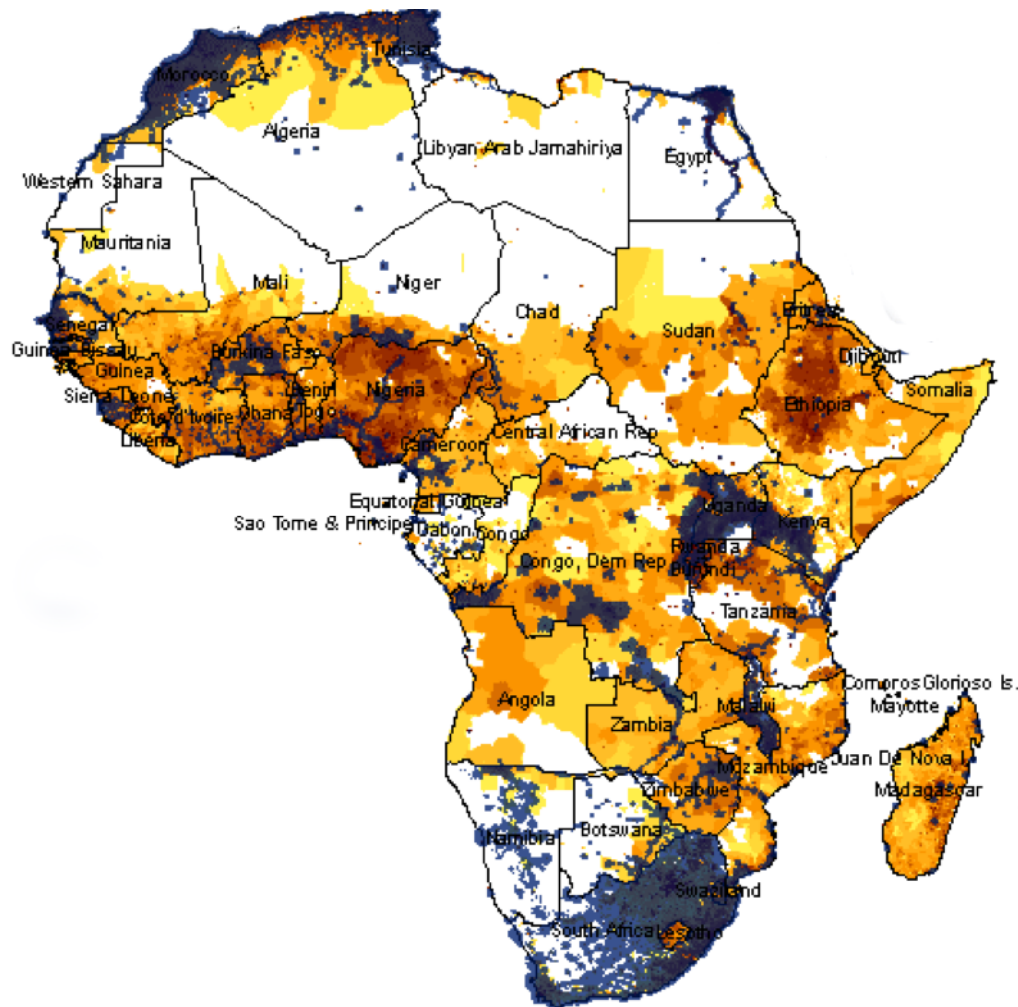


Figure 2: GSM Densities in Africa – darker colours denoting greater density.
Image from ITU, 2008 (www.itu.int)

From Developing to Developed

As a technology designer originally from Europe who moved to Africa 10 years ago, I realized I had been seduced and led astray by a thing called Moore's law[1]. Essentially, Moore's law states that, for a given price, every two years technology doubles in performance. Designers in developed countries are driven to create new prototypes based on the continued improved performance of future technology. However, this is only one form of driver for design; one that is not available to designers in Africa.

Within Africa, the relative cost of technology is much higher than in developed countries, so technology adoption rates are much lower. So, rather than work on

designs which require new technology to be introduced, we look at designing systems that extract more functionality from existing, or previous generation hardware.

Case Study 1 – The laptop

Looking at the example of a laptop, they have grown to become powerful and luxurious computing platforms. There are 17” laptops capable of running the latest games and even carbon fibre laptops from companies such as Ferrari and Lamborghini. Bucking this trend, however, is the XO from the One Laptop Per Child project (laptop.org) shown in Figure 3.



Figure 3 – The XO-1 laptop from the OLPC project. Image courtesy of Mike McGregor

This is a typical device developed for emerging economies. What is interesting, however, is the effect that this device has had on laptops created for existing markets. Looking at the sales in Figure 4, it is clear that netbooks are the most popular form of laptop. Netbooks, just like the OLPC, are stripped down, low cost, robust laptops with good battery performance.

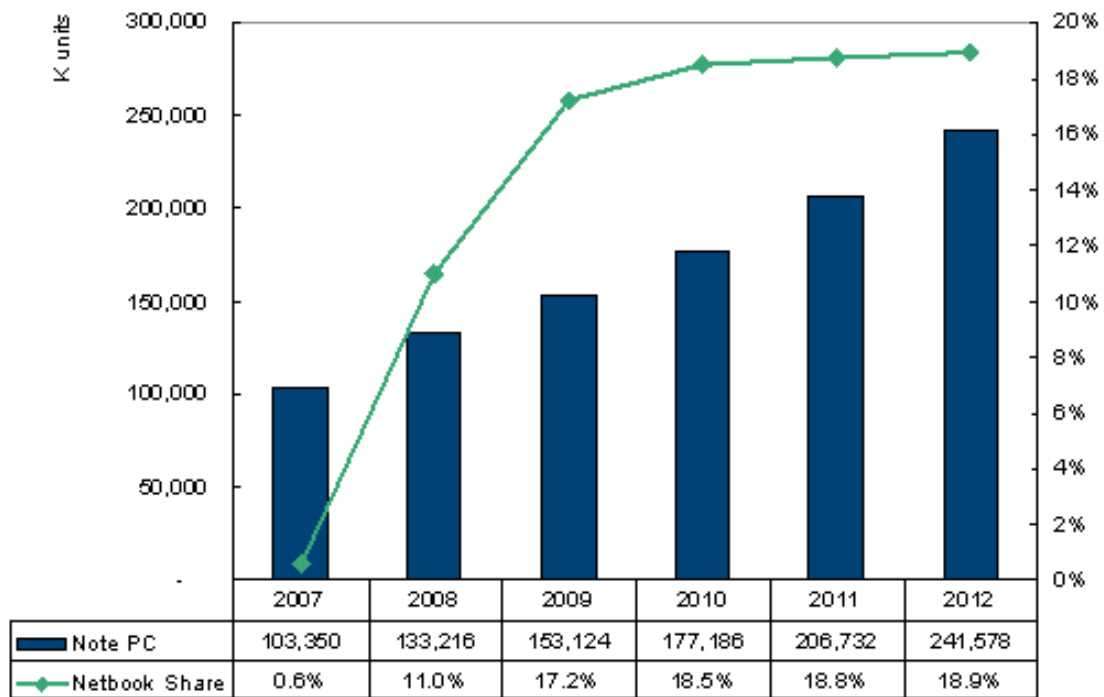


Figure 4 – Existing and predicted laptop and netbook sales

Nicolas Negroponte, the driving force behind the XO project, is claiming that the design ideas for the netbooks all came from the XO. When people saw the XO they realised that it met needs that *they* had (e.g. long battery life, robust, small) much better than the high-performance laptops the manufacturers were making at that time.

Here, then, is an example of how ignoring a technology-driven design process creates a product that has relevance in other markets. By focussing on the constraints of the environment in the developing world, the designers created a product that is useful to people living in the developing world. We believe that many more worthwhile designs can be created by focussing on the technology constraints rather than assuming it is the technology that must be changed.

Case study 2 - Photographs

The second case study resulted from our own research. We undertook an investigation which involved travelling to several countries in Africa, meeting people and seeing what they were doing with their mobile phones. One thing that became obvious is how many people had camera phones. For most people in Africa the cell phone is the only digital technology they will have access to. They won't have a digital camera. They won't have a PC. They won't have a laptop. They will just have a phone handset. The problem remains of how do they share those photographs stored on the handset. For people living in developed countries, photographs can be emailed, placed on a web site, printed or shown locally by a laptop or external monitor.

Without access to infrastructure to share photographs, many people we interviewed in Africa would have a well maintained archive on images on their handsets they used to show visitors. One person even had their wedding photographs on their handset. This led us to start thinking about what photo-management software users would want on their handsets if the handset was the only place they could store their photographs.

Firstly we wanted to create a system to share images. Given that there is no technology in the environment other than cellular handsets, we built a system that broadcasts images from one screen on to all the others within Bluetooth range [2]. See Figure 5 below.



Figure 5 – The image on one screen is broadcast to all others in the locality.

Again, we did not introduce new hardware, just increased the functionality of the existing technology.

We evaluated the system by sending people out for a day to take photographs with their cell phones. They then had to come back and explain, using the photographs, what had happened in their day to a friend who stayed behind. We did this with various groups of people yet at the end of the experiments the subjects did not want the experiment to end and would not give the devices back, even the ones who did have access to technologies such as the internet and laptops which they could use to share images. Again, we had created a solution that had broad appeal outside the developing world group it was intended for.

Case Study 3 – Mobile Banking

The final case study of mobile banking is widely analysed by other reports in this document. However, there is much to be learnt by looking at m-banking through the eyes of a technology designer. Mobile banking can easily fall into the trap that befalls others who wish to translate the desktop experience onto a mobile device; they take the desktop version and try to make it fit onto a smaller screen. (Other examples would include mobile web browsing [3].) That is exactly the wrong thing to do.

Again, when we were conducting our studies in Africa we discovered purchasing behaviour that had not been reported before. For example, in a village, 200 km

from the nearest tar road near the border of Zambia, Angola and DRC a trader was selling plastic basins. A customer asked for the price of the basin and then asked if he could pay in 'air time'! The trader accepted and after some pressing of buttons on cellular handsets, the customer walked off with the basin.

This is made possible as a lot of cell phone services in South Africa, or throughout Africa, have a network service that allows one user to transfer airtime credit to another network user. In effect, airtime becomes a currency. In rural communities where there is no cash this is a secure and trusted way in which to move payments around. This is backed by sale or service providers that are trusted within their community.

If we were to think about this transaction in terms of internet banking, it would take several minutes to complete – adding beneficiaries, verifying identity etc. But often, this is overkill. For example, if you were going out for a meal and someone forgot their change and asked you to lend them 5 € for a ticket home, you would be willing to hand over cash immediately. Again, a feature added to the network in Africa, originally to allow the transfer of airtime to people living rurally, has allowed the creation of a primitive bank system that does not require further technology or even legislative intervention. So successful is this facility that some 2% of the Zambian GDP is moved via airtime.

Releasing Design Ability

Finally, there are many people living in the developing world who could be creating designs and new forms of technology but do not have access to the education and resources allowing them to do this. One finds that many people who exist on the economic fringes are driven to be creative in ways that would not occur to those living in developed economies.



Figure 6 – A bicycle belonging to an egg trader in Mwinilunga, Zambia.

In Figure 6, is a bicycle belonging to a trader in Zambia. To borrow the Unix/Open Source metaphor, he has hacked his open source bicycle. He has added a pannier which will carry 75 kilos of eggs to run a delivery business. He has also upgraded the seat suspension with some soft wood so he can use this bicycle as a taxi. This is a very creative solution. We who design digital technology should be challenged and inspired by this – how can we make our technology adaptable to local conditions so that local users can create their own solutions.

These ideas are echoed in a blog called *afri gadget*, should you wish to see some more. Also, African design in general is celebrated at an event called “Design Indaba” which runs in the last week of February in Cape Town every year.

Conclusions

Designers in developed economies can be seduced by technology which locks them into a particular type of design thinking. However, those who are working in the developing world live under a different side of constraints which can lead to innovative solutions not obvious to those working in technology-rich environments. These solutions come about by working out what can be done with the technology that exists already. It is surprising what can be achieved.

One final thought is that there is a huge movement in developed countries towards sustainable and green design. Essentially, sustainable design is creating new things with a minimal impact. The goals of sustainable design are therefore almost identical to design for the developing world – doing more with less. There is a large potential in exploring where those design ideas overlap. Ultimately, there will be a great synergy between this sustainable movement and designing technologies for the developing world.

References:

- [1] Moore, Gordon E. (1965). "Cramming more components onto integrated circuits" (PDF). *Electronics Magazine*, 38(8).
- [2] Ah-Kun, L. & Marsden, G. (2007) “Co-Present Photo Sharing on Mobile Devices” *Proceedings Mobile HCI 2007*. Singapore. ACM Press. pp73-80.
- [3] Jones, M. & Marsden, G. (2006) “*Mobile Interaction Design*” John Wiley & Sons, New York, 2006.