**Canessa, E. & Zennaro, M. m-Science, Sensing, Computing and Dissemination, ICTP, Italy. Publisher ICTP—The Abdus Salam International Centre for Theoretical Physics 2010 ICTP Science Dissemination Unit, e-mail: sdu@ictp.it. Printing history: November 2010, First Edition ISBN 92-95003-43-8**

**mScience, Sensing, Computing and Dissemination**

This publication gives a comprehensive introduction to the design, development and deployment of the latest mobile applications, the editors were also responsible for producing a paper called a Mobile Science Index for Development, in which a barometer featured which could be used could be used in conjunction with many of the research projects outlined in this paper. This is an open source publication on the subject of m-Science by the Science Dissemination Unit of the ICTP (International Centre for Theoretical Physics) in Trieste, Italy. The overall aim is to encourage debate and engagement so as to produce awareness of the opportunities of Mobile Science which will in turn drive development. The book explains how the deployment of mobile technologies is helping to develop and augment the disciplines of scientific knowledge, teaching and learning.

The massive growth in the number of mobile phones, quote “cell phone usage in Africa is growing almost twice as fast as any other region and jumped from 63 million users two years ago to 152 million last year”(MIT 2009). “ Many mobile phones incorporate smartphone technologies, Analogue to Digital Converters (ADCs); Digital Signal Processor (DSP); a radio with hundreds of channels; a microphone and earpiece; sensors, a camera; power management and a battery; an accurate clock; a microprocessor (e.g. today’s iPhone has a 1GHz processor); Read Only Memory (ROM); flash memory (iPhone can support 32GBytes); touch sensitive colour display; some kind of keyboard; and with 4G speeds of up to 1Gbps” (Canessa, E. Zennaro, M. 2010). These attributes alongside a variety of applications facilitate their use as a platform to “collect basic information in the health, world climate, geophysics, ecology, and other sectors to exchange information, and to access scientific computing among many services”.(Based on an article published by the Editors) (July - Sept 2009, p.37).

The book devotes a large section to the evolving patterns of mScience in Africa entitled “Middleware for Grid Computing on Mobile Phones”. I found the following information useful for my presentation.

Internet availability is sporadic in poorer rural areas in Africa, but this is rapidly changing with the rapid installation of mobile towers and transmission networks. The lack of mains electricity is a drawback that maybe bypassed by the great improvements in local solar generation making the widespread installation of mains power unnecessary. These developments are preconditions that will need to be met before the widespread benefits of mScience can be enjoyed in the regions that have the most to gain, where the applications of computer-based solutions can affect constructive change. Yet there is a direct need of such applications in these areas.” Luckily, most of these countries have reported impressive adoption levels of mobile phones, a phenomenon that is now creating a paradigm shift; computing is moving from the traditional PC to the phone”(Telecommunication Service Sector).

The book sited real world examples of how mobile phone communication techniques fitted into, adapted to and altered traditional social networks. An example I found intriguing is the guanxi-embedded mobile social network in China. “Guanxi” (2), is the term used to describe how interpersonal relations and wider social networking take place in China. It also helps to explain how rapidly and profoundly social networks in China have changed because of the widespread availability of mobile phones and SMS messaging. The examples outlining the transformative effect of mScience deployments in developing countries provided the impetus for my presentation, an example of the growth in mobile banking in Africa was presented in Computerworld, Zambia, “Mobile phone banking has attracted low-income populations residing in rural areas that may not be able to afford a traditional bank account”. (Malakata, M. 2011).

Existing internet protocols (Internet Protocol version 4), Reference: (“IPv4 addtess exhaustion”), have limited remaining address space, and is estimated to be unable to provide new addresses from 2012, there is an urgent need to deploy a new protocol to resolve this concern.

Smartphone devices in common with PC’s and Laptops are vulnerable to a variety of attacks, from spam, viruses, Trojan horses, denial of service attacks, organised crime and state sponsored intelligence gathering. There is a variety of serious security risks presented here, many of the encryption techniques available for larger devices are not being used in smartphones, and this is a major concern when dealing with private and sensitive data. These limitations can disrupt the collection, analysis and interpretation of data using mobile devices.

Both hardware and software support will be required to alleviate these problems; the costs associated with this support may prove to be a great a burden for many poorer developing regions. The cost of hardware for mobile masts, and the costs associated with switching equipment, so mobiles can move seamlessly from location to location, plus the training and wage costs for network engineers and technicians all have to be accounted for.

The book employs a rational layout; it starts by defining and explaining m-Science, The Internet, Mobile Computing and the use of Mobile Phones in Developing Countries. The rest of the book is broken down into three sections, Sensing, Computing and Dissemination, mirroring the title. The principal advantage of using smartphones as data gathering solutions is the speed at which information can be gathering from the field and analysed. Mobile phones have the ability to transmit vital information instantaneously. Sensing introduces some of the myriad of new applications that can be conceived through the widespread usage of smartphones, with the huge number of smartphones in circulation, and the enormous economies of scale possible, the use of mobile phones as a platform to collect data using their sensors, promises significant opportunities for scientific research. The publication offers enough credible examples and convincing analyses of current trends to make the plausible claim that mobile technologies will offer huge benefits to academic research and education and to wider society. Smartphone technologies are further described as the first communications technology in history that have the capacity to benefit poorer, marginalised communities profoundly.

This book provided many examples of how mScience research could be successfully deployed, a difficulty I encountered here was deciding on what specific topic to select for the presentation and what core areas needed to be presented , giving the time limits but keeping to the objective to communicate the principal issue that I planned showing.

**References:**

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