**Canessa, E. & Zennaro, M. (2010). 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

A Mobile Science Index for Development

This article presents a barometer (the Mobile Science Potentiality Index) which is designed to measure the potential and capacity of a community to engage in scientific tasks using mobile devices as the primary method of sensing, interpreting, storing, developing and communicating knowledge. The study argues that enhanced development will result from greater co-operation by the international scientific community conducting scientific studies using mobile devices.

The Mobile Science Potentiality Index is calculated by using a simple “ratio of the mobile broadband subscriptions available by country and the amount of researchers in the labour force” (Canessa, E. Zennaro, M. 2010). It is this ratio that analyses the extent of mobile penetration in developing countries and draws inferences from this data, explaining that within this data, there lies a large potential resource that can be deployed in data acquisition and analysis for scientific and health research purposes, “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 of new devices are smartphones; this may allow analysts and programmers to gather rich sources of information using sensors and cameras which in turn can be used to develop databases for creating scientific applications to deal with many issues.

A considerable amount of the focus in this paper is concerned with the rate of adoption of mobile devices and how this has the prospect of opening new paths to development especially in some of the poorest, remote and marginalised communities in the world. The historical perspective of the Internet and mobile phones having being two separate technologies is briefly explained, but a new paradigm is created with the merging of the two. The article categorises and further explains these developments as mScience, which is defined” mScience is the sensing, computing and dissemination of scientific knowledge by the use of mobile devices” (Canessa, E. Zennaro, M. 2010). The authors explain in this publication why they are of the belief that mScience will enjoy exponential growth and enormous social and economic consequences in the near to medium term. The unparalleled technological developments taking place in the field of information and communications are accelerating the uses and possibilities that mScience can be harnessed for, the following is an example given in page four of the article “These include helping to prevent disease outbreaks, building a census or tracking agricultural stock levels. Data gathering with mobile devices can help to save time and money for organizations while also improving information accuracy including those needed from/for developing countries” (Canessa, E. Zennaro, M. 2010).

This article highlights some of the significant changes that are occurring in mobile technologies, such as large improvements in computational power in mobile phones which in turn enables analysts and programmers to develop new scientific applications, novel applications are now being created using some of the sensors that are now commonly integrated into mobile phones.

“As m-Science through mobile sensing, computing and dissemination continues to become less and less expensive, more integrated and more ubiquitous, the hope is that projects in this new field will increasingly be within reach of scientists in the less industrialized world” (iJIM – Volume 6, Issue 1, January 2012).

A very practical example of how these technologies can be employed is shown in the example given for the monitoring and control off Dengue fever in the Brazilian state off “Amazonas”, the use of in built sensors and cameras, the speed with which the information was transmitted and the fast analysis proves the usefulness of mScience for a time critical statuses in remote regions (Costa, A. 2009).

Smartphones are only as useful as the networks that support them, the widespread use of these devices for the collection and analysis of field data requires, robust cellular infrastructure and well trained teams of engineers and technicians, to build, maintain and constantly conduct software and hardware upgrades. The costs associated with this especially for less populated and remote areas may still remain prohibitive. There are alternative transmission methods, for example satellite links, but these have capacity and cost constraints.

I believe this is a very useful index for helping to guide researchers, when they are making the decision on whether or not mScience is the most effective method to conduct scientific research and gather data for scientific and health related purposes in a particular community.

The degree and extent of social, economic and political change that is possible throughout the developing world as a result of the widespread use of smartphones and connectivity to the internet is difficult to quantify. We have already seen glimpses, it has been reported that the use of social networking sites such as Facebook and twitter have helped in the organisation and spread of the political and social unrest at the heart of the Arab spring. The widespread use of apps, many with a large audio and graphical content to help overcome literacy problems, has the potential to have a major impact as an educational resource, and on a wider social and political scale.

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