

Mobile eHealth for health workers in developing countries: impacts on organisational process and users' behaviour: Research in progress

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Content

- **Define eHealth**
- **Mobile ICTs in developing countries**
- **Applications and cases**
- **Cases: Failure & Success**
- **Human & Organisational impacts or outcomes**
- **Critical success factors**
- **A model**
- **Conclusion**

eHealth as a development initiative

- **eHealth is the use of information and communication technologies for health processes either locally and at a distance.**
- **An opportunity for the development of public health.**
- **strengthening of health systems through eHealth may contribute to the enjoyment of fundamental human rights by improving equity, solidarity, quality of life and quality of care. WHA 58.28, WHO 2005**
- **eHealth as a subset of eGovernment**

Mobile ICT in Developing Countries

- **177 million GSM mobile users in Africa (Nov. 2006)**
- **121 million mobile phone subscribers in India (March 2007)**
- **Mobile ICT impact and growth in Africa**
 - **Increased GDP**
 - **Individual and personal empowerment**
 - **Business process transformation (m-commerce)**
- **MDGs and ICTs: NEPAD, EU-IST, ITU, WHO, WSIS, EU-IST, National bodies, NGOs**

Mobile ICT in Developing Countries

- **Developments**
 - **Emerging Market Handset (EMH) project**
 - **Shared access phenomenon**
 - **Voxiva, Cell-life, UHIN, Philippines, Indonesia projects**
 - **WHO: SAM (Health Mapper), Anthro 2005 Software**
 - **SMS alerts to patients**
 - **Mobile Web initiatives**

Applications

- **Electronic Health Records**
- **Health data collection**
- **Health Management Information System, Continuing medical education (CME)/e-Learning**
- **Laboratory Information System**
- **Drug management system**

Cases

- **Uganda (PDA)**
- **South Africa (Cell-Life (Cellphone and Smartphone))**
- **India (Jiva Teledoc (Smartphone), PDAs)**
- **Philippines (Cell Phone)**
- **Indonesia (Cell Phone)**
- **Peru (PDAs)**
- **Kenya (PDAs)**
- **Tanzania (PDAs)**
- **Mozambique (PDAs)**
- **Nepal (PDAs)**

Community Based Health Workers (CBHWs) in Developing Countries

- **Delivers essential primary care services**
- **Agents of Change and health promoters**
- **Brain drain**
- **Community/facility based care (HIV/AIDS, TB, Malaria etc)**
- **Mobiles for information, communication & logistic needs (WHO, 2006)**
- **Work as individuals & in teams**

Impacts: documental analysis

- **Impact could be positive or negative**
- **Impacts is equal to outcomes**
- **Outcome is either success and failure**
- **Two cases (Janus faced metaphor)**
- **The two sides of the outcome coin**
 - **India- Failure**
 - **Uganda- Success**

Failure: Human and Organisational impacts

- **India: The India Health Care (IHC) project**
- **Started in 1994 (Apple Newton)**
- **2001 new PDAs (Compaq Ipaq, Simputer)**
- **Closed in 2003**
- **CBHWs, mostly women**
- **Primary Health Care**
- **Standalone 200 PDAs deployed**

India: IHC case

- **Expected Impacts**
 - Digital data collection
 - Improved and timely data collection process
 - Decision support system for immunization management
 - CBHWs' workflow process planning and coordination
- **Outcome: Failure! Why?**



Reasons: Organisational impact (Negative)

- **Technical**
 - **Insufficient memory (16MB?) (technical)**
 - **Low Battery life**
 - **Low processing speed**
 - **Poor software design**
- **(These accounted mostly for the failure rate)**



Reasons: Organisational impact (Negative)

- **Process**
 - **High health needs and demand**
 - **Poor HIS & database design**
 - **Perceived high cost of the PDAs**
 - **Lack of ownership due to fear of financial responsibility**
 - **Lack of piloting or modular approach**
 - **Lack of technical support and poor maintenance process**

Users' impact & Outcome (Negative)

- **Users' impact**
 - **Low users' adoption due to duplication of efforts**
 - **Poor Human Computer Interface (HCI) design**
 - **Eye sight and visibility issues (Black and white screen & Sunlight)**
 - **Lack of adequate training**
- **Outcome**
 - **Failure and abandonment of the devices and the system**
 - **Increased workload**
 - **Poor data quality**
 - **Failure to improve the HIS due to improper change management**
 - **Failure of informed decision making behaviors**

The failure of this programme is due to improper recognition, analysis and management of human and organization issues (BEANISH 2006).

Success: Human & Organisational impacts

- **Ugandan Health Information Network (UHIN)**
- **Started in 2002**
- **Deployed in 3 health districts**
- **350 PDAs (Palm devices)**
- **Ad-hoc connection to GSM/GPRS, WiFi?
Network**
- **CBHWs and others**

UHIN: Uganda case

- **Expected outcome**
 - **Provision of access to organizational information systems**
 - **Continuing medical education (CME), e-learning**
 - **Decision Support System**
 - **HMIS- health data collection**
 - **Scheduling system**
 - **Communication system (E-mailing system)**

electricity, no running water and, until recently, no communication with the outside world. For the entire district, only twenty copies of the government-controlled popular daily tabloid, *New Vision*, come to just a few of the local leaders each week. GSM telephony is now possible, but hardly anyone in Veronica's community owns a cell phone.

Twice a week Veronica travels seven kilometers, either by foot or cycle, to charge the battery of the PDA she has received because her clinic has been connected to the Uganda Health Information Network. She invites me and my IDRC colleagues to sit down at the rough-hewn wooden clinic reception table, looks us straight in the eye, and talks.

Veronica uses her PDA for her work and for her community. She periodically travels to the wireless router that stores the surveillance report for the entire district and where she uploads her center's reports and can download news and medical information. If there is an outbreak of measles somewhere else in the district, she'll learn of it before it comes to her community. Then she can return and advise people how to prevent the illness that's nearby.

Equally, if her own report shows a local rise in cholera, the district will review her data and send medications and specialist assistance to help out. It used to take six months before the district would respond to this type of distress message, if at all. Only 20% of her previous paper reports made it to the district office because they would get lost or despoiled by weather en route. Now more than 90% of her reports get where they need to go.

A certified midwife, Veronica isn't a nurse but the local people call her "doctor". She is expected to know how to treat all sorts of illness, not just help families deliver their newborns. From the medical downloads to her PDA, Veronica learns how to diagnose and treat common illnesses, which weren't part of her medical training.

Just as important, Veronica gets news from Kampala and the world downloaded to her PDA. People come to the clinic to take turns reading the news on her PDA. She has to be careful about how she manages this. If too



Organisational Impact (Positive)

- **Improved access to clinical information at the point of care**
- **Improved clinical diagnosis**
- **Reduced difficulty in disease management/treatment**
- **Reduced difficulty in medical emergency management**
- **Inconclusive evidence on reduction in patients' hospital stay**
- **Savings to the system due to less printing and photocopying**
- **Improved health system management due to prompt reporting**
- **Improved response to disease outbreaks**
- **Improved district health system performance**

Users' impact (Positive)

- **Majority found it useful for organizational processes**
- **Positive behavioral change in clinical diagnosis and drug prescription**
- **A sense of ownership developed**
- **Improves engagement with actors on system development**
- **Health workers as champions and promoters of the system**
- **High adoptability and usability of the devices and the network**
- **High uptake of the CME for professional and personal development**
- **Seamless integration into workflow processes and organization**
- **Devices used for personal management**
- **High sense of job satisfaction**
- **Shared usage**

Analysis: Janus faced?

- **The failure of the IHC due to improper recognition, analysis and management of human and organization behaviours.**
- **The UHIN follows instead an iterative and modular approach in contrast to IHC, hence a success story.**
- **For nationwide deployment & translation to Mozambique**
- **What are the critical success factors (CSFs)?**

CSFs: A model for success, Uganda

UHIN example

- **Organisational behaviour**
 - Improved organisational efficiency
 - Modular and iterative approach
 - Local ownership (UCH, a research of the university)
 - Multiple applications
 - Choice of PDAS? (Palm vs. Pocket PC) (Linux?)
 - Networked devices (GSM, GPRS, WiFi?)
 - Solar panels (\$30) Local production
 - Local contents development
- **End users' behaviour**
 - Health workers' integration
 - Health workers' ownership
 - Health workers' usage and adoption

Mobile eHealth Model for CBHWs

- **Process**

Collection ↔ **Transmission** ↔ **Presentation**

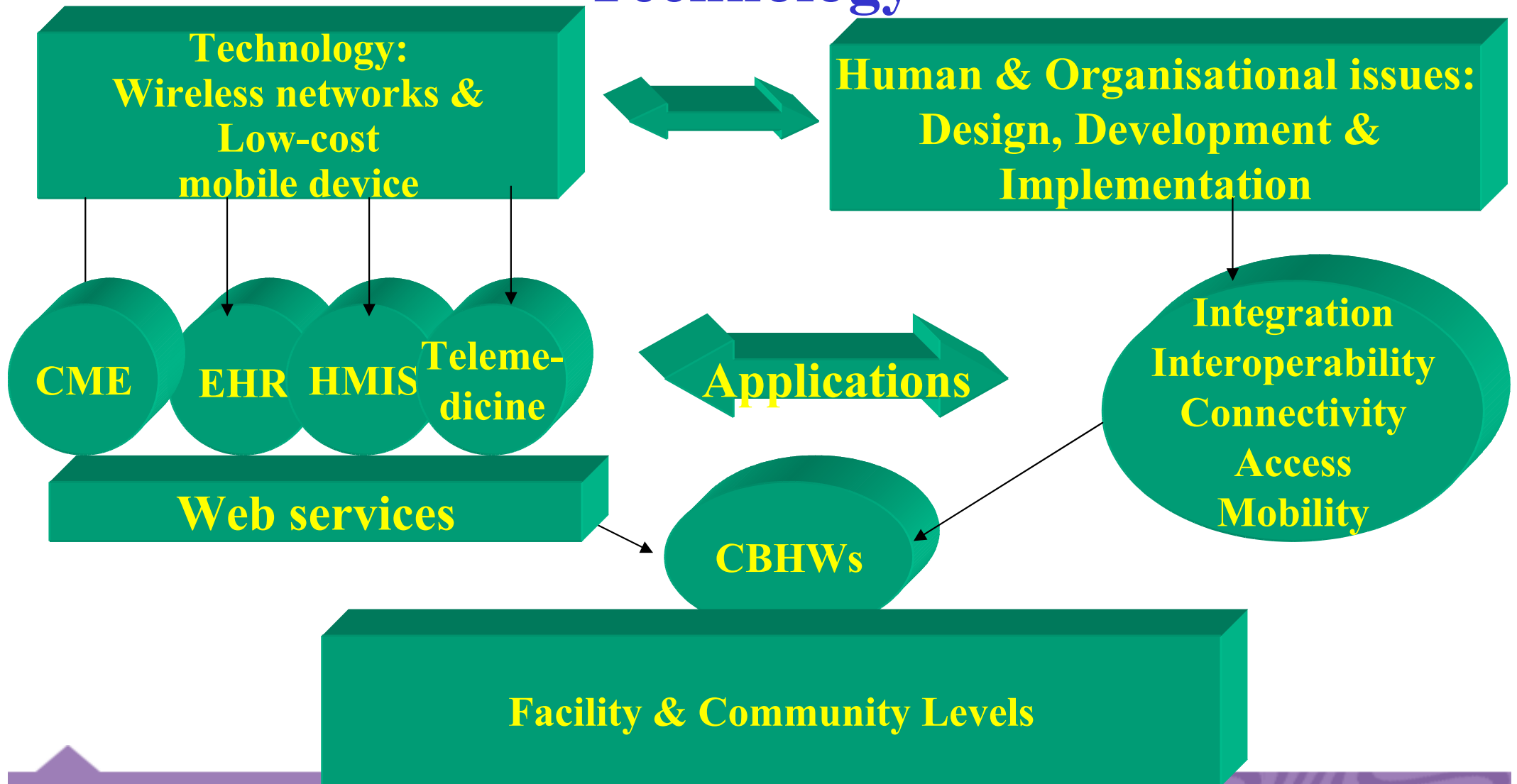
- **Facility vs. Community**

- **Remote, Local & Fixed mobility**

- **Users:**

- **Community Based Health Workers (CBHWs)-
Volunteers, salaried, Mid wives. (Community
Level)**

Mobile eHealth Model: Context and Technology



Conclusion: Research in progress

- **Aim**

To explore and understand the human and organisational factors mediating in the implementation and use of mobile eHealth systems by CBHWs in Africa.

- **Proposed case studies:**

- **Uganda UHIN**
- **South Africa Cell-Life**

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