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Using TOGAF for building a national implementation strategy for e-health services and technologies in Burundi

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Introduction

- National Health Policy of Burundi
  - Period: 2005-2015
  - One of the objectives: **strengthening of the national health information system**
    - **e-health strategic plan**
    - Integrated health information management
    - Tools for planning, monitoring and evaluation
    - Infrastructure and hardware availability
    - Data driven research in the health sector

Baseline

- Donor driven ICT tools deployment
  - Unaligned objectives
  - Lack of coordination
  - Lack of inter-project interfacing
- MoH objective:

  E-Health enterprise architecture development in order to move from the existing chaotic and organic growth of e-health silos towards a focused organization

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Material and methods

- Main study objective
  - provide a reliable documentation of the existing and needed human and material resources and issues related to health information management in Burundi
- Hypothesis
  - an industrial framework like TOGAF can be used for this, even in the challenging environment of one of the poorest countries in the world

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TOGAF architecture development components

- **Business** architecture:
  - What are the MoH business needs in terms of health information management?
- **Application** architecture:
  - Which applications address what MoH needs?
- **Data** architecture
  - What data is needed and collected today by the MoH and what is the quality of it?
- **Technology** architecture
  - what are the necessary technologies and which ones are being used today?

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TOGAF baseline architecture development method

- Detailed analysis of regulatory documents and strategic plans related to the Burundian health system
- Field visits and semi-structured interviews with a sample of relevant entities of the MoH
  - Based on a standardized study-specific interview guide

Study sample

- Field visits and interviews with 39 MoH structures in Bujumbura province
  - All MoH directorates
  - Health programs, donor agencies, NGOs
  - Public & private health facilities
- 5 rural provinces (Kirundo, Ngozi, Gitega, Muramvya, Ruyigi)
  - Provincial & district health administrations
  - 12 hospitals

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Results: hardware

- **Donor driven**: no organization-wide management of computer equipment
- **Heterogeneous distribution**
- **Hype**: computers in health centers without clear purpose
- **Dysfunctional** equipment due to computer viruses (USB memory sticks) and defective UPSs
- **Personal** user-owned computer equipment

Results: networks

- Mixed wired/wifi LANs in Bujumbura
- Internet connection dependent on donor funding
  - Limited in time (allways) & volume (sometimes)
  - Optical fiber (competing networks)
  - Prohibitive pricing
  - Unstable (power problems)
  - Uncoordinated deployment (redundant & absent)
- Rural areas
  - Unpredictable performance of 2G and 3G networks
  - VSAT connections (high operational costs)

Results: software

- MS Windows OS ubiquitous, some Linux servers at central level (core web applications)
- Few health related business applications
- Trend towards web-based & open source solutions
  - DHIS-2 data warehouse
  - iHRIS human resource management
  - OpenClinic GA hospital information management
  - OpenRBF for performance based financing
- Some successfull m-Health applications
  - RapidSMS based « Kira mama » project
  - SIDA-info
- Epi-Info & SPSS for statistics

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Results: the world of paper

- Paper predominant in many hospitals and allmost all health centers
  - ICT-tools deployed on district level
- Numerous registries for redundant data entry (25 in health centers and up to 75 in hospitals + donor specific data collection)
  - Excessive registration overhead
  - Best payer gets best data (never the government…)
- Medical record keeping

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Results: health information management problems

- Lack of **standardization** of health data
- Data **availability** risks (donor provided hosting, personal equipment, viruses)
- Data **protection** risks (access rights)
- Varying data **quality** (motivation, redundant registration, unqualified staff, lack of accountability, donor funding)
- Varying data promptness (lack of communication solutions)
- **Incomplete data** (factor of power, no personal interest)
- **Defective equipment** (no maintenance, virus infections)

Results: health information management problems (2)

- Inadequate **infrastructure** (power, internet)
- **Unregulated e-health market** (no accreditation mechanisms)
- Lack of health **applications** (generic solutions)
- Insufficient **human capacity** (lack of training opportunities, plethora of unqualified staff, unaligned training)
- **Organizational** problems (no central ICT management, unattractive status of ICT staff)
- Ineffective **dissemination** of guidelines & regulations

Conclusions

- TOGAF offered **appropriate instruments** to describe national e-health status
  - Study output used for development of **Burundi's national e-health enterprise architecture (PNDIS)**
- Detected many problems, but also some **bright spots**:
  - **Political will** to reclaim MoH leadership (recently compromised)
  - **Academia** ready to develop e-health capacity building programs
  - **DHIS-2** data warehouse implementation
  - Succesfull **hospital information systems** deployment

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Challenges / needs identified

- Creation of national MoH **datacenter**
- Development of multi-technology MoH **VPN**
- Implementation of **shared generic applications**
  - Accounting, workflow, virtual library, GIS, mail server
- Implementation of **shared health applications**
  - DHIS-2, iHRIS, OpenRBF, OpenClinic GA, LMIS…
- **Health resource registries**
- **Offline data registration tools** in health centers and for community health workers with SMS to IP gateway
- e-health **training** programs (Master, Certificate, Biomed technicians)
- Autonomous MoH **e-Health directorate**