Data Management Systems

Experience in developing Data Management Systems from Uganda

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Enhanced Water and Sanitation Security:
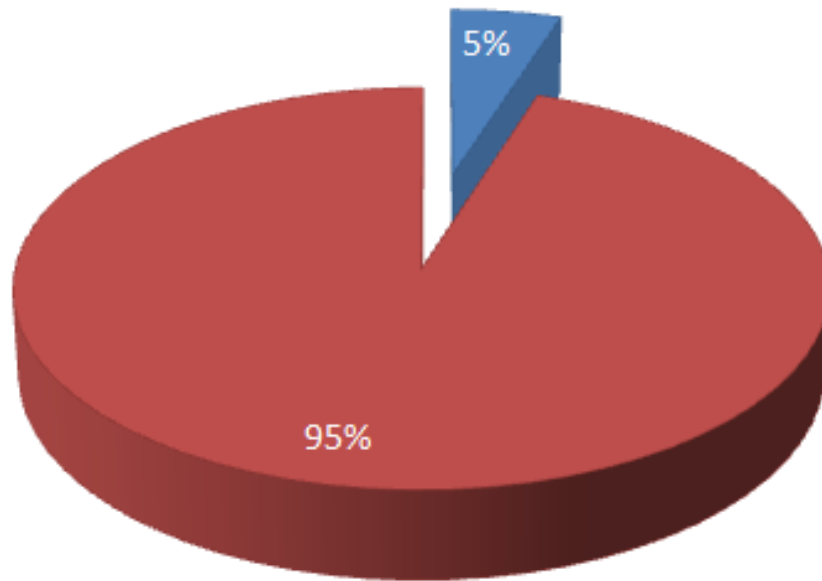Sanitation for Millions

Presentation Outline

- Sanitation Situation in Kampala
- Situation of ICT development in Uganda
- Realized Solutions

    ➢ Sanitation DMS

    ➢ Sanitation mapping with ODK

    ➢ FSM GIS Tracking App

    ➢ WinS Monitoring

- Challenges during implementation
- Lessons learned

Sanitation Situation in Kampala

5%

95%

■ HH connected to Sewerage System

■ HH not connected to Sewerage System

16%

84%
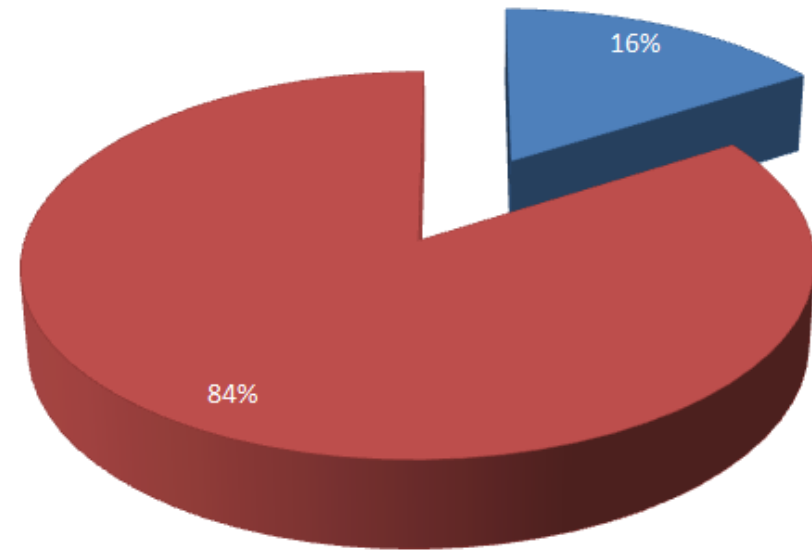
■ Private Toilet
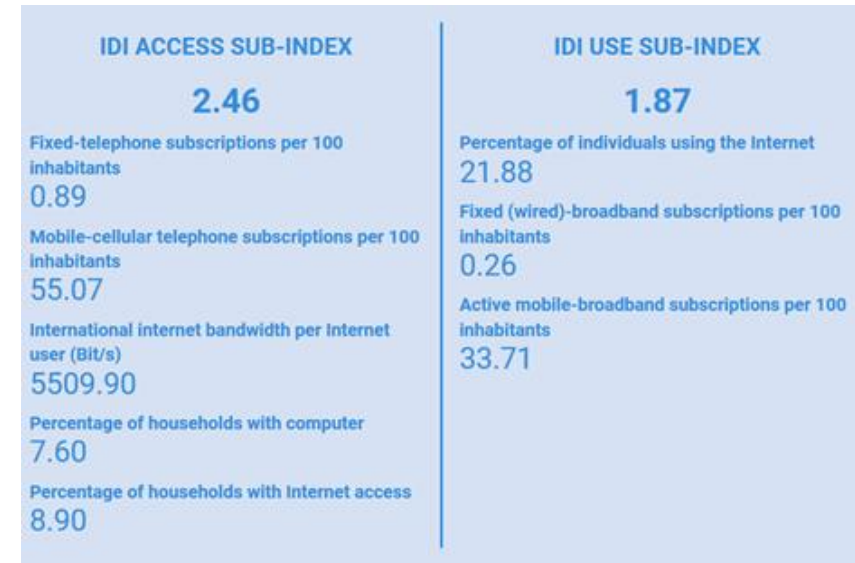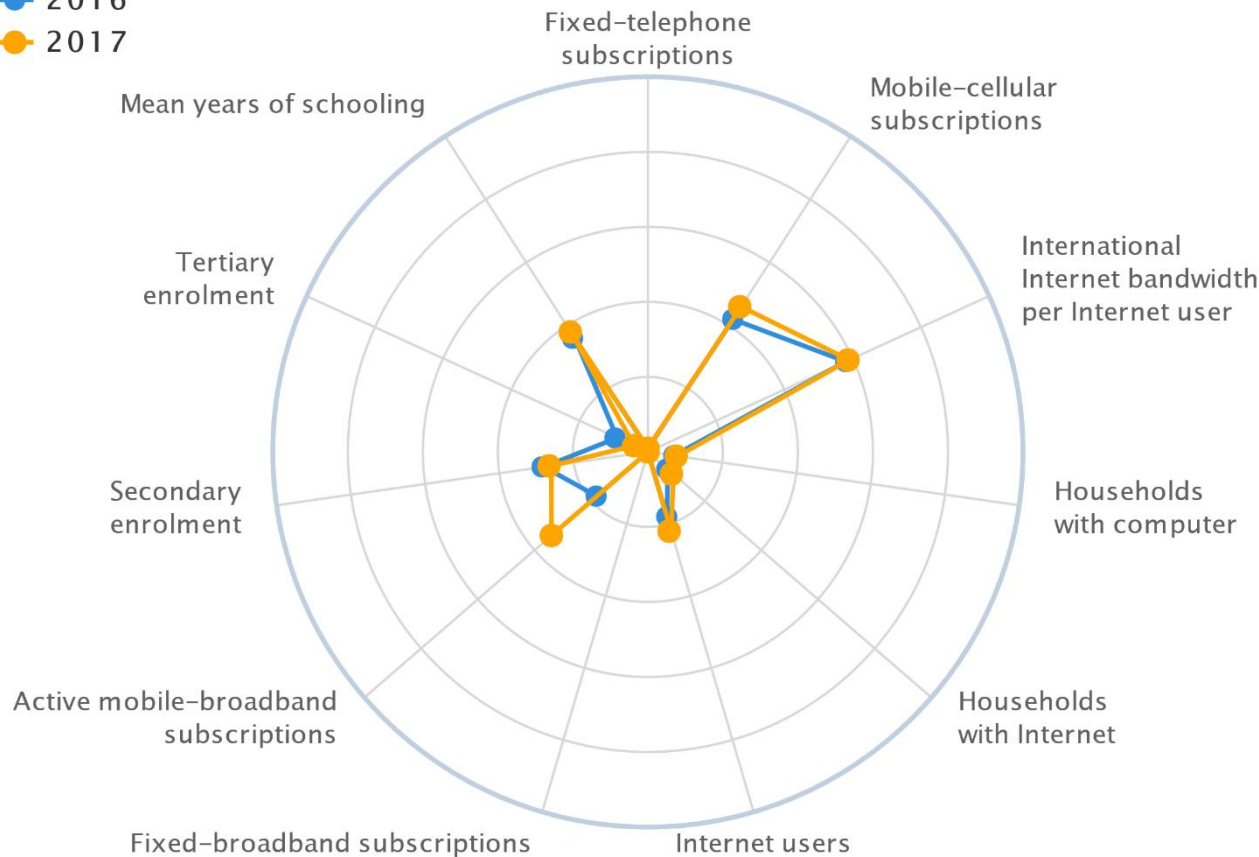
■ Shared Toilet

Situation of ICT Development in Uganda

Population: **41,468,240**
Population density: **175.28**
GNI per capita: **660**
Region: **Africa, Developing, LDC**

IDI - ICT Development Index
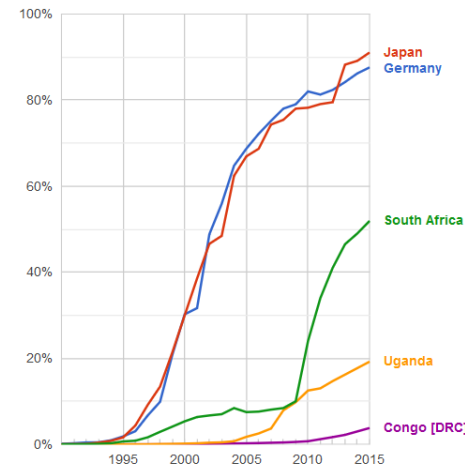
IDI ACCESS SUB-INDEX
2.46
Fixed-telephone subscriptions per 100 inhabitants
0.89
Mobile-cellular telephone subscriptions per 100 inhabitants
55.07
International internet bandwidth per Internet user (Bit/s)
5509.90
Percentage of households with computer
7.60
Percentage of households with Internet access
8.90

IDI USE SUB-INDEX
1.87
Percentage of individuals using the Internet
21.88
Fixed (wired)-broadband subscriptions per 100 inhabitants
0.26
Active mobile-broadband subscriptions per 100 inhabitants
33.71

Percentage of individuals using the Internet

IDI SKILLS SUB-INDEX
2.29
Mean years of schooling
5.70
Secondary gross enrolment ratio
26.10
Tertiary gross enrolment ratio
4.48

Source: http://www.itu.int

Sanitation Mapping with ODK Smartphone Tools

Characteristics
- Mapping of public Toilets as baseline study
- Creation of cartographic documents with Esri ArcGIS

Successes
- Fast Mapping results over the whole city of Kampala
- Establishment of baseline database
- ODK tool is used for other applications in KCCA

Status
- Currently not used anymore for this purpose
- Sanitation mapping is now done through a different software
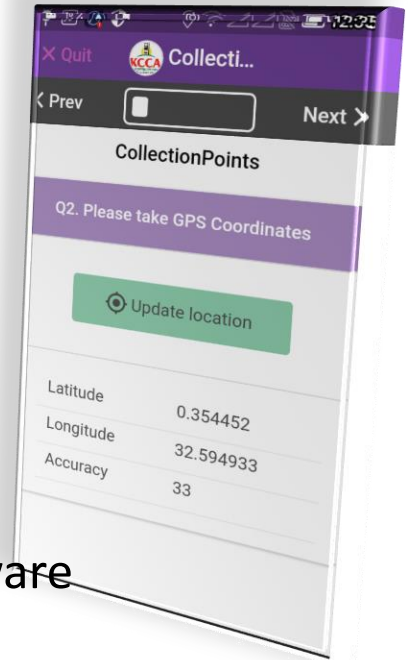
ODK: Open Data Kit

free and open-source software for collecting, managing, and using data in resource-constrained environments. (Wikipedia)

Mostly used on user smartphones.

Sanitation DMS (Data Management System)
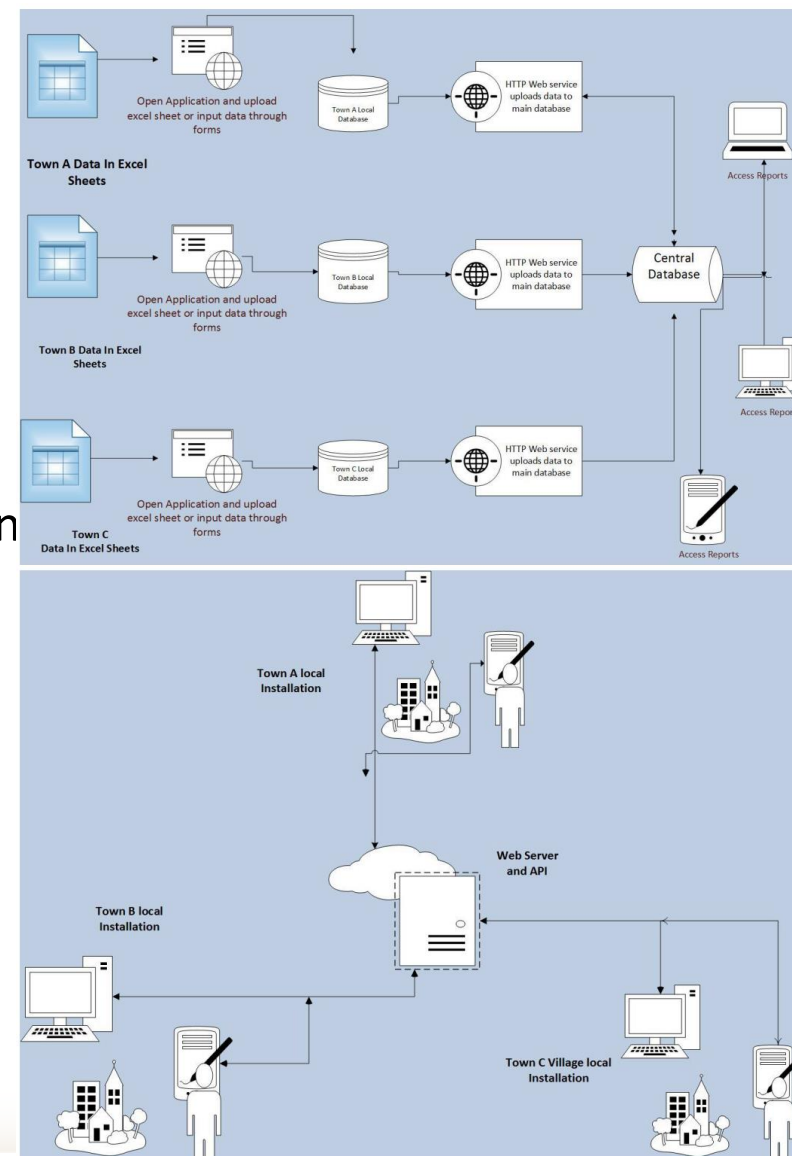
Characteristics

- Developed with 6 rural towns in 2017
- Client-Server Database Application with Web Interface
- Web GIS
- One server instance installed in each of the 6 towns
- Sophisticated Data Structure
- Sophisticated user management
- Individual dashboard for each town with report creation
- Build on Open Source Software & hosted in the cloud
- IT development outsourced to external consultant

Successes

- Application easy to handle
- Extensive Data Analysis and Visualisation possible

Status

- One data collection exercise was done in 2017
- Not actively used by town councils

Pilot: GIS Tracking of Pit Emptiers

Characteristics

- Semi professional data collection with ODK
- Creation of cartographic documents with Esri ArcGIS
- 50 Service providers where equipped with Smartphones and connection fees
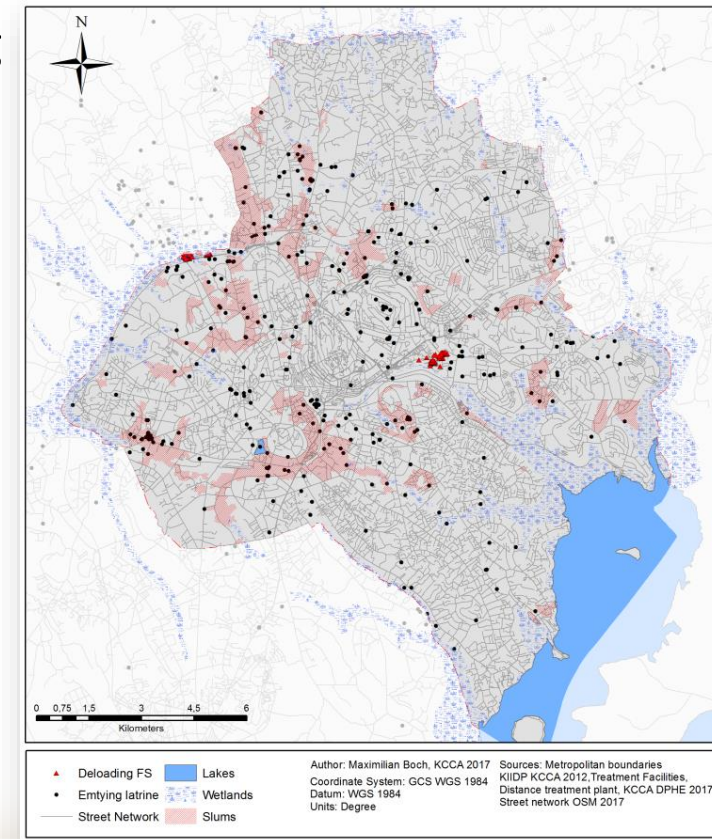
Successes

- Fast Mapping results: emptied toilets, dumping sites
- Good results to learn from to develop a professional Application
- Documents to support decision making

Status

- Experiences were used as preliminaries for professional Weyonje Smartphone Application

Weyonje GIS tracking App

Smartphone GIS application: Business support for Pit Emptiers

Characteristics

- Web- and Smartphone based System
- Real time tracking of emptying jobs and dumping
- Management Console and Dashboard used in Call Center
- Automated dispatching of emptying jobs
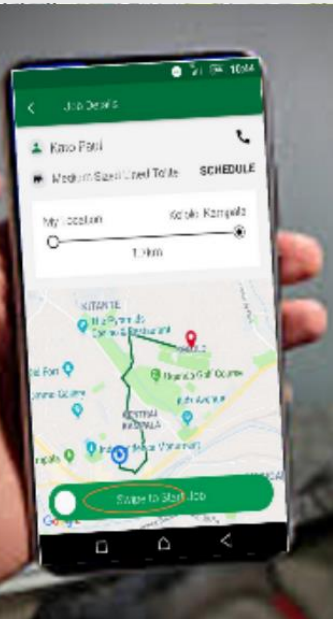- Extensive analysis functionality planned
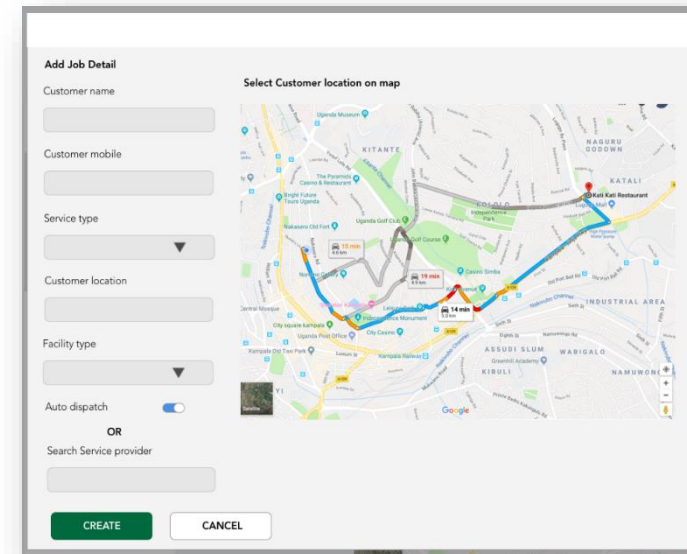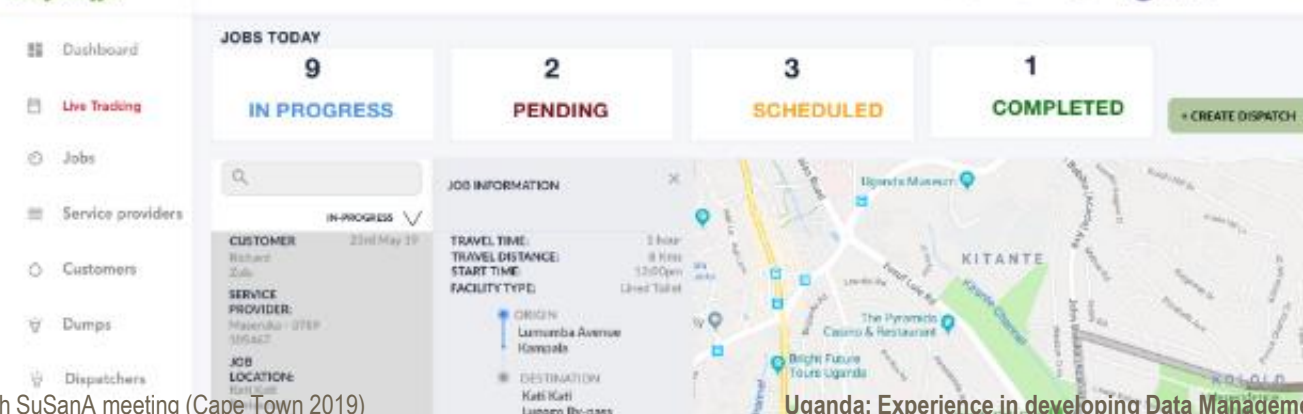
Successes

- Professional results in User Interface
- 90 Pit Emptiers use the System in the initial phase
- Ongoing data collection

Status

- Under development / piloting

Monitoring Tool for Wash in Schools (S4M)
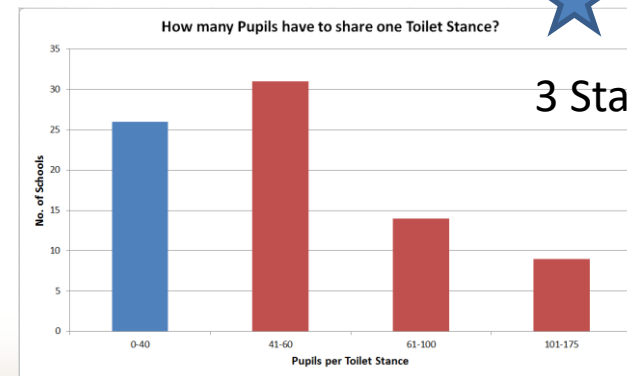
Characteristics

- Survey with ODK or Web based Survey Software
- Cloud hosted
- Standardized assessment of WinS
- Semi automated report creation
- Use of a unique School-ID
- Link up to the existing data system

Status

- Under development / piloting

-- Under construction --

3 Star approach

How many Pupils have to share one Toilet Stance?

Level	Challenges during Implementation	Leads to
Technology	Poor Data quality on Mobile Devices (accuracy of Geo-Data)	Less reliability of data
	Poor internet connection, no connection fees available	Client Server applications not operational
	Statutory constraint (Ex. 'OTT')	General malfunction of Tools
	Versatile OS and configurations on Smartphones	Unforeseen malfunctions
Planification	User not involved in planning	No benefit for users
	Very complex system, many parameters to supply	User give up, no follow up
	No unique key for the entities realized	Entities can't be found back
	Integration in existing environment gets difficult	Creation of islands, redundancies
User Knowledge	Lack of knowledge with regards to content or technical level	Poor data quality
	Not all users know, how to use maps	Less reliability of data
Organizational	no benefit, no incentives for users	Lack of motivation, no willingness to deliver data
	Insufficient communication with IT developer	Unwanted solutions
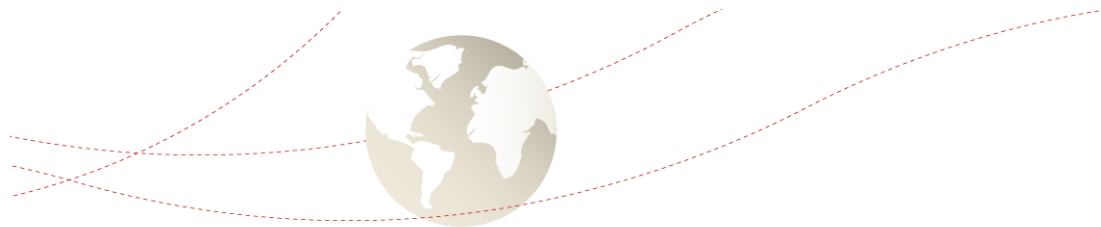
Level	Lessons learned	
Planification	Market analysis most crucial (what is already existing or planned)	Prevent creating redundant solutions Prevent creating islands Make sure there is a need
	Keep it simple (KISS)	Prevent frustration on user's side
		Prevent malfunction of the system
Implementation	Continuous evaluation with all Stakeholders	Create ownership
	Testing, testing, testing	Ensure planned results
Sustainability	Create benefit for all users	Raise willingness and participation
	Minimize maintenance fees, Hosting fees and build capacity of institutions to budget and build capacity for IT O&M	
	Allow upscaling of application	
	Use open standards	
	Try do keep independed from external service providers	
	Insist on complete documentation	

Questions?

Please don't hesitate..

Thank you for your attention