



Digitalisation references	Strategic Policy Note: 'Digital for Development' (D4D) for the Belgian Development Cooperation. https://diplomatie.belgium.be/sites/default/files/downloads/strategy_policy_note_d4d.pdf
	The Principles for Digital Development seek to institutionalize lessons learned in the use of information and communication technologies (ICTs) in development projects. They were written by and for international development donors and their implementing partners. www.digitalprinciples.org
	World Development Report 2016: Digital Dividends - World Bank Group. www.worldbank.org/en/publication/wdr2016

Definitions	e-Health: the use of information and communication technologies (ICT) for health
	m-Health: Mobile Health is a sub-segment of e-Health and covers medical and public health practice supported by mobile devices.
	Telemedicine: all medical and paramedical activities integrating distant steering through digitisation (tele-diagnosis, tele-treatment, tele-learning, ...) (WHO: the use of ICT to improve patient outcomes by increasing access to care and medical information)
	IoT: Internet of Things: the most recent phase in the digital revolution: the inter-networking of devices, referred to as "connected devices" and "smart devices", buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data and generate intelligence.
	The Knowledge pyramid: easy visual framing of the relation between data, information, knowledge and intelligence.



The diagram shows a blue pyramid divided into four horizontal sections. From top to bottom, the sections are labeled: WISDOM, KNOWLEDGE, INFORMATION, and DATA.

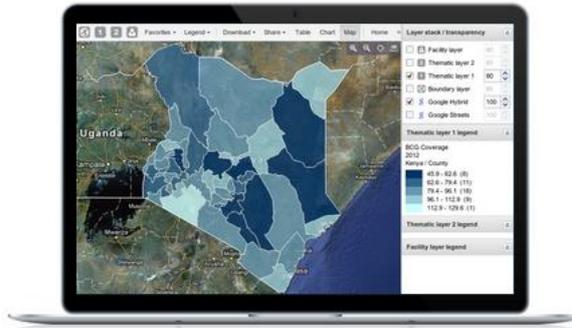
Objectives	<p>Strategic objectives for digitisation in health are</p> <ul style="list-style-type: none"> - Better use of data and information: The Belgian Development Cooperation will invest in the tools and policies needed to use real-time data to produce actionable insights for development actors, and thus to increase their impact. Equal attention will be given to 'open data'. - Digital for inclusive societies: the Belgian Development Cooperation will use the potential of digitisation to optimise democratic rights and equal access to basic services as health and education. - Digital for inclusive and sustainable economic growth: In line with its policy priority to promote sustainable inclusive economic growth, the Belgian Development Cooperation will deliberately support interventions that turn digitisation into more employment and better social protection.
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<p>Context</p>	<p>Talking about digitisation in health, we distinguish different levels, undergoing important transformations today:</p> <p>The national or international level, where data and information are progressively becoming more accurate, faster available (real-time), where knowledge is growing and evidence is available to assist decision-making, leading to better health(care).</p> <p>The facility level, where digital technologies are improving the general management, the patient administration, the invoicing and financial control, the communication. It reduces wasting of resources and waiting times.</p> <p>The healthcare professionals have easier access to the latest innovations in care, to clinical decision support tools and they can easily interact with peers or supervisors (sometimes in other continents!).</p> <p>The communities are able to effectively deliver feedback on health services and participate as responsible actors for their health.</p> <p>Patients have the possibility to be informed, tracked, mobilised, sensitised by their own portable devices (such as mobile phones, wearables).</p> <hr/> <p>@ BTC: works with its partner countries on all levels on e-Health activities: central and decentralised administrations manage their Health Information on-line, hospitals and health centres today benefit from good connectivity and energy, making them good candidates for putting in place information and management systems. Local communities are becoming more aware of their role and responsibility when it comes to their own health and mobile technologies offer new opportunities at all levels. Citizens as final and ultimate beneficiaries of digitisation in health, are treated in more efficient, transparent ways. Normative frameworks are often absent; regulations on the use of digital technologies are most of the time unavailable; protection of privacy and individual data are underdeveloped. BTC is working on developing new and implementing existing data standards to facilitate exchange and interconnectivity between systems.</p>
<p>Key message</p>	<p>Digitisation has become an essential part of healthcare provision and management. Digital 4 Development must be considered as an integral part of Health Interventions, as it contributes to all pillars of the health system: it contributes to better quality of services, better finance management, better management of human resources, qualitative and timely health information, evidence-based decision making.</p>

Level 1: the national & international level

No country can improve its health system without information of good quality. For decades health personnel has struggled with paper files, endlessly filed up in dark, humid rooms, with information that is hardly used. This was followed by decades of transcription of hardcopy information to computers, copied over and over again, transferred on CD, flash disks, floppy disks... ending up with nothing more than always late, erroneous and fragmented information.

@ **BTC**: Today, we are prepping our partner countries for the information era: on-line, on-time, quality information, made available through DHIS2, a web-based health information system. The time has come for comprehensive dashboards, with relevant level-specific information.



BTC strives for open access to data and information for all, with respect for privacy and individuals. We believe an open data environment will be beneficial to all citizens. Making health information available to all is a top priority for BTC.

Level 2: the health facility level

Further down the health pyramid, comes the health facility: the clinic, the hospital, the health insurance company. Opportunities for digitisation are multiple: going digital makes management better and faster, can smarten up the patient administration, will make users more accountable to their stakeholders, gives them opportunities to improve their collective performance as a health facility.



@ **BTC**: Together with business and academic partners, we work on hospital information systems in Senegal, Burundi, Rwanda and other countries. In 2017 Burundi will have its national digital maintenance management operational, covering equipments of over 700 health facilities. In Kigali we are building a digital urban hospital network. In Senegal BTC develops a health insurance system with digital management of individual members. (case Senegal: <https://www.youtube.com/watch?v=0xtXdkV-bX8&feature=youtu.be>)

<p>Level 3: the health professional</p>	<p>Digitisation can profoundly change the performance of nurses, doctors and community-based health workers. Their records can be stored in an easy way; data can be collected in uniform and standardized ways, opening up the ways for better case management of the people and the communities. Tablets and mobiles can open perspectives for better health care delivery, even in the most remote areas.</p> <div data-bbox="683 383 1150 663" data-label="Image"> </div> <p>@ BTC: In several partner countries we develop mobile health care delivery monitoring, always with respect for the patient's privacy and with a focus on quality control. A spectacular development in 2017 will be the Ikirezi application, a software tool offering computer assisted clinical decision support to health professionals on the one hand and randomly testing of clinical knowledge of health workers on computer generated clinical cases.</p>
<p>Level 4: the community</p>	<p>The community is an essential player in the health system in different ways. Community representatives are members of steering committees of health facilities and districts. Communities participate in significant ways, directly and indirectly in the financing of the communities' health. Communities are an actor for quality control of the services delivered in the facilities. Technology makes it possible to interact directly with communities. Use of widespread technologies such as SMS and WhatsApp can be very efficient when creating feedback loops, but also as a tool for awareness campaigns.</p> <p>@ BTC: in the context of Performance Based Financing, we develop with our business partners, easy mobile quality controls on health services to be used by community associations. This gives reliable feedback on the patients' experiences and outcomes.</p>
<p>Level 5: the patient</p>	<p>The final objective of every project, programme and policy, is at the end-user's of the health system: the patient.</p> <p>Our developments therefore must bring added value for this individual consumer of the services, whether delivered by a health professional or a community health worker, in or outside a health facility, in any given country or somewhere in a globalizing world.</p> <p>@ BTC: Today we are working on mobile money transfers for subscriptions to health insurance schemes, warning text messages on routine controls during pregnancy, health information on mobile phones and health applications monitoring physical activity... It is only the very beginning, but we are already seeing blood pressure, sleep profile or glycaemia being measured by smartwatches or phones.</p>

Points of attention for the formulation & implementation	<ul style="list-style-type: none"> - Check national rules and regulations. - Align with the policies and programmes of the government partner. - Build upon good practices and lessons learned. - Integrate tools and applications that beneficiaries are already using in their daily lives when possible - Identify appropriate indicators for the monitoring and evaluation. - Provide for the human and financial resources required. - Ensure proper communication, documentation and knowledge building. - Do not forget to develop an offline strategy
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Partners	<ul style="list-style-type: none"> - VUB: through a framework Contract (BXL1609) BTC collaborates with a consortium hosted at VUB in E-health (ehfc@ict4d.be). The consortium is composed of VUB, AEDES, Bluesquare, Institute of Tropical Medicine, E3 (renewable energy) - FEDICT: through a framework agreement, BTC has institutional collaboration with the Federal Services for ICT, and specifically their department international relations (Frank.Leyman@fedict.be) - MRAC: a framework agreement with the Royal Museum for Central Africa (Tervuren) on cartography and mapping - AKVO: a framework contract on mobile data collection with AKVO (www.akvo.org) contact: machteld@akvo.org
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Documents & tools	<p>From innovation to implementation – e-Health in the WHO European Region: http://www.ehealthnews.eu/download/publications/4742-from-innovation-to-implementation-ehealth-in-the-who-european-region</p> <p>Plan National de Développement de l'Informatique de Santé du Burundi (PNDIS), Bujumbura-Brussels https://www.researchgate.net/publication/281970920_Plan_National_de_Developpement_de_l'Informatique_de_Sante_du_Burundi_PNDIS</p> <p>Plan National de Développement de l'Informatique de Santé en RDC, October 2014, Kinshasa-Brussels https://www.researchgate.net/publication/269222160_Plan_National_de_Developpement_de_l'Informatique_de_Sante_en_RDC</p>
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More references	<p>Evaluating the impact of hospital information systems on the technical efficiency of 8 Central African hospitals using Data Envelopment Analysis. Frank Verbeke, Evelyne Ndabaniwe, Stefaan Van Bastelaere, Ousmane Ly, Marc Nyssen; Journal of Health Informatics in Africa (2013), Volume: 1. http://www.jhia-online.org/index.php/jhia/article/view/68</p> <p>Monitoring of clinical activities and performances by using international classifications ICD-10 and ICPC-2. Three years' experience of the Kigali University Teaching Hospital, Rwanda. Authors: Theobald Hategekimana, Candide Tran Ngoc, Denis Porignon, Michel De Jonghe, Frank Verbeke, Stefaan Van Bastelaere. Electronic Journal of Health Informatics, Vol. 5 No 1 (2010); http://www.ejhi.net/ojs/index.php/ejhi/article/view/107.</p> <p>Using TOGAF for building a national implementation strategy for e-health services and technologies in Burundi. Authors: Frank Verbeke, Marc Nyssen, Sandrine Kaze, Etienne Mugisho. e-Health Services and Technologies 2015, https://www.dropbox.com/s/zoa7sjx3x67mp1c/ehst.2015.togaf.burundi.pdf?dl=0</p>
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	<p>Patient identification and hospital information management systems in sub-Saharan Africa: a prospective study in Rwanda and Burundi. Authors: Frank Verbeke, Gustave Karara, Stefaan Van Bastelaere, Marc Nyssen. Rwanda Medical Journal, Vol 69 (4), December 2012, http://www.bioline.org.br/pdf?rw12002</p>
	<p>Secondary use of electronic health records for measuring the impact of health insurance status on health services consumption and in-hospital mortality. Authors: Frank Verbeke, Théobald Hategekimana, Gustave Karara, Stefaan Van Bastelaere, Alexis Rechain, Marc Nyssen. HISA 2013. https://www.researchgate.net/profile/Frank_Verbeke/publication/269222167_Secondary_use_of_electronic_health_records_f_or_measuring_the_impact_of_health_insurance_status_on_health_services_consumption_and_in-hospital_mortality/links/5507115f0cf2d7a28122d6b4.pdf</p>