Digital Transformation Center Rwanda

Quarterly Progress Report

July to September 2022

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Digital Transformation Center Rwanda

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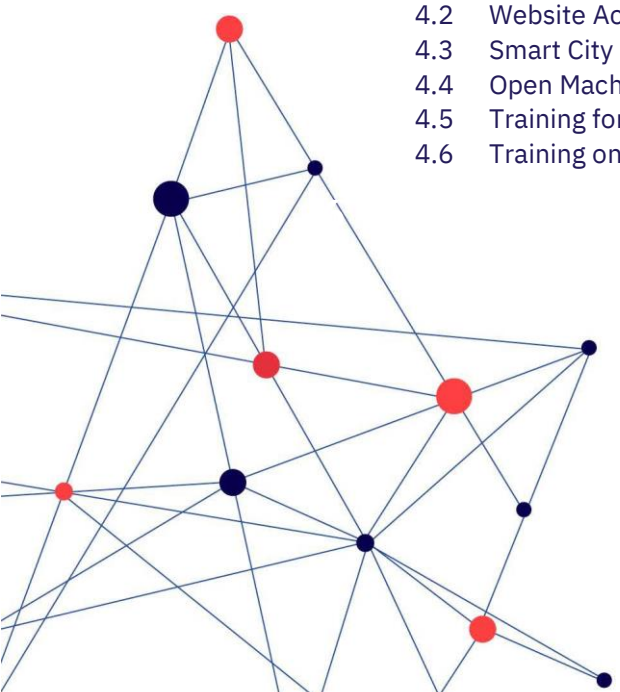


Introduction

Thank you for taking the time to read our quarterly update report and our successful collaboration during the past 3 months. Here we would like to list our highlights related to our four focus topics.

Smart Cities:
Here we keep track of all the important activities that contribute to smart cities and communities in Rwanda. This time, we would like to highlight:

- Smart Waste Management Platform
- Smart City Study Tour to Sweden

Artificial Intelligence:
Here we record all the important activities in the area of AI such as Machine Translation, Natural Language Processing and others. As highlights we would like to mention:

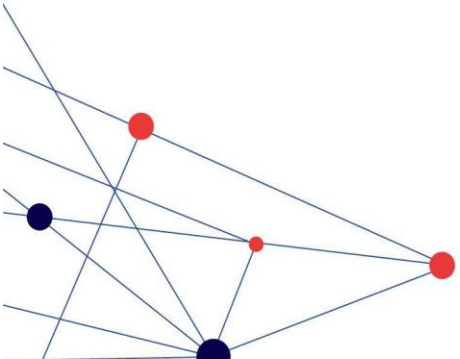
- National AI Policy
- Zindi Machine Translation Challenge

Digital Inclusion:
Here we record all important activities in the area of digital inclusion and digital literacy in order to contribute to the integration of vulnerable groups in the digital transformation. This time, we would like to highlight:

- National Strategy for Digital Inclusion
- Digital Literacy Trainings

Ecosystem-building:
Here we record all important activities in the area of building the tech ecosystem, which includes topics such as startup promotion and networking. As highlights we would like to mention:

- Voucher System
- Open Innovation Programme



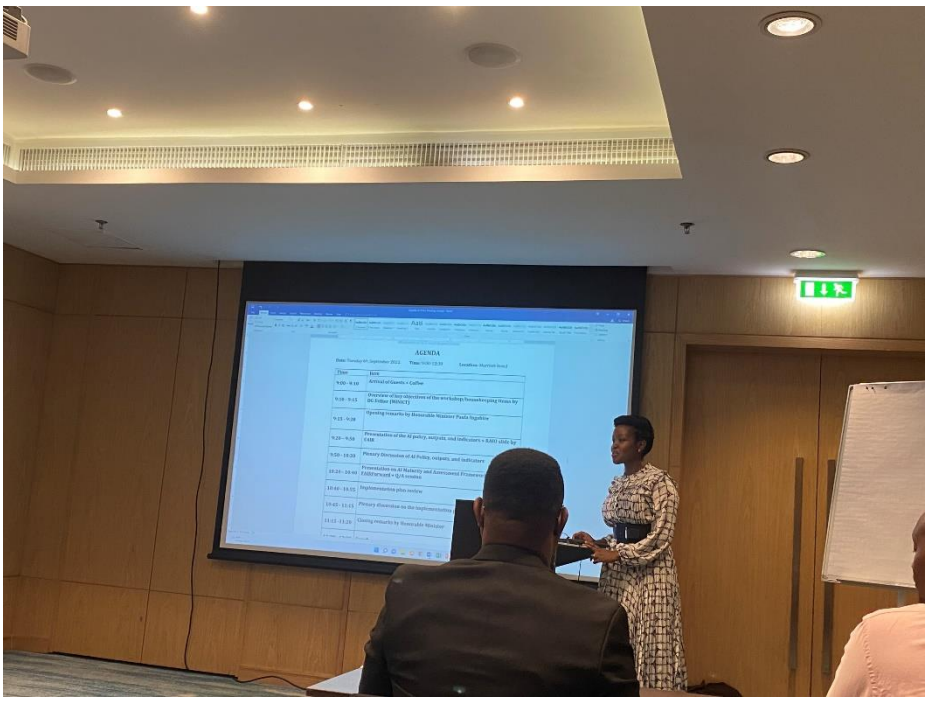
1 Policy Development and Dialogues

1.1 National Strategy for Digital Inclusion

The Government of Rwanda is seeking to develop a digital inclusion strategy as an instrument to ensure effective implementation of the principal of "leaving no one behind". Rwanda's digital inclusion strategy will establish a holistic approach to bridge the digital divide in its different forms and enable a streamlined framework for coordinated efforts and investments towards citizens' digital participation. During this quarter, EY has shared a draft of the national strategy which was presented and validated during a stakeholder workshop and later by Honorable Minister of ICT and Innovation Paula Ingabire.

1.2 National AI Policy

The AI Hub has been supporting MINICT and the Center for the Fourth Industrial Revolution in developing a National AI Policy which will enable Rwanda to harness the benefits of AI while mitigating the potential risks of this technology.

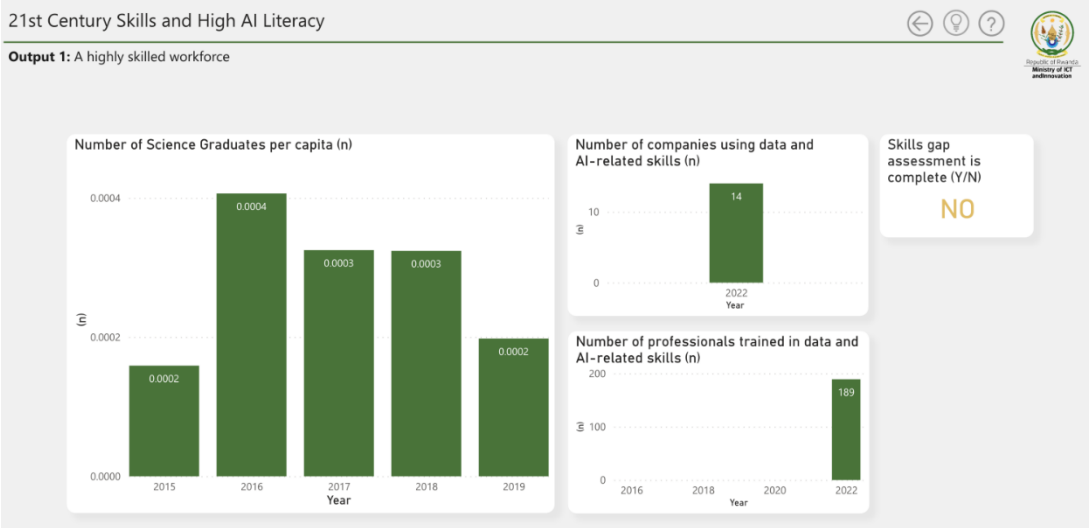


During this quarter, the validation workshops for the policy have been held. A first one in July brought together technical representatives from responsible government agencies; in a high-level workshop in September Honorable Minister Paula Ingabire gathered high-level representatives from key institutions to validate the policy and its implementation plan. In a next step, the National AI Policy will be submitted to the national cabinet for approval.

1.3 AI Maturity and Readiness Assessment Framework

The AI Hub, in collaboration with C4IR and MINICT has been working on the development of an AI Maturity and Readiness Assessment Framework.

Over the past months, the team has finalized an interactive dashboard visualizing the chosen indicators to track progress in AI in a transparent way and a final report including the methodology used to develop the framework, as well as insights gained based on the first round of data collection. Thereby, the activity has concluded and the framework can from now on help Rwanda to systematically monitor the progress of the implementation of the National AI Policy, informing both policy interventions and investment decisions for the government as well as the private sector.



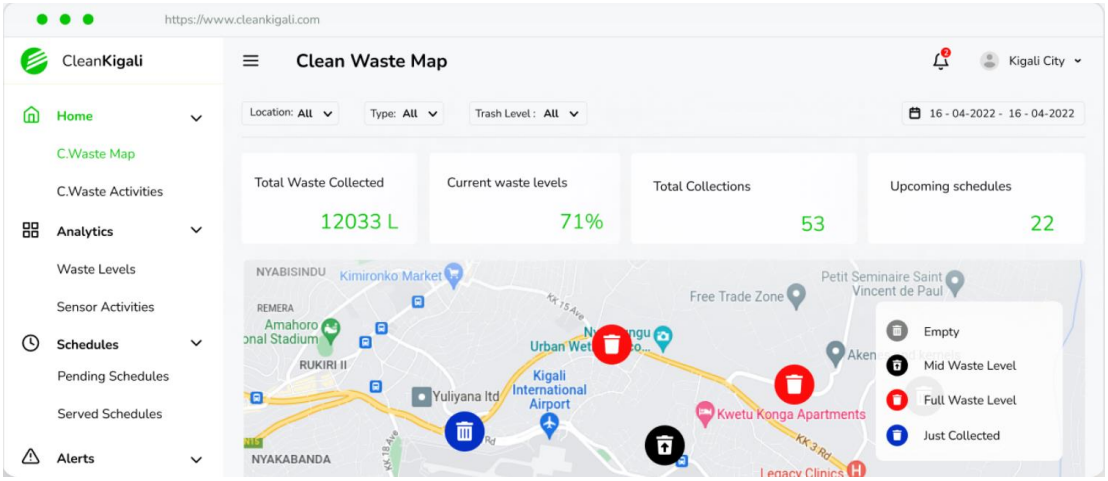
1.4 Capacity-Development on Ethical AI Guidelines

The AI Hub, together with RURA and the Center for the 4th Industrial Revolution, is implementing an awareness raising and capacity building programme for companies and start-ups on how to effectively use the ethical AI guidelines developed by RURA. The objective of the programme is to equip interested actors from government, industry, civil society and academia with the knowledge and skills they need to design and deploy AI systems in line with the ethical AI guidelines. Beyond the training aspect, the programme also aims to promote peer-to-peer exchange among the participants and, thereby, foster the growing AI ecosystem in Rwanda. A call for applications was launched and more than 50 applications were received from different members of the public, private, academia and the civil society. The workshop is scheduled 18th-19th October 2022.

2 Solutions & Innovation

2.1 Smart Waste Management Platform

The Smart Waste Collection and Management Portal is a web based app that is responsive to mobile devices built for staff of City of Kigali. During this quarter, the platform was completed, deployed and handed over to the beneficiary. The solution is capable of collecting real-time data from onsite-sensors, detect the bin-filling level, visualize sensor data, conduct location-based analytics, as well as generate statistical reports including but not limited to waste generated, collection performance and overflows. More information can be found under the official website for this project : https://cleankigali.kigalicity.gov.rw/.



2.2 Landslide Monitoring Pilot

The project pilots an optical monitoring system to detect landslides in endangered areas, initially focusing on a site in Nyabihu District. In cooperation with MINEMA and the Rwanda Space Agency (RSA), the project aims at providing image and other sensor data openly via the Geospatial Hub of RSA to enable further analyses by stakeholders. Finally, capacity building and skills transfer to local stakeholders to operate the system as well as an integration in Rwanda's early warning system are facilitated.

In the past months, work has been taken up by the German company Hesotech GmbH. After connecting to stakeholders during a first mission in July, the system was installed onsite at the end of September. Additionally, the system was connected to RSA's servers to start the collection of data.

2.3 Zindi Machine Translation Hackathon

The Zindi machine translation challenge facilitates the data collection efforts for machine translation enabling the local and African data science communities to clean and curate parallel data for English-Kinyarwanda attained from web-crawled sources.

This activity was completed in the first week of August and was implemented in two phases: a physical in-person hackathon and an online competition. Both events were well attended, with balanced gender representation among participants. Three winning teams emerged, and the DigiCenter team now has access to approx. 100,000 parallel sentences in the legal (Official Gazette) and religious (Bible, Quran) domains.

2.4 CMU Practicum on Speech-to-Text Technology

In September, the AI Hub team kicked off a 3-months long research project in the framework of CMUs' practicum approach. A team of three students in CMU's "Engineering in AI" program are working with the AI Hub team to re-train the Kinyarwanda speech recognition model developed in the MBAZA chatbot project. Specifically, the team will develop a more accurate model and extend on the previous work to a multilingual engine capable of recognizing both English and Kinyarwanda.

2.5 User-centered Design Research for Machine Translation Use Cases

In collaboration with the Kenyan design firm Made by People, the AI Hub has been conducting user-centred design research to identify potential use cases for English-Kinyarwanda machine translation.

This has included various phases, such as workshops to scope local needs and opportunities for machine translation in Rwanda, as well as the design of preliminary mockups for how the translation engine would be deployed. The two use cases that have been identified are (1) a machine translation app for the tourism sector, and (2) a machine translation feature for e-learning platforms. In September, the research team has been conducting in-depths user research on the ground, including interviews with potential users and stakeholders.

2.6 Inclusive Innovation 2030 Smart City Edition

The Rwanda Smart City Edition of Inclusive Innovation 2030 comprised of three tracks: solid waste management, road safety, and air pollution (transport) to solve challenges Rwandan cities are facing. After identifying the core challenge in each track in a stakeholder workshop with public and private sector players, the team worked on finetuning the solution concepts. The concept notes were recently validated and handed over to MINICT. The co-designed solutions include a coordinated and smart road safety platform, an application to support a deposit and refund system of PET bottles as well as a clean air center to leverage technological transport business models.

3 Ecosystem

3.1 Smart City Lab

The Smart City Lab is a joint initiative by MINICT, RISA and ICT chamber with technical advisory from GIZ to set up a one-stop-shop for co-designing solutions, developing capacity and providing testbeds for actors in the smart city sector. During this quarter, the consortium members have drafted a business plan including potential services the Smart City Lab would offer. Furthermore, an operations plan has been drawn up to set up the Lab in the upcoming months. Moreover, potential collaboration partners have been engaged to join the Smart City Lab with their planned interventions to leverage on synergies instead of setting up separate entities.

3.2 Artificial Intelligence / Natural Language Processing Community of Practice

With our work on AI communities of practice, we aim to create places for knowledge sharing, learning, and joint development of AI solutions. During this quarter, the NLP community has held multiple trainings including *"How to access the German AI Research Center (DFKI)'s HPC cluster and setup local environment*", *"Intro to Text cleaning with Pandas and Building a simple text classification model"*, and most recently *"Basics of Deep Learning"* that occurred over a period of five weekends from mid-August to early September.

Other activities in planning are data labeling for sentiment analysis happening in collaboration with researchers from Masakhane in Nigeria, and an upcoming meetup - panel discussion with PROTO Rwanda on "Business Opportunities for NLP".

3.3 Robotics Community of Practice

The Robotics Community of Practice brings together different stakeholders in the area so they can form a community for knowledge exchange, growth and collaboration through meet-ups, demo days, seminars, training series and alike. In July we conducted a meet-up on the theme of "Current skills vs the future of Robotics in Rwanda" with 28 members attending.

3.4 Cyber-Security Community of Practice

The Cybersecurity Meetup Rwanda has been dedicated to sharing cutting-edge knowledge and experience with cybersecurity community practitioners by fostering dialogues and collaboration between both public, and private sectors and academia.

A meetup in September has brought cyber-security practitioners together on how to hack Capture the Flags (CTF) by learning how to solve real-world problems in cybersecurity including reverse engineering, web security, digital forensics, cryptography, machine and network security.

3.5 Open Innovation Program

The Open Innovation Programme embraces a problem-centric approach to support the market-readiness of innovative products. This is done by connecting startups with stakeholders and conducting capacity building for the founders. During the past couple of months, the pre-acceleration programme for early-stage innovation was successfully completed through the Open Innovation Programme. Thirteen startups graduated with improved solutions to meet the market demand.

3.6 Circularity Accelerator

Impact Hub Kigali designed and delivered circularity themed events as part of the 'circularity series' aimed to set the foundation for a platform on which a community of practice around Circular Economy can grow in Rwanda. Each event was attended by 20 to 40 participants including a range of Circular Economy experts, entrepreneurs, students, to organizations such as GGGI and other relevant institutions. The focus of the events was on how Circular Economy can be applied in various sectors such as fashion, as well as raising more awareness around the need to adopt circular economy practices.

3.7 Voucher System

The voucher system empowers SMEs to approach knowledge providers with their innovation-related problems, something that they might not have done in the absence of such an incentive.

Since July 2022, 9 new start-ups and SME's have been offered the voucher services and they are already engaged in services where 5 of them are getting Business Assessment service, other 2 are taking Sales and Marketing service, and the Finance and Tax for the other 2 start-ups. We have contracted 3 consulting firms that are helping to provide those services to the selected start-ups and SME's. Three new consulting services are currently being drafted in Management Skills, Investor Readiness, Product Development, and one for the public sector which are planned to start next year.

3.8 Support to Business Angels Rwanda

During this quarter, we supported the local angels' network with tax and legal advisory services. Part of the support included the development of templates to support investment processes and *how to guides* were developed to support future deals. Angels could attend workshops to learn on how to utilize the developed guides and templates.

4 Digital Literacy & Capacity-building

4.1 Digital Literacy Trainings

The overall goal of this activity is to close the digital divide by developing curricula for different vulnerable groups and provide digital skills training for 40.000 people living outside of Kigali, of whom 20.000 are women and 1.000 are people with disabilities. During this quarter, the following milestones could be achieved:

- Supporting RISA to continue to mobilize and deploy 100 Digital Ambassadors (DAs) across the country. So far, 9700 citizens have completed all modules
- Working with the ICT Chamber to train 100 masters trainers, who will train 7500 entrepreneurs in rural population on digital literacy
- Working with REB to train 200 *Master Trainers* on how to use the virtual laboratory platform
- Working with One Acre Fund (OAF) to train 15,000 farmers on digital trainings.

4.2 Website Accessibility Assessment of Government Websites

In collaboration with RISA, Awesomity Labs and Seeing Hands, six government websites were assessed on website accessibility to further advance in digital inclusion for people with disabilities in Rwanda. During this quarter, automated and manual tests were conducted on the websites where visually impaired testers from Seeing Hands documented errors accessing the websites such as irembo or gov.rw using assistive technologies. All insights were documented in a report and presented during individual workshops with the respective website owners in July.

4.3 Smart City Study Tour to Sweden

In collaboration with Smart City Sweden, the Embassy of Sweden (Rwanda) and MINICT, a study tour was carried out for six partners from MINICT, RISA, MINALOC, MININFA, MoE and City of Kigali. The overall aim was to get insights into Swedish innovations to support towards the realization of the Smart Rwanda Masterplan, as well as benchmarking and learning from Smart City Sweden about the transition of a smart city from ideation to realization. Through identifying the various technologies that are involved in the journey of achieving a smart city, synergies with Smart City Sweden have been identified which established room for future collaboration. The tour was designed around four core topics: mobility, digitalization, urban planning and social sustainability.

4.4 Open Machine Learning for Earth Observation Training

Together with the Rwanda Space Agency and the German Aerospace Agency, the AI Hub is implementing an Open Machine Learning for Earth Observation (ML4EO) Training Program which aims at providing the necessary skills for young professionals in Rwanda to make use of machine learning techniques with earth observation data. In addition, it aims at enabling participants to build their own use cases and business models in the upcoming ML4EO space.

Over the past months, the program has kicked off and in the end of September, the program development has started with a first mission of international consultants to Rwanda connecting to stakeholders, scoping the market and assessing skills needs.

4.5 Trainings for RISA staff on Business Analysis and Project Management

In order to implement IT projects within several clusters, the restructuring and reorganization of the ICT sector and establishment of the function of the Chief Digital Officers (CDO) and business analysts in various government clusters is crucial. However, there is a need to train CDOs in project management skills to improve their knowledge of the project lifecycle and how to develop a successful project conception to completion to business analysis. During this quarter, all trainings were completed with all participants passing the mock-test.

4.6 Training on Data Dexterity

The main objective of this training program is to bridge the skills gaps in data dexterity and professional ethics for efficient use of data in various business sectors in Rwanda. The long-term goal is to create an environment that promotes smart data sharing among private and public sector organizations, academia and research institutions to build better data driven solutions for Rwanda. So far, the following sessions have been completed during this quarter:

- Stakeholder prioritization workshop: This workshop was aimed to bring together all identified key stakeholders from public and private sector organizations to agree on the priorities of the program and validate a work plan with a proposed number of key activities.
- Sector focus group discussion: Using a sector approach, specific group discussions have been conducted with representatives of organizations in each sector of interest.
- Training sessions: Reflecting on the recommendations gathered during each of the above sector focus group discussions, two series of training sessions took place to address all identified capacity gaps.

Imprint

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