INCLUDE

KNOWLEDGE PLATFORM ON INCLUSIVE DEVELOPMENT POLICIES

Digital divides or dividends? Assessing the inclusiveness of basic services in Rwanda's digitalisation agenda

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Introduction

This report is part of a larger INCLUDE research programme looking into the digitalisation of basic services in Africa and how inclusive they are[1].

Rwanda has a deep-rooted policy commitment to the digital agenda, marked by an increase of e-services spurred by the country's Information and Communication Technology Initiatives (Republic of Rwanda, 2019). Several laws and regulations have been adopted to frame the country's digital transformation. In 2006, the Rwandan government adopted the ICT Act, which applies to all electronic communications, to create a comprehensive legal framework for regulating ICT activities and promoting fair competition in the sector (Banga et al., 2020). More recently, the government developed the ICT Sector Strategic Plan (2018-2024) towards a digital enabled economy by promoting the use of integrated e-governance platforms. At present Rwanda already has 104 e-government services which can almost all be accessed through the Irembo Digital Platform that was launched in 2014 to offer government services to Rwandan citizens via the Internet (NEC, 2020). These developments have resulted in the relatively high World Economic Forum's Networked Readiness Index score compared to Rwanda's East African counterparts, placing the country as a strategic leader for regional digital integration (World Bank, 2020).

Despite Rwanda's high e-government score, the digital journey remains incomplete and comes with several challenges, including: data protection, cyber security, limited information infrastructure, cost of broadband, digital literacy gaps, exclusion of vulnerable social groups, gaps in governance and management, lack of trust in the new system and language barriers (Twizeyimana, et al., 2018; World Bank, 2020). Citizens are not fully using the mobile payment system of the Irembo platform as more than half prefer to pay an agent in cash. Overall, the daily access numbers to the Irembo services remain low, with about 1500 daily users (World Bank, 2020). Additionally, the COVID-19 pandemic increased the digital divide exposing the underlining structural challenges to the government's digitalization agenda (Munu & Vlaminck, 2021).

This study provides a holistic review of the state, progress, challenges and best practices of e-governance from an inclusive development lens. The research builds on, and contributes to, the growing body of literature on the subject by looking into three core components of e-governance (e-administration, e-service and e-participation), cutting across issues such as access to ICT and connectivity, access to information and regulation and the political environment (Fraser-Moleketi & Senghor, 2011). Furthermore, a mixed-method approach was adopted combining statistical analysis of existing databases with in-depth case studies of the ongoing digitalisation processes in the areas of land governance and health, including measures adopted in response to COVID-19. By doing so, the study not only unpacks structural (e.g. geographical, gender-based) inequalities related to access and usage of e-services, but also sheds light on the experiences and perceptions of vulnerable groups regarding the affordability, relevance and participation in digitalisation processes. More still, the findings of the study include a preliminary assessment of the impact that e-services (in the areas of land registration and health care) have on the (material, relational, cognitive) wellbeing of vulnerable groups. A political economy analysis allowed the findings to be embedded within Rwanda's political and socio-economic context as well as demonstrating the importance of adopting a human rights perspective when studying the inclusivity of e-governance processes.

[1] The Knowledge Platform on Inclusive Development Policies (INCLUDE) was conceived in 2012 by the Dutch Ministry of Foreign Affairs to promote evidence-based policymaking for inclusive development in Africa. Its members consist of African and Dutch researchers, academics, policymakers, diplomats and representatives of nongovernmental organizations (NGOs) and the private sector.

The present report starts with an overview of the adopted methodology, followed by a brief literature review from which we have drawn our analytical framework. Then a sketch of Rwanda’s digital transformation pathway is presented, including an overview of the laws and regulations and governance system guiding the digital agenda. Finally, it presents an analysis of the inclusive nature of Rwanda's digital transformation zooming in on the cases of land registration and health care.

Methodological approach

A four phased approach, using a mix of qualitative and quantitative research methods, was undertaken to reach the following four research objectives:

1. To take stock of e-governance initiatives in Rwanda (especially since the boom in digital services in the wake of the COVID-19 pandemic), looking into e-administration, e-services and e-participation.
2. To analyse progress in the enabling environment for inclusive digital transformation (incl. physical infrastructure, digital skills, regulation, political economy and institutional capacity) to see where efforts and investments could be prioritized.
3. To assess how inclusive these interventions are in terms of reaching and improving the multidimensional wellbeing of poor and vulnerable citizens by zooming in on two research areas: land governance and health.
4. To extract lessons and best practices for scaling digital basic services and making them more inclusive to reach and support those furthest behind as well as open-up digital public space enabling "free" citizen e-participation.

The first phase entailed mapping digital basic services in Rwanda focusing on services between governments and citizens (G2C). This was done based on document analysis of key government policies and websites and a literature review (see bibliography for full list of documents and literature reviewed) as well as key stakeholder interviews with government officials and members of Civil Society Organisations (CSOs) and selected private sector agencies who have been monitoring the digitalisation process (see annex for full list of key informants). The analysis focused on how available, affordable and accessible the services are, and how wellbeing and human rights issues are affected by the digitalisation of basic services in Rwanda. The analysis adopted a political economy perspective allowing for the findings to be embedded in Rwanda's socio-economic and political context. In a nutshell a political economy perspective allows us to dig deeper into Rwanda's e-governance performance by moving beyond existing policies and unpacking how they are implemented and what impact they have on Rwanda's citizens.

In the second phase, the existing enabling environment for inclusive digital transformation was outlined, revealing factors which hinder equitable e-governance and those that are conducive. The factors delved into concepts of availability, affordability and accessibility, described in the literature review. In this phase, the research was primarily quantitative, analysing existing statistical databases on digital infrastructure, digital literacy and e-readiness. This was complemented with more qualitative assessments of the political context around digitalisation. To assess the institutional capacity of the Rwandan decentralized government - or the extent to which public offices have the capability of successfully implementing and reaching set e-governance goals as well as the regulatory framework - document analysis and literature review was complemented with key stakeholder interviews.

The third phase zoomed in on the issue of inclusivity looking into who has access to the digital services and why some groups of people are excluded. To answer the "who" question, quantitative analysis was conducted of existing disaggregated statistical data on accessibility, affordability and usage of selected e-services. Inclusion was measured using the four dimensions of affordability, accessibility, number of users and geographical spread nationally and across the seven (7) provinces of Rwanda. For the "why" question, the study adopted a qualitative approach with two segments. Firstly, for a broader analysis of the inclusivity of government e-services, key stakeholder interviews were conducted with relevant government officials as well as CSOs and academic experts. Secondly, to unpack the (underlying) barriers towards accessing e-services, participation in the design and implementation of e-services and their relevance for vulnerable groups, the study zoomed in on two cases: the digitalisation of land registration and the digitalisation of

services in the health sector including health insurance. Within these research areas, the study further conducted focus group discussions with vulnerable end-users in selected communities in Kigali and the Western Province to juxtapose the rural and urban inclusive e-governance.

The fourth and last phase of this study entailed triangulation of the quantitative and qualitative data to draw a coherent and sound conclusion and to identify best practices and opportunities for scaling up inclusive e-governance processes which are grounded in the realities of Rwanda's citizens.

We used a mixed-methods approach combining quantitative data analysis, document analysis and key informant interviews (KIIs) and focus groups (FGDs). In total eleven KIIs were conducted including key government officials, representatives of CSOs and donor agencies. Four FGDs with 24 participants were held (6 participants/ FGD) in two localities Kigali City and Rubavu. In each area, two FGDs were undertaken, one on land and another on health. The participants of the FDGs were purposely sampled from two market places: Kigali city Market and Rubavu Market. Sampling was done among four labour activities (man-powers, head-porters, street vendors and market stand owners) to have a variety of socio-economic status and related vulnerabilities (see annex for full list of KIIs and FGDs participant information).

Literature review of key concepts

In today's society digitalisation has become the new social norm that defines the organisation and evolution of public and commercial services (Mariën & Prodnik, 2014). E-governance initiatives have been classified into 4 categories: Government-to-Citizen (G2C), Government-to-business (G2B), Government-to-Government (G2G) and Government-to-Employee (G2E). However, from an individual or citizen perspective, G2C e-governance is the most prominent and therefore the focus of this study. According to Asmar et al. (2020), the concept of digital inclusion relates to the deep-rooted extent to which individuals across society are able to adapt to, and benefit from digital advancements in a constantly changing society accordingly (Asmar et al., 2020). This lens places the inclusiveness of e-services in the hands of the individuals and their adaptive capacities. Other scholars take a more institutional approach and understand digital inclusion as measures to promote availability, affordability and accessibility of digital platforms for all users (Anwer et al., 2016; Mukamurenzi et al, 2019; Otioma et al., 2019). Such a lens places the responsibility of inclusiveness in the hands of the service providers. This study follows this latter line and will therefore focus on what measures the government has taken to make e-services less or more inclusive. In what follows, the concepts of available, affordable and accessible e-services will be explained as well as the possible impact of e-services on citizens' wellbeing and the need to include human rights into the analysis of the inclusiveness of e-governance initiatives.

Availability, affordability, accessibility

Availability of digital services is related to the ability to use such service at any time (Anwer et al., 2016). A digital service is available when users have it at their disposal with correct functionality, meaning without systems or network failures undermining the availability of digital services. Availability is compounded by difficulties in setting up the necessary ITC infrastructure such as laying fiber optic, base transceiver stations or poor signal due to geographic constraints (Otioma et al., 2019). Various studies, as well as the African Union, have stressed that African governments should "*retain leadership, accountability and oversight capabilities over ICT infrastructure developments"* (World Bank, 2021). In the case of Rwanda the government has definitely played such a leading role.

Affordability of digital services is related to the costs associated with using a particular platform or technology, and it is a key element for closing the digital divide. While promoting affordability is a key step, it can only be seen as an enabler, as there is also a foundational need for addressing challenges to inclusion such as digital literacy and providing training and support for vulnerable groups such as the elderly, women and rural populations (Gleason & Suen, 2021). However, internet costs remain high in most African nations (Froehlich et al., 2020).

Accessibility of digital technologies is associated with the quality of being reached and used by many users (Anwer et al., 2016). If services provided make a particular platform available to users through different channels at the time they need, then accessibility is achieved. Distance to intermediaries' service and the use of language understood by users are also key elements of accessibility (Mukamurenzi et al, 2019), as well as adjusting e-services to vulnerable groups such as people with disabilities (e.g. vision-impaired or hearing-impaired) or the elderly. Moreover, accessibility of e-services should consider existing inequalities between different populations depending on different geographical locations. In most urban areas, for example, quality internet services are readily available while in rural areas, this might not be the case (Reddick et al., 2020). While accessibility remains an important condition for digital inclusion, once barriers of access are diminished, inequalities regarding skills and usage patterns remain important issues to be addressed (Mariën & Prodnik, 2014).

Improving access, affordability and availability of digital services, driven by free market principles and government support, is a necessary but insufficient condition for digital inclusion. Existing studies (see e.g. Welby, 2019) demonstrate that inclusive digital transformation goes beyond creating available, affordable and accessible e-services and ideally also improves the wellbeing of citizens, by improving their material capabilities, personal and civic relations as well as self-worth. This study therefore examines digital inclusion considering the free market principles that dominate public policy in developing countries where people neither have equal opportunities nor equal possibilities to participate in the political decision-making processes.

Incorporating wellbeing in the digitalization agenda

> *"ICT programmes can only improve citizens' lives when ICT developers and policy makers pay attention to the following key elements: community ownership, appropriate technology, local content creation, promoting social inclusion and enhancing community networks, and social cohesion."*
> (Ponelis & Holmner, 2015)

Rapid digital developments have affected core "*concepts within liberal democracies of privacy, autonomy, agency, and the implied contract between citizens and their governments"* as well as how we relate to ourselves, others (social life) and the state (civic life) (Gluckman & Allen, 2018). These changes influence citizens' wellbeing and the impact can be felt across three dimensions: material wellbeing (e.g. housing, income), relational wellbeing (e.g. social and civic relations) and cognitive wellbeing (or individuals' personal appreciation of one's self and his and her surroundings). Besides checking of the three "As" (Accessibility, Affordability and Availability), inclusive digital transformation requires policy makers to consider social aspects such as community ownership, networks and social cohesion among others (Ponelis & Holmner, 2015). There is a lack of research on the impact of e-governance services on citizen wellbeing in Africa. Many studies adopt a national perspective and have looked into the relation between digitalization and the Sustainable Development Goals (SDGs) (see e.g. (Mondejar et al., 2021) or how digitalization can improve trade (see e.g. Adeniran & Osakwe, 2021) and some have addressed the role of digitalization on democratic consolidation through enhanced citizen participation (e.g. UNDP & IPAO, 2015). Studies adopting a micro-lens and looking into user-experiences of e-services are scarce. Those that do exist often only touch upon the impact of digitalization on material wellbeing by examining how affordable e-services are for poorer tiers of the population. Fewer studies have been conducted related to the other two dimensions of wellbeing: relational and cognitive.

In Europe, the OECD has been leading research on the link between digital transformations and citizens' wellbeing through its research project, Going Digital[2]. Welby (2019) for example has zoomed in on relational wellbeing and citizen-government engagement in Europe and identified three areas in which digital transformations can affect both "*citizens and governments in their experience of civic engagement and public services*": i) citizen participation and expression of "political voice" ii) digital security and protection of user privacy; iii) making policy-making processes more transparent. Adopting an institutional perspective, citizen wellbeing can be improved through digital e-services if the government is responsive (designs e-services based on needs assessments), protective (prioritizes protecting personal data from misuse and privacy) and trustworthy (installs open and transparent systems which generate trust among citizens). The institutional approach adopted by the Going Digital research project overlooks the capabilities of people to use the provided e-services in a way that is not only beneficial to consolidating democracy or good

[2] https://www.oecd.org/digital/going-digital-project/

governance, but also empowers vulnerable groups within society (Moodley, 2005; Avgerou & Madon, 2004; Avegerou & Addo, 2017). Further on in this report the extent to which Rwanda's digital transformations adhere to the principles of responsiveness, protectiveness and trustworthiness will be examined and light will be shed on the empowering capacity of existing e-services.

Recent events in Sub Saharan Africa demonstrate that fostering a healthy citizen-state relationship requires that governments also uphold these values outside the digital realm. In many African countries, advances made in e-governance and e-participation have not translated into smoother citizen-state relations (see e.g. UNDP & IPAO, 2015). Despite spurs in digitalization due to the COVID-19 pandemic, citizens across the continent have expressed their grievances against "other pandemics" such as social injustices and gender-based violence as well as corruption[3]. This comes to show that e-governance services do not function as magic markers which erase existing structural frictions.

Kasongo (2017) cautions that "*failure to address the roots of societal challenges through ICT may limit the impact to meeting people's immediate needs, whilst leaving the structural causes of their underdevelopment unchallenged and unchanged*" (Kasongo, 2017).

Human rights and digital participation

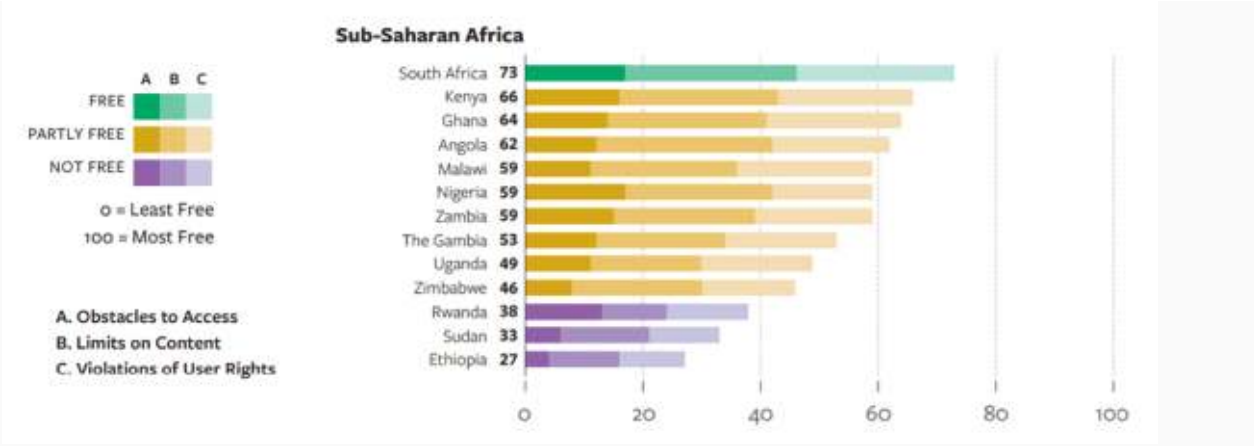
> "*ICTs pose a challenge in terms of control and freedom. They are capable of both reinforcing participation and democracy and enabling ubiquitous control that enhances the power of few people"* (Misuraca, 2007)

In 2019, Rwanda ratified "The African Convention of Cybersecurity and Personal Data Protection". Subsequently, the Rwandan cabinet approved the country's draft data protection and privacy law in October in 2020. The draft law aims to ensure that the privacy of personal data will be protected. Yet, critical voices have raised that the law is too little too late, as many Rwandans are already sharing personal information through online platforms such as Irembo (Afadhali, 2021). Furthermore, other laws curtail freedom of expression on the internet. Article 52(1) of Rwanda's Law No. 44/2001 of 30/11/2001 Governing Telecommunications empowers the minister in charge of telecommunications policy and law, to "*interrupt or cause to be interrupted, any private communication which appears dangerous to the national integrity, contrary to law, public order or public morals*" (CIPESA, 2021).

In addition, COVID-19 has raised concerns of how the government is using citizen data. The use of technology to track the spreading of the virus has been non-transparent and arrests of media-practitioners for COVID-19 violations has raised eyebrows (Afadhali, 2021). Digital interventions adopted to control COVID-19 and Rwanda's general digital transformation process should be situated in a context of low internet freedom. Rwanda is one of the countries with the lowest Freedom on the Net scores in Sub-Saharan Africa (Freedomhouse, 2021). The report further indicates that despite Rwanda's high scores in terms of internet access, the government has strict control over content and oppression of critical voices on the net, through surveillance, arrest, and intimidation, especially against journalists, activists, and opposition leaders is not uncommon (White, 2021).

[3] Some of these popular movements in Africa included the #stopGBV movement against gender-based violence in South Africa, the #ZimbabweanLivesMatter movement against rights violations, the #ShutItAllDown movement against gender-based violence in Namibia, the #AmharaGenocide protests against violence in Ethiopia, and the #EndSARS movement against police brutality in Nigeria, among others (Ajinbola, 2021).

Figure 1: Freedom on the Net SSA



SOURCE: Freedomhouse (2021)

Moving forward, the Rwandan government faces an important challenge of increasing trust among its citizens and transparency of how personal data will be protected and privacy guaranteed. If they are unable to build this trust it might present itself as an important obstacle towards wide scale use of digital services. In this endeavor, cooperation with key civil society actors as well as media will be imperative as well as full transparency of how data will be protected. Coming back to Welby's research (2019), these interrelated issues, trust and data-protection, are not only important for sound e-services provision but also foster better state-citizen engagements and relational wellbeing.

Context assessment

Laws and policies framing Rwanda's digital agenda

E-government in Rwanda has two main objectives. The first objective is to implement e-government by integrating all government services in order to enhance operational efficiency and the quality of service delivery to citizens and businesses. The second objective is to establish effective communication channels to enable and empower both rural and urban communities as the means to increase citizens' participation in governance. E-government is spearheaded by the Ministry of ICT and Innovation (MINICT) and the Rwanda Information Society Authority (RISA) (Mukamurenzi et al, 2019).

The implementation of Rwanda's digitalization agenda has been guided by a series of 5-year ICT strategic plans, widely referred to as National Information Communication Infrastructure (NICI) plans, implemented since 2001. The Smart Rwanda 2020 Master Plan (SRMP), adopted in 2015, is the most recent plan guiding digitalization and by extension e-governance in Rwanda. The SRMP focuses on building business and innovation to place Rwanda as Africa's ICT Hub, using a private sector driven economy. The plan also seeks to support national economic digital transformation by ensuring a broadband for all by 2020, digital literacy for all, research and development for exports and economic digital transformation (Internet of Things, Big Data and Analytics, Cyber Security Research, Creative Industries and Multimedia, Mobility and Digital Lifestyle).

Besides this master plan Rwanda has developed several policies and strategies to promote digitalization over the last few years, which are ultimately geared towards promoting economic growth (RoR, 2019). The National Broadband Policy for Rwanda (2013) was created with the objective of ensuring transformation driven by universal access to high speed, reliable, affordable and secure Broadband infrastructure and services. National Cyber Security Policy (2015) was also developed to ensure Rwandan Cyber Space is secure and resilient. Other relevant policies include: the National Digital Talent Policy (2016) which was designed to bridge ICT skills gap and educate Rwanda's working age population (15-64 years old) in digital literacy and become an exporter of ICT skills in the region (Job Creation); the Child Online Protection (2019), which seeks to empower Rwandan children to access the digital environment creatively, knowledgeably and safely; and the National Data revolution policy (2017) with an objective of building an innovation-data enabled industry to harness rapid social economic development. The Government of Rwanda, in implementing its digitalization policy framework, supports young Rwandan ICT entrepreneurs by sending them abroad for computer and information technology training engineering. This is in addition to funding the Kigali Institute of Technology in order to increase the number of advanced technology students in the country (Mann & Nzayisenga, 2015). More recently in 2022, Digital Health laws and regulations Rwanda was adopted covering the digital ecosystem of the health care covering data use, sharing, intellectual property, commercial agreements, artificial intelligence, machine learning and liability health care digital infrastructure.

Rwanda is among the 17 African countries out of 32 countries with a data protection and legal framework, allowing for data processing on the basis of controller's legitimate interest[4]. The published Data Protection Law has been in existence since 2021. The Rwandan law No. 058/2021 brings Rwanda in line with international data protection standards (vital for the modern digital economy) and provides an enabling working environment for services sector including e-commerce, international financial transactions, and various online services[5]. While the Rwanda Draft Protection Law 2020 regulates the data controllers and

[4] Key features of the new Rwandan data protection law | Hogan Lovells - JDSupra
[5] Microsoft Word - 211021_PRESS RELEASE_Rwanda's New Data Protection Law.docx (minict.gov.rw)

processors, and provides data subjects their rights, there are other laws and regulations that contain ancillary provisions related to protection of personal data and privacy[6]. Furthermore, the Rwanda Utilities Regulatory Authority ('RURA') Draft Regulation Governing the Use of Personal Data in Rwanda published in 2019 enables citizens to exercise their rights to data privacy and has enforceable recourse should the right be infringed upon. While the Draft Laws and Regulations are observed as a step in the right direction to promote right to privacy and safe processing of personal data, there still exist several challenges that make implementation of the laws difficult. The challenges include but are not limited to: limited awareness campaigns for the general public regarding their rights to privacy & protection of personal data, how the law applies to them and how it comes to assist them[7]; limited implementation frameworks from supervising authorities and other stakeholders in operationalizing the law in all government institutions to ensure compliance; limited platforms to support organizations of all sizes to become data secure and institute internal frameworks and policies to protect their data uphold rights; inadequate frameworks for cross-border compliance and training across both public & private sectors.

Figure 2: Key policies guiding Rwanda's digital development

Source: Developed by authors

In terms of institutions, the Ministry of ICT & Innovation (MINICT) is mandated to monitor and evaluate the implementation of national policies, strategies and programs to promote technology and communication, and to develop and disseminate policies, strategies and programs for ICT and Innovation in Rwanda. To execute its mandate, the MINICIT created the Digital Transformation Directorate Department, with a specific focus on sector policy orientation and interpretation on ICT and Skills development. MINICT has a vision to foster ICT development and diffusion in the Rwandan Society and Economy through working with different agencies such as Rwanda Information Society Authority (RISA), Rwanda Utilities Regulatory Authority

[6] Rwanda - Data Protection Overview | Guidance Note | DataGuidance
[7] Rwanda enacts data protection law to promote rights to privacy - Paradigm Initiative (paradigmhq.org)

(RURA), Rwanda Development Board (RDB), National Identification Agency (NIDA) and the National Post Office (NPO) RoR (2019). Other relevant institutions for e-government include the National Institute of Statistics of Rwanda (NISR), Ministry of Health (MOH), Ministry of Local Government (MINALOC), Provincial and other district public offices across the country. All these agencies are gateways for stakeholder engagement including donors as well as through sector wide approaches.

Although the laws and policies framing Rwanda's digitalization agenda have seen an advance in e-government, there are still challenges such as those related to literacy, electricity, and internet connectivity. These challenges are the main reason for the frequent use of public and private intermediaries between the government and citizens in the service delivery process, which is not yet as inclusive as intended by the government (Mukamurenzi et al, 2019). Therefore, digital inclusion policies and laws should include an overarching and simultaneous strategy aimed at simultaneously addressing digital and social exclusion mechanisms (Mariën & Prodnik, 2014).

E-governance and stakeholder participation

A key step in fostering responsive e-services which address the needs of the end-users (see Welby, 2019), is the participation of relevant stakeholders and interest groups throughout their design, implementation and monitoring & evaluation (M&E). In the following section the extent to which different stakeholders (private sector actors, CSOs and international development partners or donors) have been incorporated into Rwanda's digital journey will be discussed. These processes are framed by general traits of Rwanda's democracy: a neoliberal market-led approach to development, a decentralised governance system with strong central control and instrumentalised citizen and civil society participation (Behuria, 2016; Chemouni, 2014; ISHR, 2016; Munu & Vlaminck, 2021). Similar to how the government has reacted to the COVID-19 pandemic, key partners of Rwanda's digital transformation have been donors and private sector actors rather than local CSOs. This, it is argued, could exacerbate existing structural biases and disparities, especially across rural and urban areas as well as other vulnerable groups such as women (Pfeifer et al., 2020). In what follows the roles of private sector actors, CSOs and international donors in Rwanda's e-governance initiatives will be consecutively addressed.

The role of the private sector in e-governance

The government has integrated the private sector in its e-governance programmes with both land registration and health services provision, relying on the private sector for investments and innovations in the digital economy. Since most Rwandans use mobile phones to access the internet, Mobile Telecommunications Network (MTN) is the leading services provider, with over 4 million subscribers. Government agencies also rely on internet services provided by these private networks to implement e-governance programmes. Public Private Partnerships (PPP) remain central to e-governance services provision in line with the ICT policy. This is also apparent in both case study areas: land and health selected for this study. The selection of the two case studies is formed by their linkages, not only to inclusive digitalisation but inclusive public service. While land is a key resource for both rural and urban populations' livelihood, healthcare service provision is central inclusive development. Therefore digitalisating land registration and health service provision brings with them important issues such as accessibility, availability and affordability, and citizen wellbeing that needs to be explored in light of increased role of the private sector in Rwanda's public service.

In terms of land registration, digitalization has led to an increased role of the private sector in land governance across Rwanda. Land-related digitalization results in the transfer of public-sector responsibilities related to documentation of citizen's data to the private sector, as well as an increase in

Public-Private Partnerships (PPP). Such partnerships blur the distinction between public and private actors, posing serious questions about responsibility for basic needs provision and sovereignty (Pfeifer et al., 2020). Moreover, there is a rural-urban divide affecting the accessibility of land services given the fact that private corporations cherry-pick their investments, concentrating their investments in socio-spatial zones that offer a specific return-on-investment (Mariën & Prodnik, 2014).

With regard to health services provision, the private sector remains a key partner to the government. The use of drones, to deliver medicine and other medical equipment to remote areas, is a partnership arrangement with the private sector, while the information management system used by health facilities is also a private sector innovation. With mobile phone usage heavily a private sector phenomenon and a company known as Babyl Rwanda, the largest digital health provider in Rwanda, with over two million registered users (SPIDER, s.d). It can be argued that Rwanda's private sector is the main driver of e-governance in the health sector, which brings with it important issues of data management or privacy, use of data for commercial gains, and the overall question of government authority in the provision of services.

The role of CSOs

Digital transformations are altering civic spaces across the globe and this process has been accelerated due to the COVID-19 pandemic and the rise of digital interventions. These changes run from increased control over civic spaces and limited freedom to more civil liberties and an open and dynamic civil society (OECD, 2020). The role of civil society in Rwanda is contentious. Although the government has put in place several participatory fora, CSOs often remain limited to service deliverers in line with government policies. Critical CSOs who play a watchdog role are scarce (Constantini, et al., 2013). Media is also overlooked by the government, making it difficult for independent journalists to operate freely. This was accentuated during the first year of the COVID-19 pandemic, with several online journalists being arrested (CIVICUS, 2020). The limits of critical oversight by CSOs or media as well as the "doing business" mentality driving digitalisation raises important questions for inclusion.

In resonance with a previous study on COVID-19 responses in Rwanda (see Munu & Vlaminck 2021), the findings show that international donors (such as GIZ, ENABEL, DFID and EU) and development agents (UNICEF) are more actively participating in policy-making and implementing processes in the realm of digitalization than local CSOs. The Rwandan CSO platform which encompasses more than 1500 national CSOs was for instance not consulted in the (re)design of the IREMBO platform and describes its role in the country's digitalization process as: "*sensitizing citizens and affiliated organizations on existing digital services as well as providing support to make correct use of the digital services where needed*"[8]. The need to make digital services more inclusive was recognized by the CSO platform, especially for People with Disabilities (PWDs), women, rural residents and the poor. Overall, the CSO platform judged the digital transformation (and more specifically the IREMBO platform) to be a positive development as it has facilitated tax-declarations, freeing up time for core-activities and increasing trust towards government institutions. Whilst before one had to visit several government offices at various points in time to be able to get a marriage certificate, for instance, it can now be demanded online. This has raised the impression that government has citizen's personal data secure and safe, however, fully fledged inclusion remains a challenge (KII)[9]. Challenges remain multi-pronged *inter alia* internet accessibility, ICT infrastructure, affordability, ICT literature, and fully responsive policy framework.

[8] Interview CSO platform representative
[9] Interview with CSO platform representative

The Role of International donors

Rwanda remains heavily dependent on official development assistance (ODA) despite progress made over the last years (GoR, 2017). In 2019, ODA amounted to almost 60% of the central government's expenses[10]. With this in mind, donors play important roles in policy making processes and key donors are often consulted during formulation of new policy lines (see e.g. Munu & Vlaminck (2020) on the role of donors in the formulation of Rwanda's COVID-19 response). In this section we explore how much donors have weighed on Rwanda's digital agenda.

The latest Government of Rwanda ODA report (2017) mentions health, agriculture and social protection as the areas which have received the largest amounts of ODA in the period 2015/2016. The same report states that ICT has received the least amount of ODA, 2.5 million USD (GoR, 2017).

Although budget wise digitalisation does not seem to be the priority, more and more donors have incorporated digital transformation into their programmes in line with the government's policy. The EU in 2020 launched a three year programme entitled 'strengthening resilience in education and health services through digital solutions', of which Rwanda is one of the partner countries. The specific inclusion of digitalisation is new to the EU-Rwanda cooperation. In the 7 years support programme (2014-2020) between the EU and Rwanda framed by the National Indicative Plan, no specific mention is made of digital transformations to reach the program objectives (EU-GoR, 2014). The World Bank has, through the International Development Association, focused more specifically on digitalization in a number of their projects. They have supported the implementation of e-taxation systems as well as digital revenue collection at district level (IDA, s.d.).

Several bilateral donor agencies are also promoting digitalisation in Rwanda. For instance, GIZ has a 3 year programme supporting the development of digital skills and entrepreneurship among young people in East Africa, and ENABEL (the Belgium Development Cooperation Agency) is supporting digital skills training in Rwanda Polytechnic (RP) and the Rwanda TVET Board (RTB) (GIZ, 2021; E-learning Africa 2022). In line with the SDGs and the "leave no one behind" discourse, inclusiveness is high on the policy agenda of all donors. The UNCDF also works on capital development – that includes financial inclusion, interoperability of the financial services, digital payment platforms and e-commerce platform. UNCDF supports the government in these areas and is also undertaking research on digitalization in the tea sector. Although the complementary work by donors, private sector and government agencies has been supportive of digitalization, there are challenges regarding inclusive implementation. The limited space given to local civil society organizations to watch over inclusivity and other more pressing priorities to a certain extent hamper advancements to making Rwanda's digital pathway more inclusive.

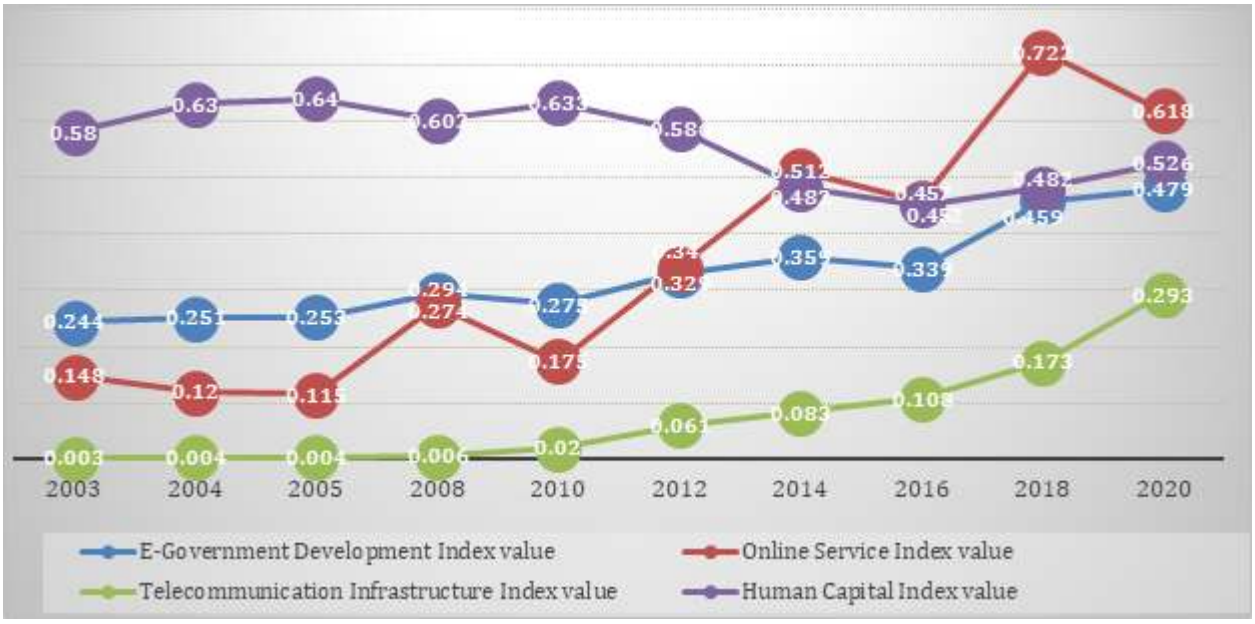
Analysis of existing enabling conditions for digital inclusion

The e-Readiness Index & the Online Services Index (OSI): The E-Governance Development (Readiness) Index (EGDI) which is a composite of the online service index (OSI), telecommunication infrastructure index (TII) and the human capital index (HCI), gives the state of e-government development at a national level. The most recent 2020 EGDI indicates that Rwanda ranks 130 out of 193 nations included in the index with an overall score of 0.4789 (UNDESA, 2020). This implies that the capacity and extent to which national administrations are willing to use information and communication technologies to deliver public services remains below global average. Over the period 2003-2020, EGDI followed a fluctuating

[10] https://data.worldbank.org/indicator/DT.ODA.ODAT.XP.ZS?locations=RW

trend, increasing from 24.4% in 2003 to 39.5% in 2016 and then further increased from 45.9% from 2018 to 47.8% in 2020 (Figure 3).

Figure 3: E-Government Development Index Trends in Rwanda, 2003-2020



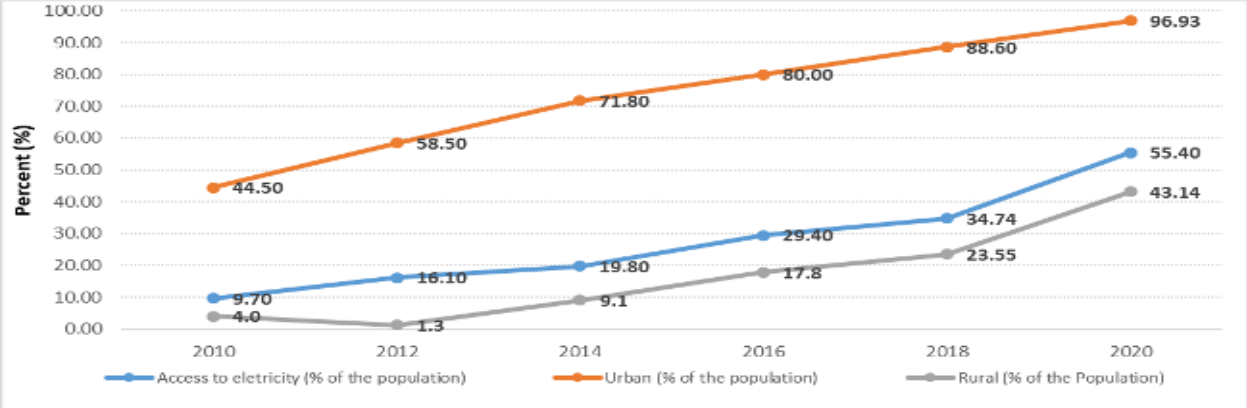
Source: UN E-Government Data-Center

Infrastructure development

One of the foundations for inclusive digital development is sound ICT infrastructure which overcomes social, spatial and economic gaps. Evidence shows that the part of the Rwandan population with access to electricity has been increasing since 2010, from 9.7% to 55.4% in 2020 (Figure 4). This has since increased from 55.4% in 2020 to 68.17% in 2021, including 48.72 % connected to the national grid and 19.45% accessing electricity through off-grid systems (Gihana and Kooijman, 2020). However, progress in access to electricity remains far below the universal access target of 100% by 2024[11]. Moreover, the rural-urban divide continue to widen, with urban access rate at 97% in 2020 and at only 44% in the rural areas. In addition, gender disparities persist, with more male headed households (31.2%) accessing electricity compared to 21.1% of the female headed counterparts (Gihana and Kooijman, 2020).

[11] Rwanda's 100% electrification target by 2024 receives frw 82.1 billion financing boost (reg.rw)

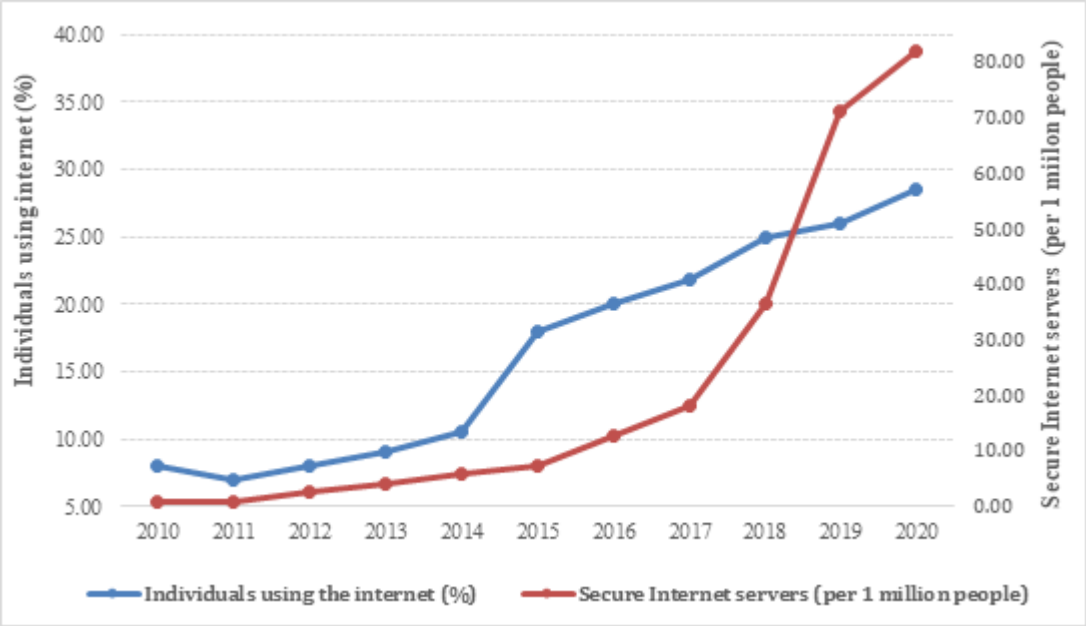
Figure 4: Electricity access in Rwanda



Source: WDI database[12]

Telecommunication infrastructure index (TII): This index consists of the estimated number of internet users, the number of main fixed telephone lines, the number of mobile subscribers, the number of fixed internet subscriptions and the number of fixed broad- band facilities, each per 100 inhabitants.

Figure 5: Population using internet and with secure internet servers in Rwanda, 2010-2020



Source: ITU database

Individuals using the internet (% of population) increased from 8% in 2010 to 28.5% in 2020 (Figure 5). As of January 2021, internet penetration in Rwanda is estimated at 31.4%[13]. On the other hand, the proportion of the population with secure internet servers increased from 0.90% in 2010 to 71.28% in 2020 (see Figure 5).

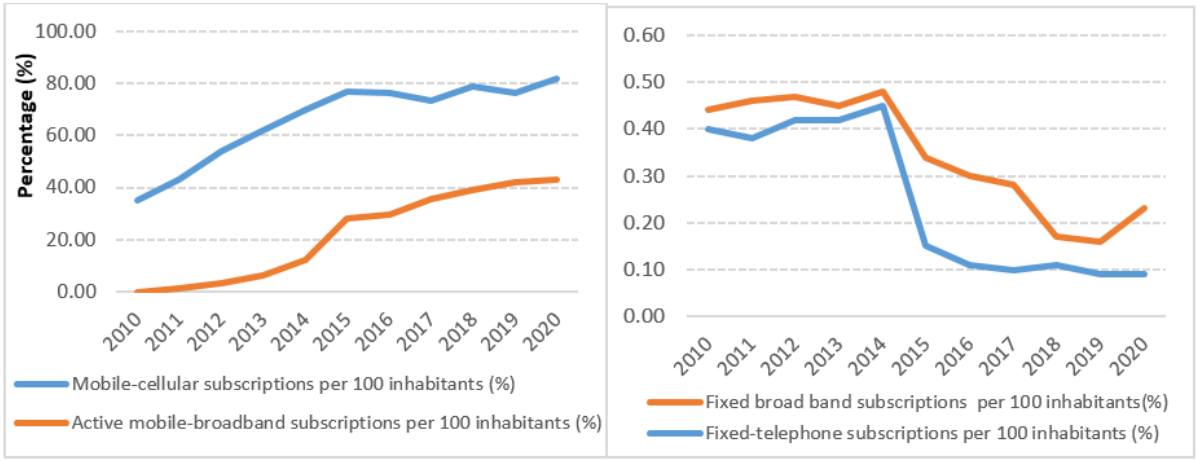
Mobile-cellular, telephone and broadband subscriptions per 100 inhabitants. The number of mobile cellular subscriptions increased from 35.35% in 2010 to 77.05 % in 2015, decreased to 73.6% in 2017 to rise again to 82% in 2020 (Figure 6). The inconsistencies in mobile cellular subscriptions could be attributed

[12] Access to electricity (% of population) - Rwanda | Data (worldbank.org)

[13] Digital in Rwanda: All the Statistics You Need in 2021 — DataReportal – Global Digital Insights

to many people having more than one subscription to take advantage of competing voice or data plans of more than one operator.

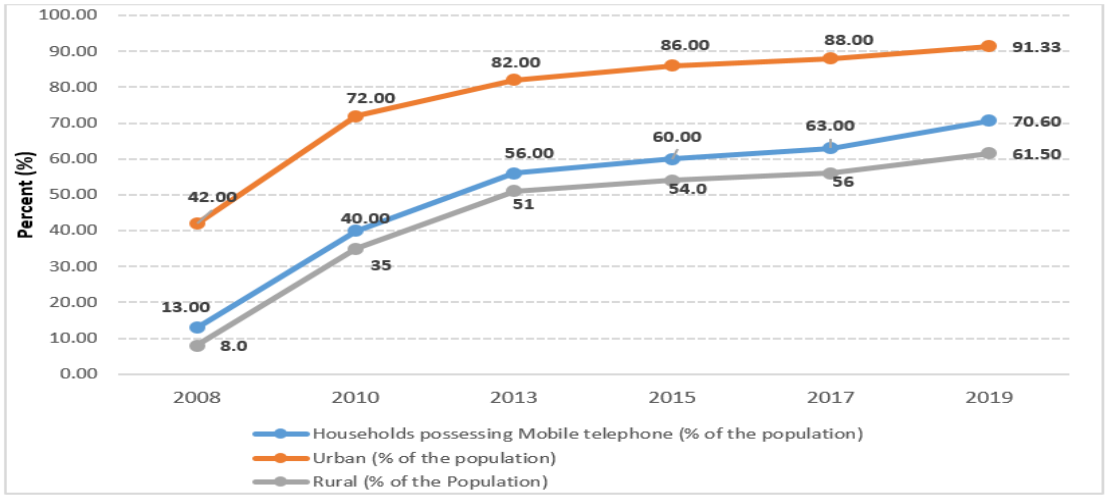
Figure 6: Mobile-cellular, telephone and broadband subscriptions per 100 inhabitants



Source: ITU database and World Bank database

On the other hand, active mobile broadband increased from 0.02% in 2010 to 42.3 % in 2020 growing at an average annual rate of 4.2% (Figure 6, left panel). Over the period 2010-2020, both fixed-telephone and broadband subscriptions per 100 inhabitants exhibited a declining trend (Figure 6 right panel). The low penetration rates for both subscriptions could be attributed to the high cost of establishing the required infrastructure that has made fixed telephony and fixed broadband either unavailable or unaffordable for most parts of the population.

Figure 7: Households possessing mobile phone, Rwanda



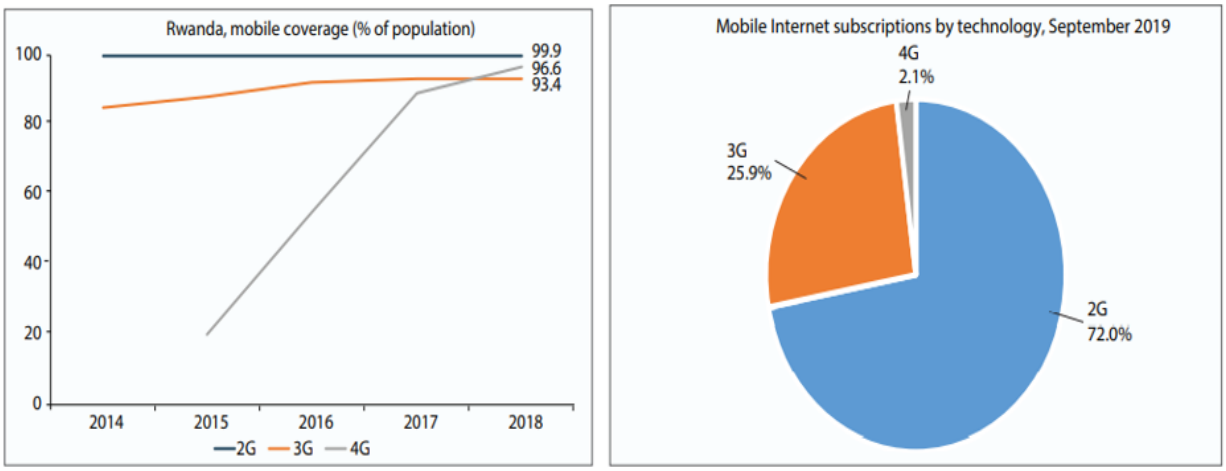
Source: NISR 2019) Integrated Household Living Conditions Surveys (2008-2019)

The proportion of urban households possessing a mobile phone has been increasing from 42% in 2008 to 86% in 2015 and 91.3% in 2019 (Figure 7). However, while rural possession of mobile phone increased to 61.5% in 2019, the rural urban divide continues to predominate. This in part is attributed to high cost cost

of handsets as revealed by rural respondents targeted in this study 9, which typically also stops them from accessing mobile and broadband services altogether.

In terms of mobile coverage and subscription, 2G leads on mobile coverage followed by 3G and lastly 4G (Figure 8). The increase in mobile coverage of 3G and 4G could be attributed to more investments as well as enabling regulatory reforms that have supported the country's realization of some of the network coverage rates in the region, bringing virtually all Rwandans within range of mobile broadband. Increased mobile coverage has also facilitated digitalisation of other services, including financial (mobile money, mobile banking services), agriculture (e-Soko), health (Mobile e-Health), and administrative services (Irembo). However, weak access to smart phones and 4G compatible devices restricts access to basic 2G or slower 3G internet services, with some 72 percent of the mobile subscribers in the country continuing to rely predominantly on 2G services that have limited practical application (Figure 8).

Figure 8: Mobile coverage and Mobile Internet subscriptions by technology, 2019



Source: RURA Report, 2019

Network Readiness Index (NRI): Rwanda ranks 96th out of the 134 economies included in the NRI 2020 with an overall score of 38.65. This implies that the extent to which the factors, policies and institutions enable a country to leverage information and communication technologies (ICTs) for shared prosperity on an annual basis remains below average. At continent level, Rwanda ranks 5th[14] and outperforms its regional counterparts in each of the four pillars of NRI and outperforms the average in Africa in ten of the twelve sub-pillars including Access, Future Technologies, Businesses, Governments, Trust, Regulation, Inclusion, Economy, Quality of Life and SDG Contribution.

Digital literacy: The literacy rate among the population aged 15 years and above stood at 72.4% in 2020, with women at only 69.3% and male at 76.1% (NISR, 2021). However, Computer literacy rate of the population aged 15 years and above was as low as 11.9% (male at 14.7% and females at 9.6%). The overall estimated adoption rate of digital skills in Rwanda was estimated at 20-25% in 2019, with the services sector having the highest adoption at 30-35% and the agriculture sector the lowest at 5-10% (IFC, 2021). The household affordability of digital skills training is varied with foundational/basic skills estimated to be afforded by 20-25% of the households but drops to less than 5% for advanced and highly specialized skills such as computer science skills, Big data analytics, IT systems and networks as well as software development skills (IFC, 2021).

[14] Rwanda – Network Readiness Index

Internet affordability: An internet user in Rwanda pays a 7.1 percent share of the gross national income - $780 or around Rwf744,000 - for a monthly allowance of 2GB (IFC, 2021). The UN Broadband Commission for Sustainable Development defines the internet as being affordable when 1GB of mobile data is priced at no more than 2 percent of average income. The average monthly price of 1GB of data has been declining since 2015, from 20.2% of GNI to 3.9% 2017, then increased to 4.7% in 2018, and further declined to 3.5% in 2020. While Rwanda has some of the lowest absolute prices in the region, broadband services remain expensive relative to average incomes and below the global affordability target of 2%. The cost of 1GB has fallen to less than a fifth of what it meant for a user in 2015, this is faster than the regional counterparts including Kenya, Tanzania, or Uganda (A4AI, 2020).

Opportunities and challenges to inclusive digital transformation

In summary, the opportunities for inclusive e-governance in Rwanda are founded in a strong political commitment to the ICT roll-out, reflected in the supportive and legal frameworks and increased digitalization of government services on the Irembo platform with over 104 services (MINTC, 2020). However, besides these opportunities there are associated challenges to full-fledged inclusive digitalization in the medium to long term. Based on the research the following enabling conditions for inclusive digitalisation have been identified:

- Supportive institutional set-up: conducive policy framework and adequate capacity development of relevant government institutions
- Inclusive e-service penetration: available, accessible and affordable services across diverse socio-economic groups, bridging existing structural inequalities (such as rural/urban divides and gender)
- Participation of citizens and CSOs in designing and monitoring e-services implementation
- Respect for human rights and citizen data

Table 1: Enabling conditions for inclusive digitalisation: challenges and opportunities

Enabling conditions for Inclusive digitalisation	Challenges	Opportunities
Institutional Set-up		
Conducive policy Framework	Both the legal as well as policy commitment lack specific attention for inclusion and are primarily geared towards supporting digitalisation for "doing business" and increasing efficiency.	There is strong policy commitment towards digital transformation and related legislation.
Adequate capacity development of government agencies	Inadequate number of digital specialists needed to propel the kind of cross-sectoral digital transformation that Rwanda aspires to achieve (MITCI, 2017).	Rwandan government has established Digital Transformation Center to strengthen the capacity of public and private actors for increased service delivery in the context of inclusive digital transformation.
Inclusive E-service penetration		
Availability	The available services do not explicitly address the needs of vulnerable groups (poor, elderly, etc.) as no needs assessment was conducted in the design of e-services. Irembo sometimes runs into network errors, leading to longer loading times.	There are over 100 e-services on Irembo and government has made significant effort in advertising Irembo services to make citizens aware.

Accessibility	Infrastructure and connectivity issues remain problematic and need to be resolved, especially at sector and cell level in peri-urban and rural areas (Khan, 2022). Service penetration is still problematic due to Low electricity and internet penetration compounded by power shortages, ICT devices and service provision gaps in the rural areas continues to be a challenge in Rwanda resulting in delays. COVID-19 pandemic has affected inflow of funds from development partners on achieving universal access by 2024. Basic digital skills gap remains a key cross-cutting barrier to increasing digital adoption and expanding digital innovation.	The Rwandan Government has already mapped national connectivity and established significant supply-side programmes to increase universal service and access to networks in the country. The Government scaled up electricity access to reach 81% with focus on low performing districts and promotion of more off-grid electricity solutions are needed to expand ICT penetration in the rural areas. COVID-19 pandemic has accelerated the adoption of digital technologies in the economy The Government of Rwanda in its ICT for Education Strategy 2016 integrated ICTs in teaching and learning to improve ICT skills in all 29 public and private Higher Learning Institutions (HLIs).
Affordability	Affordability of devices and broadband connections remain key barriers to internet accessibility due to the cost of data bundles (World Bank 2020). Some of the IREMBO services are costly.	Supportive Public Private Partnerships and existence of innovative financing schemes to expand ICT and make broadband affordable. Irembo registration is free.
Citizen and CSOs participation		
Responsive e-services	CSOs have not been consulted in the design of IREMBO or other e-services Donors have played a more active role in Rwanda's digital agenda than local CSOs. It is unclear if there has been citizen consultation in the design of Irembo.	IREMBO's first design principles iss "prioritize the citizen, people over process". The objective is to make the life of users easier (Irembo, 2021).
Participatory M&E system	The research did not identify a participatory M&E system in place. The National CSO platform did mention they would address inclusion issues when discussing the next national budget with the government.	Irembo 2.0. is presumably an improvement of the first version based on user experiences.
Respect for Human Rights		
Personal data	Article 52(1) of Rwanda's Law No.	Rwanda ratified "The African Convention

protection	44/2001 of 30/11/2001 Governing Telecommunications curtails internet freedom. Un-transparent use of citizen data gathered in response to the COVID-19 pandemic. Restricted political space for critical voices makes it difficult for CSOs to play a watchdog role.	of Cybersecurity and Personal Data Protection" and is drafting a related law.

Mapping of e-governance initiatives in Rwanda

Irembo: Rwanda's integrated cross-sectorial e-government platform

Rwanda has implemented e-government initiatives using the country's approach of centralized planning, backed by local government structures. Increased operational efficiency, reduced government spending, better trust in government, easier and quicker access to services, and cheaper services to citizens are all seen as potential benefits of e-government, which is crucial for Rwanda's aspiration to become an IT nation and a regional powerhouse for digital services and business (Mukamurenzi et al, 2019).

E-government services have been gathered under a digital platform, Irembo, which means 'gateway' or 'door' and represents literal access. Irembo was launched in 2014 and is intended to create easy, efficient, transparent and reliable procedures to facilitate service delivery in the public sector by digitizing access to various online public services. Since its inception, the platform has gone through two update processes. These processes were said to be based partially on user satisfaction surveys, but CSOs were not consulted. The Irembo provides a front-office for users to timely file their applications and a back-office system for public servants to process users' applications (where back-office operations are under the responsibility of each government institution in the Irembo project).

The website groups e-services under the following categories: Family, Identification, Immigration and Emigration, Land Police, Notarization, Health, Governance, Education, Rwandan Museums, Transport, Criminal record, Media (a full list can be found in Annex 2). Users register on the platform for free and can access the required e-service which have different costs, ranging from 500Frw to up to 150 000Frw (or 0,49 to 149,00 USD) and more. The documents are then sent digitally. The platform is adapted to mobile phone interfaces. Irembo can be accessed in Kinyarwanda, English and French. As of yet no special adaptations have been made for the seeing-impaired or people with other disabilities. This however was not seen as a great concern to the NUDOR, which represents CSOs focusing on people with disabilities in Rwanda. NUDOR representatives mentioned that there are more pressing concerns for disabled people in Rwanda, such as jobs, inclusive education and fighting stigmatization in general. It was not stated by the organization that digitalisation could perhaps be a tool to reach these other objectives. The following table presents the 10 most used services.

Table 2: Top 10 Irembo Services

Institution	Service	Cost in Frw/USD
Rwanda National Police	Registration for driving test definitive	10 000/9,78
Rwanda National Police	Registration for driving test provisoire	10 000/9,78
Rwanda Directorate General of Immigration and Emigration	Ordinary passport	100 000/97,80
Rwanda Directorate General of Immigration and Emigration	Work permit	150 000/149,00 and above
Rwanda Social Security Board	Mutuelle	1000-7000/ 0,98- 6,85 per person
Rwanda National Police	Motor vehicle inspection	20,000 - 40,000 /19,56 - 39,12
Rwanda National Police	Application for definitive driving license	50 000/48,90
National Public Prosecution Authority	Criminal record clearance certificate	1200/1,7
National ID Agency	Application for National ID	500/0,49
The Ministry of Local Government	Birth certificate	500/0,49

Source: developed by authors based on field data

Despite the advances made by IREMBO in digitalising government services, citizen uptake remains low with about 1500 daily users (Worldbank, 2020). The mobile payment system presents an obstacle, resulting in the creation of intermediaries who are paid to do online applications for end-users. These intermediaries are also known as IREMBO agents who offer the service of doing applications for third parties. To become an agent you have to register through an application form managed by the Rwanda Telecentre Network and when approved you can provide Irembo related services in your businesses, applicants must have an existing business license (RTN, 2022). Irembo agents charge a commission fee per transaction, which is a percentage of the costs of the e-service. The Minister of ICT in 2021 raised the commissions and suggested developing a charter regulating charged fees on services and additional services. In a press conference the Minister in 2019 stated: "*We are looking at creating uniformity in offering services by standardizing tariffs and when citizens experience inappropriate services, the agents can even lose licenses*." These measures were taken because Irembo agents prioritized Irembo applications with higher costs and often fell short of providing services related to *Mutuelle de Sante* as these have a low transaction cost (Nkurunziza, 2019). Whilst FGD participants generally expressed their satisfaction with Irembo agents, one person mentioned they were weary the agent might misuse their personal information, such as ID number.

Inclusion analysis of digital interventions

In what follows light will be shed on how inclusive e-governance interventions in Rwanda are and what this means for citizen wellbeing. Consecutively, Irembo, digital land registration and e-services in the health sector will be analyzed through an inclusive development lens. The case selection was purposeful. Land ownership, although often overlooked by development indicators, is an important contributor to the people's sense of wellbeing in Rwanda (see e.g. Verpoorten 2014 & Dawson 2018). Rwanda's land reforms have been the subject of much debate (see e.g. Ansoms, et al., 2018) and in an attempt to make the process more transparent the government embarked on the process of digitalising land registration in 2009 through the Land Tenure Regularisation Programme (LTRP), with substantial funding from DfID, Sweden, DGD (The Netherlands) and the EU (FIAN International 2020). Yet in practice, digitalisation has only been partly effective and has left certain population groups excluded. On the other hand, the COVID-19 pandemic has demonstrated how vital a well-functioning health care system and an effective national health insurance scheme is. Whilst Rwanda is presented as a best practice in health insurance coverage (Mason, 2020) the pandemic has also highlighted some of the weaknesses embedded in its health care system (see Munu & Vlaminck, 2020). In what follows, whether the existing and newly developed digitalised services within the health sector have helped to smoothen existing inequalities or have exacerbated them, will be analyzed.

Increasing accessibility and trust in IREMBO

Findings from the Key Informant Interviews (KIIs) and Focus-group discussions (FGDs) indicate that 65% of the users have noticed the efficiency and well-timed service delivery through Irembo, which may be justified by the structure and framework of Irembo in terms of receiving and processing applications. During the KIIs, one of the respondents stated that: "*Irembo is less time consuming compared to previous non-digital public service I was used to. Before Irembo, I could spend my whole day for one service on the queue or long procedures for different official approval and payment*".

With regard to Irembo's accessibility, users from FGDs indicated they are facing a number of challenges: 85% of users reported high costs of data and limited access to the internet, 72 % said they do not have a mobile phone, and 92% pointed out the lack of IT literacy. Some participants found the platform "*hard to manipulate/ navigate through when you are not versed with digital skills*", whilst others mentioned being frustrated *"when the internet is not that fast and the platform takes time for loading".* Another focus group participant proffered that *"an accessible and affordable internet could have facilitated effective use".*

There are some segments of the population that are likely to be excluded from using Irembo services, namely, households with low income and people with disabilities, since the structure and functionality of the platform do not consider such groups. For example, there no features for disabled people such as the blind and it requires some resources to access it, excluding the poorest households. During the FGDs, one of the participants had another concern in relation to Irembo accessibility: *"It has something to do with the payment modalities under the platform. Most often they are not user-friendly, resulting in delays especially in getting the payment token, and the automatic save mode is not always well-functioning".* These interface issues, coupled with limited digital literacy in some segments of population especially in rural areas, mean that some participants still prefer to visit offices for assistance.

Regarding the impact of Irembo on citizen wellbeing, data from the KIIs and FGDs allows the following preliminary assessment. Firstly, related to material wellbeing, it can be proffered that although the prices of services provided through Irembo are along the same lines as they were before, there is an economic advantage in terms of time spent obtaining documents as well as related transportation. As Irembo is less time consuming, people have more time to spend on income generating activities. FGDs participants also

mentioned they were less likely to have to pay penalties for missing deadlines for document applications or renewal.

> *"I was always paying penalties for missing deadlines due to the long and tiresome process of traditional public services."*
> *"Irembo has helped me in saving money. Before I used to hire someone to pay taxes on my behalf because I could not leave the shop for more than 3 hours."*
> FGDs participants Kigali City Market

However, whilst registering to Irembo is free, some e-services remain to have a high cost. Services that used to be more expensive before Irembo remain more expensive. Additionally, the increased commission fee for Irembo agents causes problems for people with lower levels of income.

The impact on relational wellbeing can be felt through the ways in which Irembo is working towards building more trust between citizens and the government. One respondent mentioned that *"Irembo increased trust in the government"* because citizen data and related documents are now all harmonized, giving the impression that the government is *"taking good care of"* this personal information. Before, Irembo people often consulted various government agencies before being able to obtain the document they were seeking. Other FGDs participants mentioned that Irembo decreased corruption and increased transparency. Through Irembo people can, for instance, track their water and electricity consumption allowing them to cross-check if the amount they are charged by the end of the month is correct. Before, this calculation was left to officials who could sometimes overcharge for their own benefit.

> *"Before Irembo you could bribe a public service provider to speed things up. Irembo really brought transparency into the public service delivery."*
> FGDs participants Kigali City Market

On the other hand, however, human rights advocates caution for the possible misuse of citizen data, raising the bar for the Rwandan government to demonstrate personal information will at all times be protected. Furthermore, some FGD participants mentioned that their relationship to the government is not only defined by the access and affordability of public services, but also about affordable education, respect of basic rights, and lack of harassment by police officials in the specific case of street vendors. These statements allude to the fact that Irembo does not change structural inequalities such as those experienced by informal workers, neither does it address the increasing costs of quality education.

The impact on cognitive wellbeing is more difficult to evaluate based on the gathered data. Whilst some FGDs participants mentioned frustration, due to inadequate internet connection or lack of mobile phones, others applauded Irembo for "making life easier". Although Irembo agents serve as a buffer for those with limited digital skills, lack of mobile payment possibilities or possession of mobile devices or computers, the related commission fees imply that those who are already underserved are the ones who have to pay an additional cost for using Irembo. This inequality could lead to a sense of injustice and discontent among already vulnerable Rwandans.

Assessing the inclusiveness of the digital land registration process

Land ownership is key to citizen wellbeing in Rwanda (Dawson, 2018). Land is perceived as a priceless asset for future investment and secure collateral. It has improved income security for residents, particularly rural citizens, as well as giving access to finance by applying for credit against the value of their land. While

the digitization of land registration programs has been seen as successful and a model for other countries, it still has limitations in addressing the structural problems faced by vulnerable people such as land concentration, lack of effective protection of collective tenure rights and systems and corruption (Pfeifer et al., 2020). The majority of the FGDs participants, representing poorer tiers of Rwanda's population, furthermore indicated that for them the digitalisation process is irrelevant because they do not own land and most likely will never do so.

> *"How should I know or appreciate the service delivery? I don't have a land even where I stay, I rent a small one bedroom house for twenty-five thousand Rwandan francs".*
> FGDs participant Kigali City Market

In 2005, Rwanda's new land law made registration obligatory, and in 2009 the Rwanda Land Management and Use Authority embarked on a process of digitizing all land services entitled the Land Tenure Regularisation Programme (LTRP). By 2014, Rwanda had increased its formal land titling and digitalized to 60%, higher than regional peers of Kenya (40%), Ethiopia (50%) and Uganda (20%) (World Bank, 2015). As a result of several measures for raising awareness about the importance of titles and for facilitating their take-up, 7.16 million out of 8 million certificates that had been printed by the RNRA were handed over to owners as of June 2017 (Innovations for Successful Societies, 2017).

25% of LTRP was funded by the government. The rest was received from development partners including DfID, Sweden, DGD (The Netherlands) and the EU (RNRA, sd; World Bank 2015)[15]. LTRP went through two phases. The first from 2009-2013 which focused on parceling and demarcating private land parcels (more than ten million) which were converted into a digital cadaster. The second phase of the LTRP (2013–2019) focused on continuous upgrades of the digital registry and linking it with the tax authority, banks and microfinance institutions, a national identification project, and more recently to IREMBO (FIAN, 2020). According to an independent impact evaluation carried out at the end of phase two of LTRP in 2018-2019, the digitalization of land registration has had both positive and negative impacts. Positively, it enabled women to register titles under their own name, individually or as co-owners alongside their husbands. Additionally, it has decreased land related conflicts which were common in the densely populated country of Rwanda. Citizens who have used the land related services are satisfied by the service delivery at a rate of 61.7% (59.4% of men and 63.6% of women) (Rwanda Governance Scorecard 8th Edition, 2021). Women are the ones who have benefited more from the digitalisation of land registration. A considerably higher number of women than men own a plot of land with an official title document. In 2016, 63.7% of titles were owned by women or co-owned by men and women, which indicates that men were not using the new official transaction mechanisms to "grab" land from women (Schreiber, 2017). A participant during a focus group discussion said "*It is not only digital land registration, but also the land policy that has reduced the conflict. If you are legally married, your spouse has to be aware when buying or transferring land. When it is family land all members have to approve the land transferring or buying, regardless of their gender*."

Overall, the land title process has been made easier through a paperless land registration application dubbed 'Ubutaka App', which is integrated with existing infrastructure and 20 e-services on land transactions combined in the Irembo platform. The Utaka App is a PPP, created by Medici Land Governance (MLG) in conjunction with the Rwanda Land Management and Use Authority (RLMUA) and the Rwanda Information Society Authority (RISA) to enable paperless land transfers by voluntary sale and lower Rwanda's carbon footprint. The system hopes to make land transfers more secure by using block chain technology. The technology hopes to address some of the existing challenges of the digital land

[15] https://www.iisd.org/system/files/meterial/session-12-christophebazivamo-country%20experiences-en.pdf

registration process including: title duplications, data errors, document misplacement, land document forgery, fraud, error or the alteration of records (Businesswire, 2021)[16]. Interviewees stated they found the process smooth and were able to digitally verify land certificates and get confirmation. Getting title deeds was overall seamless. The Land Query Notification System (LQNS) allows the public to check the status of a particular plot of land using their mobile phones. Digitalisation has also made it easier for people to access loans and microcredits through the linkages between digital systems. In 2020, 65 microfinance institutions and 18 banks accessed the digital registry to obtain and evaluate potential customer information and make loan decisions. The Ubutaka app is, however, only accessible for people with a higher income who can afford to buy a smartphone and the data bundle necessary to run the application. For people with a lower income, land related public services are arranged through Irembo agents, to whom they have to pay a commission fee.

Negative impacts are the lack of expected reduction in rural poverty or increased agricultural investments. The evaluation points to the possibility that the LTRP *"may inadvertently result in an increase in rural poverty as poorer households sell their land, resulting in land concentration in fewer, richer hands*" (FIAN, 2020). Many poorer households also prefer not to go through the digital registration process as they find it too complex and costly according to the evaluation. In addition, the LTRP process does not necessarily imply the reception of ownership titles, as in many cases leasehold titles (such as 99-year leases for agricultural land) are given. So in practice, alongside the formal system, a parallel informal system is used, especially among the poorer population (FIAN, 2020). According to discussions from the focus groups, among the issues hindering land registration and transfer are land taxes. More than three quarters of FGDs participants from both localities (Rubavu and Nyarugenge) highlighted land taxes as a big challenge. The income from the land is little compared to the land tax, which varies between 0-300 Rwandan francs per square meter depending on the use of land. Through informal land registration these taxes can be circumvented. There are challenges regarding the participation of women and overall land governance systems in the country which is a hindrance to inclusion (Sabiiti, 2021). It is important to note that land is a deeply political subject, and the application of digitalization processing technologies does not change that. As a result, digitization procedures cannot take the role of tenure regulations based on human rights (Pfeifer et al., 2020).

Some of the barriers identified in land related services are: high land service prices, insufficient information about the master plan for the land, limited human capacity in the service delivery of land, and inadequate technology in land services delivery (Pfeifer et al., 2020). Citizens of Rubavu districts have revealed persisting issues, namely, land related disputes and errors in determining land use during the demarcation process. Due to this, one of the FGDs participants stated: "*I have been involved in a land conflict with my in-law family when my spouse passed away. The local authorities intervened and I was given a part of the land and decided to sell and buy the land in another district"*. More than half of FGDs participants reported considerable delays in service provision, particularly the land construction permit service where it can take more than two months. However, most participants stated that they were satisfied with the time it took to get the other services, including land ownership transfer process. In the words of one of the key informants from the Rwanda Land Management and Use Authority (RLMUA) "*limited capacity is a challenge, at sector level where all applications (around 200 land transfer per day/ per district) are reviewed, this is a task for one person. Over 200 requests, the staff can examine 40 maxima"*.

Zooming in on citizen wellbeing, the impact of digital land registration seems to have had a larger impact on people with a higher socio-economic status, as the possibility of owning land is an opportunity that is not

[16] https://www.businesswire.com/news/home/20210428005538/en/Medici-Land-Governance-Launches-Ubutaka-Piloting-a-Paperless-Land-Transfer-System-in-Rwanda

within reach of poorer people. Nevertheless, analysis of the FGDs reveals that there is an advantage for material wellbeing as the e-registration is less time consuming than the traditional public service. This, however, is especially true for those who have access to the Ubutaka app, which, as mentioned before, is not the case for poor people. The digitalisation has also not changed the relatively high taxes paid on land ownership, which is one of the key barriers mentioned by FDG participants for buying land. On a relational level, research has indicated that land related conflicts have gone down since the inception of e-registration, although some FDG participants mentioned disputes over land were still taking place in their communities. Lastly, on a cognitive level, the FGDs indicated that it is not the digitalisation of the registration process that leads to higher level of contentment among citizens, but the fact of owning or aspiring to own land. Whether people have to go through Irembo or through the traditional system to reach this life goal seems to be of lesser importance.

Digitalization in Rwanda's Health Sector: Impact of COVID 19 and inclusiveness

The e-government programme in health services provision is not new in Rwanda, since from 2009, the country was already committing funds to e-health system support. In the same year (2009), Rwanda committed US$ 32 million to enhance eHealth through ICT. Out of the $32 million, a total of $7 million was allocated to the development of ICT mechanisms to assist district and health center levels, with an additional $6.3 million earmarked for the improvement of hospital administration information systems. More than $5 million was set aside for epidemiological surveillance, telemedicine, and the installation of computed radiography systems at district hospitals. A further $4.5 million was set aside for the development of Internet-based infrastructure for eHealth data and voice. A further US$ 4 million was allocated on community-based information systems, while $ 1.5 million will be spent on computerizing the national health-care system (Roodenbeke et al., 2011).

In terms of health services provision, some e-government programmes have been implemented through partnership with the private sector. The Government of Rwanda, in conjunction with Babyl, the country's largest digital health service provider, set up an e-health platform, allowing citizens to access services via their mobile phones. Babyl is, however, in the words of one of the FGDs participants, "*only accessible for people with higher income levels who can afford a smartphone and are able to buy the necessary data bundles*". Among the FGDs participants, it was also questioned how effective diagnosis through Babyl could be, as they believed personal care to be important for making sound medical judgements. Key informants have also mentioned the lack of trust in digital health service provision.

This is in addition to the creation of professional networks of healthcare specialists which provide diagnostics and treatments advice, whereby from 2013 -2019, more than 24,473 patients received support through RapidSMS, and 48 hospitals signed up for a digital platform for an open clinic and open medical records system. The government also partnered with a company called Zipline to introduce a drone delivery system for urgent medical supplies such as blood and vaccines (RoR, 2019). Digitalization also saw the government introduce robots to help doctors manage COVID-19 patients. More so, the link between public provision of e-health services and the private sector is blurred.

However, the most important digital transformation in the health sector has been digital registration to the national health insurance scheme, known as *"mutuelles de santé*" or Community-Based Health Insurance (CBHI), which is administered at a relatively low cost. Three different categories for financial contributions are created depending on individual financial status. The first category pays RW 1,000, second category pays 3,000 RW, and the third category pays 7,000 RW. The lowest category are the poor who cannot afford

to pay, so the government pays fully for them. The insurance covers basic healthcare meeting doctor's consultation fees and access to medicine and has made great progress toward universal health coverage. According to a key informant interview, the payment for CBHI is fully digitalised, i.e. through mobile phone app or web-based, and it is integrated with both online banking and mobile money payment systems. The digitalisation has, however, made access for poor people or those who live in rural areas (over 86%) difficult as they might lack mobile phones, or have insufficient funds to pay for internet access or mobile data Some FDGs participants mentioned they paid their *mutuelle* through a health center as they could not afford to pay the related commission fee to the Irembo agent and also did not possess a mobile device which allowed them to pay through mobile money. Other FGDs participants however mentioned Irembo has helped them to pay their *mutuelle* on time, hereby avoiding to pay penalties for not meeting the deadline. Interestingly, respondents in Kigali mentioned Irembo allowed them to pay for the *mutuelles* of family members living in rural areas. So whilst rural residents might not have access to the Irembo's e-services related to the *mutuelle*, relatives in the city can bridge this accessibility gap by doing the payment on their behalf.

COVID 19 affected the wellbeing of Rwandan citizens across all the four dimensions of wellbeing i.e. material, relational, subjective wellbeing and collective, with the largest effect felt due to the measures put in place to contain the virus than the virus itself (Munu & Zjos, 2021). In terms of health services provision, the health systems were strained and remained vulnerable should another wave come. Even though innovations and digitalization have made e-governance possible, the impact of the pandemic far outweighs the strides made. Digitalization might also not address the most pressing needs of the poor and vulnerable who, due to accessibility and affordability issues, would not benefit from such innovations in the first place. Women remain more affected despite the country's remarkable programs to include women in the ICT sector, as the digital gender gap therefore remains a major concern (Afadhali, 2021).

Zooming in on the impact on wellbeing of e-services related to *Mutuelle de Sante*, it was mentioned by FGD participants that Irembo has lowered costs due to the fact that no time is wasted in long queues or on transport. Although, for the poorest participants, the commission-fee charged by the Irembo agents were too high, leaving them with no option than to follow the traditional system of registering and paying at a health center. Considering the impact on relational wellbeing, Babyl was specifically mentioned as an e-service which engendered little trust among FGD participants. Additionally, the research findings indicate that mobile payments of *Mutuelle de Sante* allows for people in the city to support their relatives in rural areas more easily. Hereby, partially bridging the rural/urban digital divide. This also has a positive effect on the cognitive wellbeing of citizens as they know their mother, for example, has their health care paid for in a timely fashion. Yet, similar to the land registration case, it is the availability of health insurance which is of more importance for people's sense of wellbeing than the fact that the service provision has been digitalised. Especially, because the digitalisation as such has not made health insurance more accessible to poorer or vulnerable people, as our findings indicate that barriers regarding cost of internet or data bundles as well as smart phones hinder them from using the e-services.

Lessons learned and best practices for scaling inclusive e-governance initiatives

Government efforts to enhance digitalisation in Rwanda, alongside the role played by various actors such as private sector, CSOs and donors, present important lessons for improving the overall e-government agenda in the country. Moreover, some initiatives can be identified as best practices that could be scaled up to enhance inclusive e-governance. These lessons and best practices can be summarised along key themes of social equity, spatial equity, political economy and inclusive governance.

Social equity

Categorisation of citizens/users is an important factor for promoting inclusive e-governance initiatives. Accessing e-governance requires access to power and ICT equipment that are not available across all income groups. Since income inequality remains a big problem in Rwanda, the government approach of categorising beneficiaries for the health insurance system has enabled the poor to access health care, moreover, with a variety of digital payment and enrollment systems that cover both the poor and the affluent. Such categorisation could be scaled-up to be more inclusive by considering various vulnerable groups such as the disabled, women and the elderly who may have peculiar needs. The role of Irembo agents could also serve as a best practice as they are a buffer for those who have no access to the necessary digital equipment or lack the digital skills to access e-services. Although, in order not to exclude the poorest and most vulnerable, the commission fee should remain low. Developers of e-governance initiatives should also be supported to be mindful of vulnerabilities of certain groups. However, this should be balanced with allowing innovators to explore what may work in the markets.

Spatial equity

Geographical locations matter for inclusive e-governance and the digitalisation agenda. While the policy and institutional frameworks are centrally managed in the Capital Kigali, Rwanda's local government system seeks to decentralise services such as land registration and national health insurance system so as to promote spatial equity. However, network and electricity coverage, crucial factors for digitalisation, are not balanced between rural and urban areas, meaning citizens in rural areas are likely to have limited access to e-governance compared to their counterparts in urban areas. The rural-urban divide is also evident in other areas such as e-literacy and financial capabilities. Therefore, government and other actors including the private sector, CSOs and the donor community should tailor interventions to ensure that the benefits of digitalisation are enjoyed by both rural and urban populations. The findings suggested that mobile paying schemes, especially for *Mutuelle de Sante,* has allowed Rwandans to partially overcome this urban/rural divide as people in the city can pay the *mutuelle* of relatives in rural areas.

Political economy

Political economy issues have a huge influence on e-governance. Rwanda's centralised government approach, backed by an efficient local government structure, demonstrates a strong ruling government bent on adopting digitalisation for improved service delivery. However, concerns around citizen participation and the use or abuse of personal data in e-governance remains a crucial issue for investigation, as participants to the research seemed not eager to discuss much. This shows that either the system is working as expected, at least according to the existing policy and institutional frameworks, or citizens do not want to be associated with heavy criticisms of the government due to political implications. What is currently missing from the government digital agenda is an explicit focus on tackling inequalities and using e-services in a way which not only makes doing business easier, but proactively fosters inclusive development. At the

moment, inclusiveness is not a clear policy goal of the digital agenda. In line with Rwanda's general developmental approach, the focus lies on streamlining public service delivery and increasing efficiency. It would be interesting to examine how Rwanda's wealth categorisation (or *Ubudehe*), can be used to adjust e-government services and related costs for targeted socio-economic groups[17].

Inclusive governance

CSOs have been overlooked as critical partners in the country's digital agenda. If Rwanda seeks to strengthen its democracy through e-governance, increased participation of civil society and citizens at large needs to be enhanced in the country's e-governance and overall digitalisation agenda. In line with the country's development path which places high priority on nation-building and sustaining unity, there is little room for CSO to play a critical watchdog role in the country's digital agenda. CSOs are used to support and advocate for the emerging e-services but have little opportunity to check whether the services are being implemented in an inclusive manner. Indirectly Irembo does contribute to strengthening democracy as the use of mobile and internet payment systems have also checked corruption tendencies by public servants and some respondents also mentioned how e-services have increased trust in the government. However, more action is needed by the government and stakeholders to address the issue of accessibility and affordability, especially by the vulnerable poor and those in rural areas.

[17] *Ubudehe*, is a participatory poverty assessment process managed by the Local Administrative Entities Development Agency (LODA) through which Rwandans across the country place themselves in categories from most poor to rich and which is used to target beneficiaries of social protection programs (LODA, 2018). The Ubudehe system has been adapted in 2020 due to mounting critique of people being incorrectly classified and related misuse of social protection programs. In the new classification the previous four wealth classifications (1 poorest - 4 richest) were replaced by five categories: A, B, C, D and E, and new rounds of classification are to take place every three years (Mutanganshuro, 2020).

Conclusion

Whilst Rwanda has undoubtedly made important strides in digitalising public services through Irembo and the leadership and policy commitment shown by the national government is exemplary, it has missed the opportunity to use digitalisation as a means to tackle existing inequalities. The top-down implementation of Rwanda's digital agenda, with little participation from local CSOs and the lack of an extensive needs assessments among the country's most vulnerable population (such as people with disabilities, rural citizens and women), leaves the country's digital journey incomplete. Leveling key social foundations by tackling rural/urban digital divides, gender inequality, exclusion of people with disabilities and poverty is detrimental for the digital agenda to foster inclusive development. In what follows the positive sides of Rwanda's digital journey will be outlined as well as the key challenges towards inclusive e-governance.

On the positive side, Rwanda has a strong policy commitment to the digital agenda, as seen by a surge in e-government policies, facilitated by the country's ICT initiatives. In addition, several laws and regulations have been enacted to guide the digital transformation of the country. These processes have furthermore been steered by a sound coordination structure amongst and between government agencies. The harmonisation of e-services related to different public entities through IREMBO has streamlined service delivery, decreased costs (in terms of time and transportation) and seems to have increased government trust among Rwanda's citizens. Overall, the findings suggest that Irembo has made public service delivery more efficient and less time consuming. Irembo agents play an important role in increasing accessibility for those who have limited digital skills or lack the necessary technological devices to access the e-platform. However, the use of these intermediaries come with an additional cost, increasing inequality in terms of access, as those who are already vulnerable (e.g. those who cannot afford a mobile device), will have to pay more for accessing Irembo services. Another positive development is the advances made with regards to building the right enabling environment in terms of ICT infrastructure. For example, internet accessibility has increased from 8% in 2010 to 28.5% in 2020.

However, there are still a number of challenges with regards to making Rwanda's digital journey more inclusive. Firstly, from the perspective of the general public, e-governance, particularly land registration, does not appear to be as participatory. Local CSOs are not involved in the creation or implementation of the country's digital agenda, and there is no political room for them to play a watchdog role, protecting citizen privacy and human rights. Whilst the government of Rwanda stresses the ways in which they have adapted IREMBO based on user-experiences, and the country is often praised for its participatory governance processes, actors outside of the public and private sector realms suggest a top-down implementation of digitalization. Secondly, rather than tackling existing structural inequalities, digitalisation runs along the same divides and in some cases exacerbates them. This is most notable between rural and urban areas, as well as other vulnerable groups such as women and the disabled. There is particularly a significant rural-urban difference in terms of accessibility to e-governance, with urban access rates of 97 percent in 2020 and rural access rates of only 44 percent. Furthermore, gender discrepancies persist, with 31.2 percent of male-headed homes having access to electricity compared to 21.1 percent of female-headed households.

Both case study areas also demonstrate that digitalisation is only an enabler for improved service provision but not a solution for addressing structural inequalities related to health or land registration. For the poor whether or not land registration is handled digitally does not make it less or more accessible to them. Their main set-back is insufficient economic power to purchase land and the high taxes on land ownership. Among the poorer population informal land settlements remain common. The Land Tenure Regularisation Programme has however aided gender inclusive access and registration, with women reportedly increasing their registration faster than men.

Whilst, the national health insurance program is operated at a comparatively low cost and the government hopes to increase its health insurance coverage through digitalisation, the process still excludes poor people and rural residents to a large extent, as they have limited funds to access the service or have no means to connect to the internet. From the perspective of the poor and vulnerable, digitalisation is not a priority - adequate, affordable and accessible health care, on the other hand, is. The pandemic has also demonstrated the rural-urban divide in terms of health service quality (see Munu & Vlaminck, 2020).This raises questions about where funds could best be allocated in the health sector.

Overall, the government's efforts to improve digitalisation in Rwanda provide vital lessons for enhancing the country's entire e-government agenda. Several factors can be highlighted as best practices that could be replicated to improve inclusive e-governance. Within all the factors, community health insurance and digitalised land registration has capitalized on advances in digitalisation to enhance service delivery, but in the process not by design have excluded significant portions of the population, most notably rural communities and other vulnerable groups such as the disabled. Women are indirectly excluded because they are less digitally connected. Further research focusing on the impact of Irembo services on citizen wellbeing could shed light on how Rwanda's digital journey could not only improve public service delivery, but help to strengthen democracy and tackle structural inequalities at a deeper level.

Policy Implications

The lessons learnt and priority areas for digital transformation present important implications for policy that could be looked at by the government, alongside stakeholders in the digitalisation agenda. Firstly, stakeholder participation should be enhanced by greater involvement of civil society. The civil society has the potential to promote inclusion through dialogue and engagement with key players in the private and public sector, thereby improving public participation. Secondly, the policy implementation process needs to prioritise issues that promote inclusion such as availability, affordability and accessibility, as well as wellbeing. Capacity building initiatives to enhance digital skills among vulnerable people needs to be further improved through capitalising on the partnerships and synergies Rwanda has created with both domestic stakeholders and international partners/donor agencies.

Priority areas for inclusive digital transformation

Efforts to propel inclusive digital transformation need to focus on the following key areas;

I. **Adopt an explicit inclusive digital development approach**. At present, Rwanda's digital agenda is geared toward strengthening the country's economy and making service delivery more efficient. By placing citizen wellbeing at the center of the digital transformation, Rwanda could foster deeper societal changes which strengthen democracy and tackle inequalities.

II. **Affordable and universal access to connectivity.** The government of Rwanda needs to implement measures that improve awareness, affordability and accessibility of digital services. This could be done through developing programs (including but not limited to increased citizen awareness initiatives on Irembo services; and policies for mobile money) audiovisual and web accessibility to increase uptake and usage, especially for marginalized and vulnerable categories of people including persons with disabilities and women.

III. **Digital skilling for all**. Sufficient digital skills and digital self-efficacy are an essential building block of sustainable digital transformation[18]. However, this calls for delivery of massive online Digital Skills for All programs that provide basic online knowledge and security and privacy skills. Rwandan government needs to focus on developing and sustaining evidence-based, decentralized and cost-

[18] ibid

effective digital skills enhancement to augment modern digital skills on the supply side (civil servants) as well as on the demand side (citizen, civic actors and business).This will further enhance greater access to advanced and high-end digital skills that are attractive to local consumers and investors.

IV. **Promote innovative digital ecosystems**. The private sector in Rwanda plays a far greater role in spearheading digitization through both increased uptake and development of digital products and services among local businesses[19]. Therefore, building a more vibrant digital entrepreneurship ecosystem through utilizing innovative tools, such as mobile money to fund development projects, will be key to support adoption of digital innovation in the country.

V. **Advocate for openness and innovative use of digital platforms**. The Rwandan government need to advocate for open digital standards to unlock scale, reusability and interoperability to reduce the digital divide in the face of COVID-19 pandemic and foster an inclusive digital transformation that respects and protects human rights. This will be achieved through a holistic and integration approach of ICT applications into social and user environments involving capacity building, risk monitoring, policy advice and awareness-raising.

VI. **Enhance CSO participation throughout the digital journey**. Including CSO and citizens throughout thel phases of Rwanda's digital transformation is key to ensure more inclusiveness. These CSOs should not only be used to support the government's initiatives but vitally should be given safe political space to play watchdog roles in order to protect the rights of vulnerable groups.

[19] Rwanda Economic Update: Leveraging Digital Transformation for Sustainable Growth (worldbank.org)

References

Adeniran, A. & Osakwe, S. (2021). *Why Digitalization and Digital Governance Are Key to Regional Integration in Africa.* Retrieved on 28 June 2022 from https://www.cgdev.org/blog/why-digitalization-and-digital-governance-are-key-regional-integration-africa

Afadhali, J.P. (2021). *Rwanda Digital Rights and Inclusion Report*. . Paradigm Initiative: Lagos. Retrieved on 28 June 2022 from https://paradigmhq.org/wp-content/uploads/2021/05/lr-Rwanda-Digital-Rights-Inclusion-2020-Report.pdf

Ajibola, B (2021). Technology and social movements against 'other pandemics' in Africa. Retrieved on 28 June 2022 from https://blogs.lse.ac.uk/internationaldevelopment/2021/09/14/technology-and-social-movements-against-other-pandemics-in-africa/

Alliance for Affordable Internet (A4AI) (2020). The Affordability Report 2020. Web Foundation. Available at: Affordability-Report-2020.pdf (a4ai.org).

Ansoms, A., Cioffo, G., Dawson, N., Desiere, S., Huggins, C., Leegwater, M., ... & Van Damme, J. (2018). The Rwandan agrarian and land sector modernisation: confronting macro performance with lived experiences on the ground. *Review of African Political Economy*, *45*(157), 408-431.

Anwer, M. A., Esichaikul, V., Rehman, M., & Anjum, M. (2016). E-government services evaluation from citizen satisfaction perspective: A case of Afghanistan. *Transforming Government: People, Process and Policy*.

Asmar, A., Van Audenhove, L., & Mariën, I. (2020). Social Support for Digital Inclusion: Towards a Typology of Social Support Patterns. *Social Inclusion*, *8*(2), 138-150.

Avgerou, C., & Addo, A. (2017). Developmental Effects of the Digital Revolution. In R. Galliers & M.-K. Stein (Eds.), *Critical Perspectives on Business and Management: Management Information Systems*. Routledge.

Avgerou, C., & Madon, S. (2004). Framing IS studies: understanding the social context of IS innovation. In C. Avgerou, C. Ciborra, & F. Land (Eds.), *The Social Study of Information and Communication Technology*: 162–182. New York: Oxford University Press

Bakunzibake, P., Klein, G. O., & Islam, S. M. (2019). E-government implementation process in Rwanda: Exploring changes in a sociotechnical perspective. *Business Systems Research: International journal of the Society for Advancing Innovation and Research in Economy*, *10*(1), 53-73.

Banga, K., Rodriguez, A. R., & te Velde, D. W. (2020). Digitally enabled economic transformation and poverty reduction.

Behuria, P. (2016) Countering threats, stabilising politics and selling hope: examining the Agaciro concept as a response to a critical juncture in Rwanda, Journal of Eastern African Studies, 10:3, 434-451, DOI: 10.1080/17531055.2016.1250871

Chemouni, B. (2014). Explaining the Design of the Rwandan Decentralization: Elite Vulnerability and the Territorial Repartition of Power. Journal of Eastern African Studies, 8 (2), 246-262. DOI: 10.1080/17531055.2014.891800

CIPESA (2021). *2021 State of Internet Freedom in Africa*. Retrieved on 28 June 2022 from https://cipesa.org/?wpfb_dl=467.

CIVICUS (2020). MULTIPLE JOURNALISTS ARRESTED THROUGHOUT COVID-19 LOCKDOWN PERIOD. Retrieved from 28 June 2022 on https://monitor.civicus.org/updates/2020/09/09/multiple-journalists-arrested-throughout-covid-19-lockdown-period/

Constantini, G., Verdechhia, S. & Rutayisi, F. (2013) MAPPING OF THE CIVIL SOCIETY AND PROJECT IDENTIFICATION OF A SUPPORT PROGRAM TO THE CIVIL SOCIETY IN RWANDA. Retrieved on 28 June from https://eeas.europa.eu/archives/delegations/rwanda/documents/press_corner/mapping-of-the-civil-society-and-project-identification_en.pdf

Dawson, N.M. (2018). Leaving no-one behind? Social inequalities and contrasting development impacts in rural Rwanda. *Development Studies Research*, 5(1), 1-14. DOI: 10.1080/21665095.2018.1441039

EC-GoR (2014) *European Union – Government of Rwanda National Indicative Programme 2014 – 2022*. Retrieved on 28 June 2022 from https://ec.europa.eu/international-partnerships/system/files/pin-rwanda-fed11-2014_en.pdf

Freedomhouse (2021). *Freedom on the Net 2021*. Retrieved om 28 June 2022 from https://freedomhouse.org/sites/default/files/2021-09/FOTN_2021_Complete_Booklet_09162021_FINAL_UPDATED.pdf

Gihana, D. and Kooijman, A. (2020). Gender and Energy Country Briefs - Rwanda, ENERGIA.

GIZ (2021). *Digital Skills for an Innovative East African Industry (dSkills@EA).* Retrieved on 28 June 2022 from https://www.giz.de/en/worldwide/100379.html

Gluckman, S. P., & Allen, K. (2018). Understanding wellbeing in the context of rapid digital and associated transformations. The International Network for Government Science Advice. https://www. ingsa. org/wp-content/uploads/2018/10/INGSA-Digital-Wellbeing-Sept18. pdf.IDA (s.d). *Rwanda*. Retrieved on 28 June 2022 from https://ida.worldbank.org/en/country/rwanda#1%20From%202014%E2%80%9317,%2030%20districts%20were%20using%20automated%20revenue%20collection%20system.%20During%20the%20same%20period,%2096.9%%20of%20small%20and%20micro%20enterprise%20taxpayers%20filed%20their%20taxes%20using%20e-tax%20portal,%20up%20from%2069.3%%20in%202014.

International Finance Corporation (IFC) (2021). Demand for Digital Skills in Sub-Saharan Africa. Key Findings from a Five-Country Study: Côte d'Ivoire, Kenya, Mozambique, Nigeria, and Rwanda. Pennsylvania Avenue, N.W. Washington, D.C. 20433. Available at: Demand+for+Digital+Skills+in+SubSaharan+Africa_web.pdf (ifc.org)

Gleason, K., & Suen, J. J. (2021). Going beyond affordability for digital equity: Closing the "digital divide" through outreach and training programs for older adults. *Journal of the American Geriatrics Society*.
GoR (2017). RWANDA OFFICIAL DEVELOPMENT ASSISTANCE REPORT 2015/2016. Retrieved on 28 June 2022 from http://www.devpartners.gov.rw/fileadmin/user_upload/ODA_report_201516__2_.pdf

ISHR. (2016). Rwanda: Participation and protection of civil society is crucial to development. Retrieved from https://www.ishr.ch/news/rwanda-participation-and-protection-civil-society-crucial-development

Irembo (2021) IremboGov design principles. Retrieved from https://irembo.com/2021/07/09/irembogov-product-design-principles/

Fraser-Moleketi, G., & Senghor, D. (2011). E-governance and citizen participation in West Africa: Challenges and opportunities. Panos Institute West Africa (PIWA) and the United Nations Development Programme (UNDP).Froehlich, A., Siebrits, A., Ringas, N., Kotze, C., & Wilson, J. (2020). Space Supporting Africa: Volume 3: Security, Peace, and Development Through Efficient Governance Supported by Space Applications. Springer International Publishing. https://books.google.nl/books?id=FxP9DwAAQBAJ

Kasongo, F. (2017). Evaluating the Impact of ICT Intervention on the Well-Being of Indigent Citizens within the South African Historical Context. *The International Journal of Multi-Disciplinary Research* ISSN: 3471-7102. Retrieved on 28 June 2022 from http://www.multiresearch.net/cms/publications/CFP1562017.pdf
Khan, F. (2022). GIZ Bangladesh -Gender Equality for a Sustainable Tomorrow. Available at: https://gender-works.giz.de/giz-bangladesh-gender-equality-for-a-sustainable-tomorrow/.
Mann, L., & Nzayisenga, E. (2015). Sellers on the street: the human infrastructure of the mobile phone network in Kigali, Rwanda. *Critical African Studies*, *7*(1), 26-46.

Mariën, I., & Prodnik, J. A. (2014). Digital inclusion and user (dis) empowerment: A critical perspective. *Info*.

Mason, E. (2020). Universal Health Coverage: How Rwanda is moving forward with healthcare for all. Innovations in Healthcare. Available at https://www.innovationsinhealthcare.org/universal-health-coverage-how-rwanda-is-moving-forward-with-healthcare-for-all/

Madon, S. (2004). Evaluating the developmental impact of e-governance initiatives: An exploratory framework. The Electronic Journal of Information Systems in Developing Countries, 20(1), 1-13.

Ministry of Information Technology and Communications (MINTC) (2020). ICT for GOVERNANCE CLUSTER STRATEGY 2020-2024. Available at: https://www.risa.rw/fileadmin/user_upload/Others%20documents/ICT4_GOV_CLUSTER_STRATEGY_2020-2024.pdf
Ministry of Information Technology and Communications and Innovation. 2017. National Digital Talent Policy.
Misuraca, G. C., 2007, 'E-Governance in Africa: From Theory to Practice - A Handbook on ICTs for Local Governance', Sections 3 and 4, Africa World Press, New Jersey, International Development Research Centre, Ottawa

Moodley, S. (2005). The Promise of E-Development? A Critical Assessment of the State ICT for Poverty Reduction Discourse, *South Africa Perspectives on Global Development and Technology*, (4):1

Mondejar, M. E., Avtar, R., Diaz, H. L. B., Dubey, R. K., Esteban, J., Gómez-Morales, A., ... & Garcia-Segura, S. (2021). Digitalization to achieve sustainable development goals: Steps towards a Smart Green Planet. *Science of the Total Environment*, *794*, 148539.

Mukamurenzi, S., Grönlund, Å., & Islam, S. M. (2019). Improving qualities of e-government services in Rwanda: A service provider perspective. *The Electronic Journal of Information Systems in Developing Countries*, *85*(5), e12089.
Munu, M. & Vlaminck Z. (2021) ***B****eyond the curve: equity in Rwanda's COVID-19 response*. Include Report. Retrieved on 28 June 2022 from https://includeplatform.net/publications/beyond-the-curve-equity-in-rwandas-covid-19-response/

NEC. (2020). Africa as the Next Frontier for eGovernment. Nippon Electric Company. Available at https://www.nec.com/en/global/insights/article/2020022516/index.html Nukurunziza, M. (Feb 12 2019). Irembo agents to benefit from increased commission fees. The New Times Retrieved from https://www.newtimes.co.rw/business/irembo-agents-benefit-increased-commission-fees
OECD (2020). *Digital Transformation and the Futures of Civic Space to 2030*, OECD Development Policy Paper 29.

Otioma, C., Madureira, A. M., & Martinez, J. (2019). Spatial analysis of urban digital divide in Kigali, Rwanda. *GeoJournal*, *84*(3), 719-741.

Pfeifer, M., Seufert,P., Beringer, P. L., & Herre, R. (2020). Disruption or Déjà Vu? Digitalization, Land and Human Rights: Case Studies from Brazil, Indonesia, Georgia, India and Rwanda. FIAN International, available at https://www.fian.org/files/files/FIAN_Research_Paper_Digitalization_and_Land_Governance_final.pdf

Ponelis, S. R., & Holmner, M. A. (2015). ICT in Africa: Building a better life for all. Information Technology for Development, 21(2), 163-177.
Reddick, C. G., Enriquez, R., Harris, R. J., & Sharma, B. (2020). Determinants of broadband access and affordability: An analysis of a community survey on the digital divide. *Cities*, *106*, 102904.

Roodenbeke, E. D., Lucas S, & Rouzaut A (2011). *Outreach services as a strategy to increase access to health workers in remote and rural areas*. Technical Report No. 2, World Health Organization, available at https://apps.who.int/iris/bitstream/handle/10665/44589/9789241501514_eng.pdf

RoR (2019). Rwanda ICT sector profile 2019. Republic of Rwanda, Ministry of ICT and Innovation, Kigali, Rwanda.

RTN (2022). Irembo Agent Application Form. Retrieved from https://rtn.rw/telecentre-application-form/

Sabiiti, D. (2021). Ubutaka App: Rwanda's Paperless Land Registration System Ready To Go. KTXpress, November 01, 2021, available at https://www.ktpress.rw/2021/11/ubutaka-app-rwandas-paperless-land-registration-system-ready-to-go/

SPIDER (s.d.) *Increasing Access to Digital Health in Rwanda*. Retrieved on 28 June 2022 from https://spidercenter.org/project/increasing-access-to-digital-health-in-rwanda/

Twizeyimana, J. D., Larsson, H., & Grönlund, Å. (2018). E-government in Rwanda: Implementation, Challenges and Reflections. Electronic Journal of e-Government, 16(1), pp19-31.
UNDP & IPAO (2015) *E-Governance and Citizen Paticipation in West Africa: Challenges and Opportunities.* Retrieved on 26 June 2022 from e-Governance and Citizen Paticipation in West Africa (UNDP-IPAO Report English).pdf

UNDESA (2020). United Nations E-Government Survey 2020. United Nations, New York. Available at https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf

Verpoorten, M. (2014). *Growth, Poverty and Inequality in Rwanda: A Broad Perspective*. WIDER Working Paper 2014/138. Helsinki, Finland: UNU-WIDER.

Welby, B. (2019*). The impact of digital government on citizen well-being*. OECD Working Papers on Public Governance No. 32, May 2019. Retrieved on 28 June from https://www.oecd.org/gov/digital-government/working-paper-the-impact-of-digital-government-on-citizen-well-being.htm

White, T. (2021). *Figure of the week: Internet freedom in sub-Saharan Africa declines*. Retrieved on 28 June 2022 from https://www.brookings.edu/blog/africa-in-focus/2021/09/23/figure-of-the-week-internet-freedom-in-sub-saharan-africa-declines/

World Bank (2015). *Searching for the "Grail": Can Uganda's Land Support its Prosperity Drive?* Uganda Economic Update | Sixth Edition, September 2015 | Report no. 99060
World Bank (2020). Rwanda Economic Update Retrieved from https://documents1.worldbank.org/curated/en/912581580156139783/pdf/Rwanda-Economic-Update-Accelerating-Digital-Transformation-in-Rwanda.pdf

The World Bank (2020b). Rwanda Digital Acceleration Project (P173373). Available at: https://projects.worldbank.org/en/projects-operations/project-detail/P173373

ANNEX

Annex 1: Operationalisation of wellbeing

Dimension of wellbeing	Case study	Operationalization	Data source/research method
Material wellbeing	Land registration	Has the e-service reduced user costs related to land registration and health care?	Qualitative survey among end-users in western province and Kigali KII FGDs in western province and Kigali
		Has the e-service increased land-ownership among the poorest quintile of the population?	Idem
		Has the e-service increased land-ownership of women?	
		Has the e-service increased land ownership among people with disabilities and the elderly?	
		Has the e-service increased land ownership among poor urban dwellers?	
	Health care	Has the e-service reduced user costs related health care?	
		Has the e-service increased access to basic health care services among the poorest quintile of the population?	
		Has the e-service increased access to basic health care by women?	

		Has the e-service increased access to basic health care by people with disabilities and the elderly?	
		Has the e-service increased access to basic health care to rural citizens?	
Relational wellbeing	Land registrations	Has the e-service decreased land related conflicts/disputes?	
		Has the e-service decreased intergenerational conflicts (e.g. between heritors of a same land)?	
		Has the e-service decreased the state-citizen distance when it comes to land-related issues? Can citizens easily ask questions/file complaints to relevant government officials?	
	Health care	Has the e-service improved doctor/nurse patient relations?	
		Has the e-service decreased the state-citizen distance when it comes to health care-related issues? Can citizens easily ask questions/file complaints to relevant government officials?	
		Has the e-service decreased the distance between health care service providers and patients? Can citizens easily ask questions/file complaints to health care service providers?	
		Has the e-service had an impact on the social	

		(incl. family) relations of users?	
Cognitive wellbeing	Land registration	Has the e-service affected the self-perception of users in a positive or negative way?	
		Has the e-service affected future aspirations of users in a negative or positive way?	
		Has the e-service affected how users value government institutions, in a negative or positive way?	
		Has the e-service affected the sense of community/place among users in a positive or negative way?	
	Health care	Has the e-service affected the self-perception of users in a positive or negative way?	
		Has the e-service affected future aspirations of users in a negative or positive way?	
		Has the e-service affected how users value government institutions, in a negative or positive way?	
		Has the e-service affected how users value health care service providers, in a negative or positive way?	

Table 1 Operationalization of impact of digitalization on wellbeing

Annex 2: Irembo E-services

FAMILY	**Identification**
Certificate for Widow/Widower	Application for National ID Correction
Certificate of Residence	Application for National ID
Certificate of Genocide Survivors	Registration in the National Population Registry
Certificate of Being Single	National ID Replacement
Record of recognition	Certificate for Replacement of National Identification
Guardianship Record	
Certificate of Succession	Certificate of Full Identity
Certificate of Cohabitation	Change of name
Birth Services	Certificate of Nationality
Marriage Services	Certificate of Divorce
Death Services	Certificate of Being Alive
Adoption Record	
Immigration And Emigration	**Land**
Pay for Transfer/Transcription Fees	Sporadic Registration
Penalty Payments	E-payment Services
DPA payment	Authentication for Loan Agreement
CEPGL Services	Change of Land Use
Permits	Title Details Update
Foreigner ID Card	Document Replacement
Foreigner Travel Document	Title Transfer
e-Passport Application	Land Merging
Laissez-passer	Subdivision
Visa Application	
Police	**Notarisation And Gazette Service**
Duplicate of Driving License	Subscribe for the Official Gazette
Traffic Fines	Various Notary Services
Replacement of Definitive Driving License	Publish in the Official Gazette
Motor Vehicle Inspection	Purchase an Official Gazette
Driving License Exam Results	
Renewal of Driving License	
Application for Driving License	
Registration for Driving Test	
Health	**Governance**
COVID-19 Test	NGO Registration
Yellow fever vaccination	Application For NGO Legal Personality
Community Based Health Insurance(Mutuelle)	Registration and Issuance of Legal Personality to FBOs
Education	**Rwanda Museums**
Application for Equating Foreign Qualifications	Schedule a Visit
Application for Equating Foreign Qualifications - General Education	Re-schedule a Visit
Transport	**Criminal Record**

Transport Authorization Transport License	Criminal Record Certificate
Media Accreditation for Foreign Media	

Annex 3: FGDs

Participants	Total Females		Total Males		Landowner		Activity				Mobile Phone		Total
	Age: Under 30	Age: 30+	Age: Under 30	Age: 30+	Yes	No	Manpower	Street Vendors	Head porter Vendor	Vendor (owns stand in the market)	Yes	No	
Number of people attended the FGDs	9	5	6	4	3	21	10	6	3	5	19	5	24
Number by Kigali City	5	2	4	1	1	11	5	3	2	2	11	1	12
Number by Rubavu District	4	3	2	3	2	10	5	3	1	3	8	4	12
Health	6	3	2	1	0	12	4	3	2	3	10	2	12
Land	3	2	4	3	2	10	6	3	1	2	9	3	12

Annex 4: KII

KIs	
1	NUDOR (National Union of Disabilities Organisations of Rwanda)
2	Rwanda Civil Society Platform
3	Health Development Initiative
4	UNCDF
5	ENABEL
6	RGB and JADF
7	RLMUA Rwanda Land Management and Use Authority
8	Min of Gender and Family Protection
9	Min of ICT and Innovation
10	Min of Local Government
11	DAI
12	DFID
13	Freedom House
14	GIZ
15	Digital Opportunity Trust

16.	National Women's Network
17.	Rwanda Journalist Association