



# **E-GOVERNANCE IN UGANDA 2024:**

**PROSPECTS AND CHALLENGES**

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# Summary

The beginning of 2000s in Uganda was marked by the ICT importance trend in the development of governance and economy. Two successive Uganda national IT policies (Uganda National ICT Policy Framework<sup>1</sup>, 2003, and the National Information Technology Policy<sup>2</sup>, 2009) stressed a pivotal role of information and IT in socio-economic development of the country, including an increase in efficiency and effectiveness in service delivery.

The e-Government implementation encountered a number of challenges due to lack of electricity and poor internet penetration — especially in rural communities, lack of skilled IT personnel and illiteracy of citizens in general, insufficient equipment, limited usage of the internet in offices and mainly static web-sites of government ministries, and other problems. The project initiated creating regulatory and institutional frameworks, ICT infrastructure which have been constantly modernized for the following decade.

## To drive e-governance development numerous initiatives were launched, including e-taxes and revenue collection systems, online portal for public procurement, business support system and other

One of the new aspirations is the **Uganda e-Government Interoperability Framework<sup>3</sup>** which stipulates interoperability, aiming at cooperation, exchanging information for legal and political purposes, sharing and using it for the efficient delivery of public services and the reduction of administrative burden for citizens and businesses.

Kampala has its own online services portal **eCitie<sup>4</sup>** managed by the Kampala Capital City Authority

(KCCA) with an online payment system, information about revenue sources.

## The Artificial Intelligence sector continues to be driven by private and multinational companies,

while in the area of environmental monitoring initiatives are proposed mainly by international organizations.

Despite these ambitious and diligent efforts, today e-service delivery is still facing the challenges of poor infrastructure, high costs of the Internet, low investment, and low citizens' awareness of e-government advantages. Moreover, disintegration of services and systems remains significant: there are no catalogs of registries and data services even in the form of a list as it exists for public services. The duplicated functions of different ICT systems and difficulties in data sharing between these heterogeneous systems and low development of shared information systems, paper documents management are also mentioned as weaknesses of the present-day e-Government practice. In the UN E-Government Survey 2022<sup>5</sup>, Uganda ranked 144 with an index of 0.44, slightly higher than the regional average.

From the start the e-Government projects in Uganda have been aligned with East African Community programmes, it has been monitored by the UN and supported by the funding of the UN Development Programme, U.S. Agency for International Development, and the World Bank. Uganda is also among top five recipients<sup>6</sup> of the World Bank loans. The Government of Uganda encourages cooperation

1 National Information and Communication Technology Policy. Ministry of Work, Housing and Communications of the Republic of Uganda. 2003. URL: [http://www.ist-africa.org/home/files/Uganda\\_NationalICTPolicyFramework\\_Oct2003.pdf](http://www.ist-africa.org/home/files/Uganda_NationalICTPolicyFramework_Oct2003.pdf)

2 Information Technology Policy for Uganda. Ministry of Information and Communications Technology of the Republic of Uganda. 2009. URL: [http://library.health.go.ug/sites/default/files/resources/Information%20Technology%20Policy%20for%20Uganda\\_0.pdf](http://library.health.go.ug/sites/default/files/resources/Information%20Technology%20Policy%20for%20Uganda_0.pdf)

3 Uganda e-Government Interoperability Framework. The Republic of Uganda. 2021. URL: <https://qualityassessmentofservices.com/GEAGIF/eGIF-Final/1%20e-GIF-%20eGovernment%20Interoperability%20Framework.pdf>

4 eCitie. URL: <https://ecitie2.kcca.go.ug/portal/>

5 UN E-Government Survey. 2022. URL: <https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/179-Uganda>

6 Digital Governance Projects Database. The World Bank Group. URL: <https://datacatalog.worldbank.org/search/dataset/0038056/Digital-Governance-Projects-Database>

## CHALLENGES

The e-Government implementation encountered a **number of challenges** in Uganda, and the main one are the following:

- **Uneven Internet access** and **limited Internet connectivity**, due to the lack of electricity and poor internet penetration, which is especially crucial for rural areas;
- **Digital illiteracy**: lack of skilled IT personnel, especially among the public officials;
- Lack of developed **infrastructure**: Inadequate infrastructure such as computers and laptops. The problem is exacerbated with limited usage of the internet in offices and mainly static web-sites of government ministries.

That's why special attention is paid to the information and IT sectors development in Uganda.

## PROSPECTS

To drive e-governance in Uganda development numerous initiatives were launched. To provide enhancements, a technical and regulatory framework for reliable and secure e-services is being created.

**The goal** of e-government deployment in Uganda is to make services delivery more accessible to citizens and business. Initiatives and projects aim to improve internal efficiency of agencies and facilitate community participation in e-Government policy.

Prospective areas for improvement include the following:

- **e-taxes** and revenue collection systems
- **online payments**
- online portal for **public procurement**
- business support system implementation
- **Artificial Intelligence (AI)** used for the benefits of people
- **Passports, Visas/permits**, citizenship applications
- **eCitizen portal** creation, to provide citizens access to licences, permits, and fees.
- creation of a national cloud platform and **data centers** for storing data.

and experience sharing with other countries using more advanced e-government practices.

## Institutional Frameworks

As far as strengthening the institutional structure is concerned, the **Ministry of Information and Communications Technology and National Guidance** was established in 2006 to enhance

the ICT use and promote digital services in the country. In 2009, there was created the **National Information Technology Authority – Uganda (NITA-U)** with its mission of developing a technical and regulatory environment for reliable and secure e-services delivery throughout the country under the supervision of the Ministry of ICT and National Guidance.

# E-Government in Uganda

2024

Ministry of ICT and National Guidance and MTN Uganda launched the Phase II of MTN Africa Centre for Excellence Program



2023



Launch of the Uganda Registration Services Bureau



Digital Transformation Roadmap for 2023–2027 developed in collaboration with United Nations Development Programme

2022

Adoption of a draft of the Digital Government Strategy



2021



Adoption of the Uganda e-Government Interoperability Framework



Launch of Uganda Systems and Data Integration Platform (UGHub) allowing seamless data sharing between Government systems



Launch of the e-Government Procurement System by the Public Procurement and Disposal of Public Assets Authority (PPDA)

2019

Establishment of a Tier III Data Centre



2018



Launch of the Uganda Trade Portal, a one-stop shop for trade information, providing step-by-step guides for import, export, and transit of a commodity (steps taken, institutions involved, results, documents, costs, etc.)

2016

Launch of the e-Immigration System with electronic visa/permits and citizenship applications



Lunch of the Uganda Business information licensing portal, an online database of business licences



2015



Launch of the eCitizen Portal by NITA-U. The portal serves as a one-stop shop for Government online services

2014

Launch of e-taxes service by the Uganda Revenue Authority



2011



Launch of the National Electronic Government Policy Framework

2009

Establishment of the National Information Technology Authority (NITA-U). Its mission is outlined as developing a technical and regulatory environment for reliable and secure e-services delivery throughout the country



National Information Technology Policy

2006



Establishment of the Ministry of Information and Communications Technology and National Guidance

2002

The first Uganda National ICT Policy Framework



# Strategies and Regulations

In terms of legal and regulatory framework, a number of acts were passed (among them are the cyber laws<sup>7</sup>, including The Computer Misuse Act, 2011, The Electronics Signatures Act, 2011, The Electronics Transactions Act, 2011, Data Protection and Privacy Act 2019, Data Protection and Privacy Regulations 2021<sup>8</sup>, NITA-U (E-Government Regulations), 2015 — SI No. 27 of 2015<sup>9</sup>) as well as some basic policies and strategies were elaborated. The Uganda E-Government Regulations (2014)<sup>10</sup> can serve as an example of an attempt to consolidate regulations in the sector.

**The National Electronic Government Policy Framework, 2011<sup>11</sup>** declared the main goals of e-Government deployment as making service delivery more accessible to citizens and business, improving internal efficiency of agencies due to their interaction in the process of providing services, and facilitating community participation in e-Government policy implementation.

The program announced the introduction of computerisation projects in a number of government institutions, which resulted in digitisation of their registers and services according to Digital Government Strategy (Draft), 2022<sup>12</sup>. The latter is being designed and aligned with other policy documents, underlying governance frameworks for national development (Uganda e-Government Interoperability Framework (e-GIF), 2021<sup>13</sup>, the third National Development Plan (NDPIII) 2020/21–2024/25<sup>14</sup>, National Planning

Authority, 2020<sup>15</sup>, The e-Government Master Plan (2012–2016) and others).

**The main goal is defined as transforming Uganda into a digitally enabled society that is innovative, productive and competitive, which requires developing three domains, namely digital government, connectivity, trust and security**

## One-stop shop portal

In 2021, NITA-U launched a Data Integration Platform (UGHUB) — **eCitizen portal<sup>16</sup>** as a one-stop shop platform for a significant number of government services. The development of the platform was financed by the World Bank under the Regional Communication Infrastructure Programme.

The platform is structured to facilitate access to all 86 e-services by means of an online search, by subject, by topic, or through a link to a ministry, department, or agency. Besides, the portal offers other options for a search, namely Services to Citizens, Business, and Non-Residents. The design of web-pages on the platform is more or less unified, with either the name of a government institution or the list of services, or both, and the logo of the institution. Some services on the platform are accessed through signing up, with a unique registration form and procedure for each public body, delivering a service.

7 Acts and Laws - Ministry of ICT & National Guidance. URL: <https://ict.go.ug/resources/acts-and-laws/>

8 Data Protection and Privacy Regulations of the Republic of Uganda. 2021. URL: [https://www.dataguidance.com/sites/default/files/uganda\\_data\\_protection\\_regulations\\_small.pdf](https://www.dataguidance.com/sites/default/files/uganda_data_protection_regulations_small.pdf)

9 Laws & Regulations. National Information Technology Authority of the Republic of Uganda (NITA-U). 2024. URL: <https://www.nita.go.ug/laws-regulations-0>

10 Uganda E-Government Regulations. National Information Technology Authority of the Republic of Uganda (NITA-U). 2014. URL: <https://www.ict.go.ug/wp-content/uploads/2018/06/electronic-government-regulations-2014.pdf>

11 National Electronic Government (e-Government) Policy Framework. Ministry of Information and Communications Technology of the Republic of Uganda. 2011. URL: [https://ict.go.ug/wp-content/uploads/2019/12/National\\_E-Government\\_Policy\\_Framework\\_2011-2.pdf](https://ict.go.ug/wp-content/uploads/2019/12/National_E-Government_Policy_Framework_2011-2.pdf)

12 Digital Government Strategy of the Republic of Uganda. 2022. URL: <https://www.nita.go.ug/sites/default/files/2022-02/Digital%20Government%20Strategy%20-%20Draft.pdf>

13 Uganda e-Government Interoperability Framework. The Republic of Uganda. 2021. URL: <https://qualityassessmentofservices.com/GEAGIF/eGIF-Final/1%20e-GIF-%20eGovernment%20Interoperability%20Framework.pdf>

14 Third National Development Plan (NDPIII) 2020/21–2024/25. 2020. URL: <https://ncs.go.ug/files/NATIONAL%20DEVELOPMENT%20PLAN%20III.pdf>

15 National Planning Authority Strategic Plan 2020/21–2024/25. 2020. URL: <https://www.npa.go.ug/wp-content/uploads/2023/08/NATIONAL-PLANNING-AUTHORITY-STRATEGIC-PLAN-202021---202425.pdf>

16 eCitizen portal. URL: <http://www.ecitizen.go.ug/>

Signing-up is required on the platform for users to access the services.

Open data is searched through a link to a required institution website, sometimes without redirecting, or with contents being outdated, or claimed unavailable. The portal allows users to **report wrongdoing** (terrorism, money laundering, corruption), suspected adverse drug reactions<sup>17</sup>, to **get monetary and financial information** on the website of the Bank of Uganda<sup>18</sup>, **trade data** on the Trade information portal<sup>19</sup>, **register for taxes** on the Revenue Authority website<sup>20</sup> and others.

## e-Immigration System

Visas/permits and citizenship can be applied for through the **Electronic Visa/Permit Application**

**System** on the immigration portal<sup>21</sup> of the Directorate of Citizenship and Immigration Control<sup>22</sup>. The website of the DCIC provides the list of services and the detailed information on the steps taken to apply for visas and permits as well as links to electronic forms to get e-services.

Citizens can apply for passports through the passport portal<sup>24</sup>, schedule an appointment, and check the application status.

## e-Licensing

With e-Licensing business entities and individuals can obtain information about licences, permits, and fees, required to start up a business, and apply for them online. **The Uganda Business information licensing portal**<sup>25</sup>, which can also be accessed through the eCitizen portal, is an online database of business licences issued by government agencies and local

**APPLY ONLINE**

STEP 1 Application type | STEP 2 Fill the form | STEP 3 Add documents | STEP 4 Submit

**Step 1 of 4: Select type of application**

Required fields are indicated by a red asterisk \*

Visa or permit type \* | Category \*  
 Student Pass | 3 months

Subcategory \*  
 3 months

**Supporting documents**

The following documents are mandatory and should be uploaded

Supported formats are : JPEG, PNG, BMP, PDF

Minimum file size is 5 KB. Maximum file size is 250 KB

- Valid Student ID Card
- Recent Passport-size Photograph
- Valid admission letter from school
- Passport Copy (Bio Data Page)
- Support Letter from School

Source: e-Immigration portal (e-Visa application page)<sup>23</sup>.

17 National Drug Authority. URL: <https://vigiflow-eforms.who-umc.org/ug/ade>  
 18 Bank of Uganda. URL: <https://www.bou.or.ug/bouwebsite/BOU-HOME/>  
 19 Uganda Trade Information Portal. URL: <https://ugandatrades.go.ug/>  
 20 Uganda Revenue Authority. URL: <https://ura.go.ug/en/>  
 21 Immigration Portal. URL: <https://visas.imhttps://visas.immigration.go.ug%20migration.go.ug>  
 22 Directorate of Citizenship and Immigration Control of Uganda. URL: <https://www.immigration.go.ug/>  
 23 Uganda Electronic Visa/Permit Application System. URL: <https://visas.immigration.go.ug/#/>  
 24 Uganda Passport Application. Ministry of Internal Affairs of the Republic of Uganda. URL: <https://passports.go.ug/>  
 25 Business information licensing portal. URL: <https://businesslicences.go.ug/index.php/>

The screenshot shows the Uganda Business Licensing Information Portal. At the top, there is a header with the portal logo and name, along with a language selection dropdown and 'Sign in' and 'Create an Account' buttons. Below the header is a navigation menu with links for Home, Browse, Help Center, News, FAQs, Useful Links, Publications, Contact Us, and Online applications. The main content area is titled 'Filter Licenses' and contains three dropdown menus for 'SelectJurisdiction', 'SelectIndustry', and 'SelectBusiness type', followed by a 'GET RESULTS' button. Below these are 'Save Search' and 'Share your Search' buttons. A section titled 'Filter Licenses by issuing Agency' has a dropdown menu set to '10'. A search bar contains the text 'Search Licenses by Keyword e.g. Trade License or Agency e.g. Ministry of Education'. The search results are displayed in a table with columns for '#', 'License Name', 'Issuing Agency', and 'Duration'.

#	License Name	Issuing Agency	Duration
<input type="checkbox"/> 1	<b>Aerodrome certificate</b> To ensure that all operators/crew/organisations in the aviation industry are properly certified/authorized in accordance with International Civil Aviation Organisation (ICAO) standards and recommended practices.	Civil Aviation Authority	1 Month
<input type="checkbox"/> 2	<b>Aerodrome construction permit</b> To ensure compliance with safety standards.	Civil Aviation Authority	1 Month
<input type="checkbox"/> 3	<b>Aerodrome license</b> To ensure compliance with the aviation safety regulations.	Civil Aviation Authority	1 Month

Source: Business information licensing portal.

authorities for individuals, business entities, and investors striving to learn about a particular licence, or a certificate. On the platform the data on 521 licenses and permits are available, including the name, the issuing authority, the downloadable content, fees, laws, duration, etc.

**Other procedures of licensing via the e-licensing portal (applying and paying for licensing, viewing the application status, uploading required documents, and getting notifications) are to be developed**

Moreover, the portal provides links to online applications. They duplicate the ones provided on the e-Citizen platform (among them are<sup>26</sup> applying for a passport, an electronic visa/permit, applying for crops and fisheries certification on the website of the Ministry of Agriculture, Animal Industry and Fisheries, getting the identification numbers for payment registration on the online platforms and others), but

their shortened list makes the information graspable and easily accessible.

## e-Agriculture

The Ministry of Agriculture website<sup>27</sup> was not only an informational resource, containing the certification guidelines, but also a transactional one, redirecting the user to the portals for online application and certification for crops and fisheries.

## B2B Services

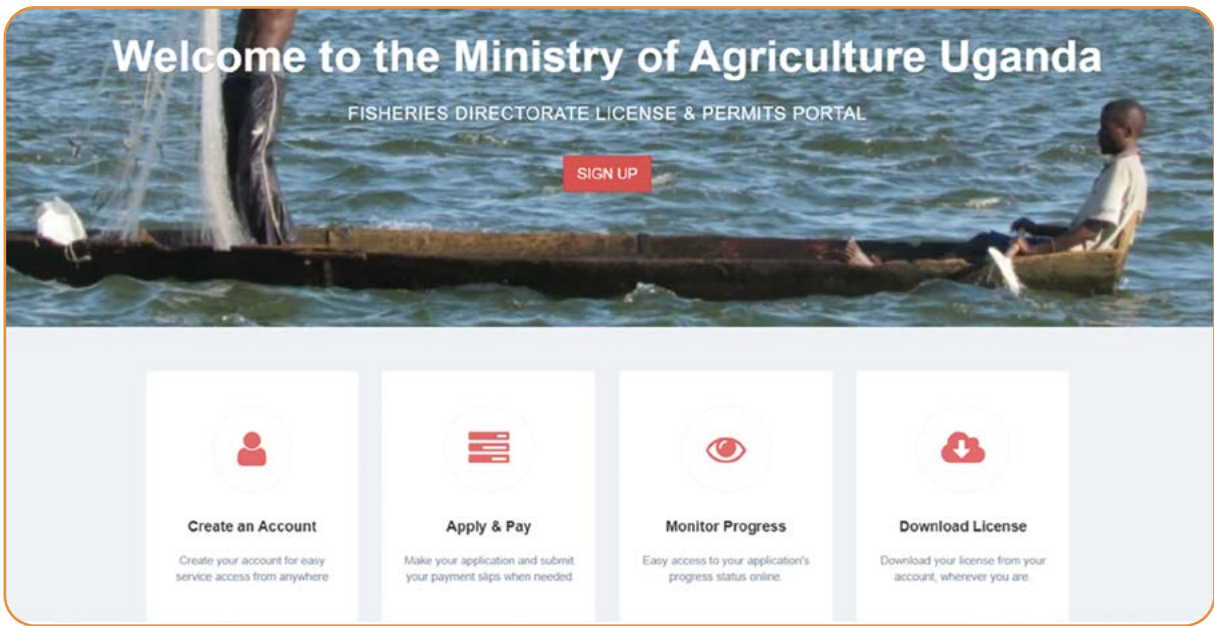
Besides e-licensing, a number of portals were designed to facilitate starting up and operating business. On the platform of the **Uganda Registration Services Bureau**<sup>28</sup> a company can be registered, the procedure beginning from name reservation to generating payments, applying for registration and uploading all required documents.

<sup>26</sup> Uganda Business Licensing Information Portal. URL: <https://businesslicences.go.ug/index.php/press/30>

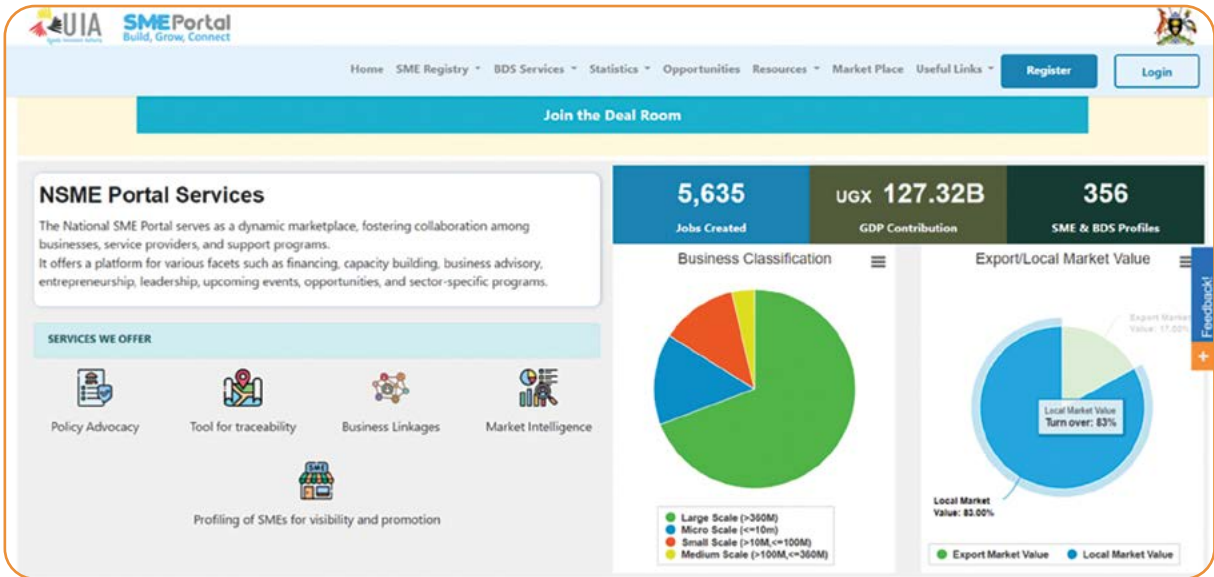
<sup>27</sup> The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). URL: <https://www.agriculture.go.ug/online-certification/>

<sup>28</sup> Uganda Registration Services Bureau. URL: <https://ursb.go.ug/>





Source: The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)



Source: The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

**The Uganda Trade Portal<sup>29</sup> is claimed to be a one-stop shop for trade information, providing step-by-step guides for import, export, and transit of a commodity (steps taken, institutions involved, results, documents, costs, etc.)**

The electronic One Stop Centre<sup>30</sup>, which was established by the **Uganda Investment Authority**, is the web portal providing e-services (e.g. applying for

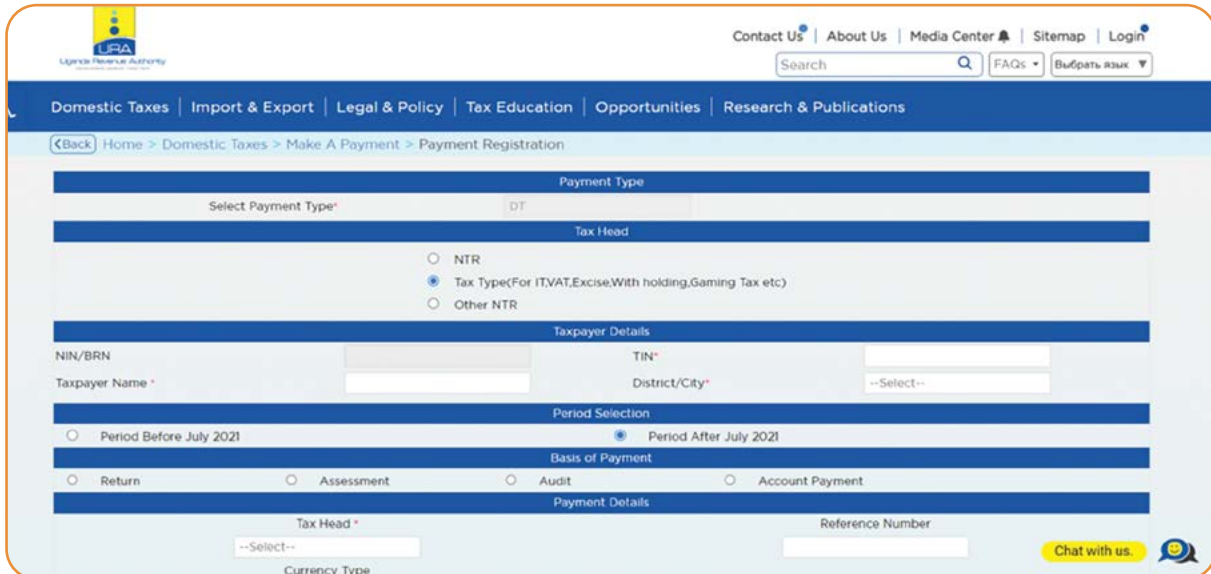
<sup>29</sup> Uganda Trade Portal. URL: <https://ugandatrades.go.ug/>

<sup>30</sup> Electronic One Stop Centre. URL: <https://www.ebiz.go.ug/>

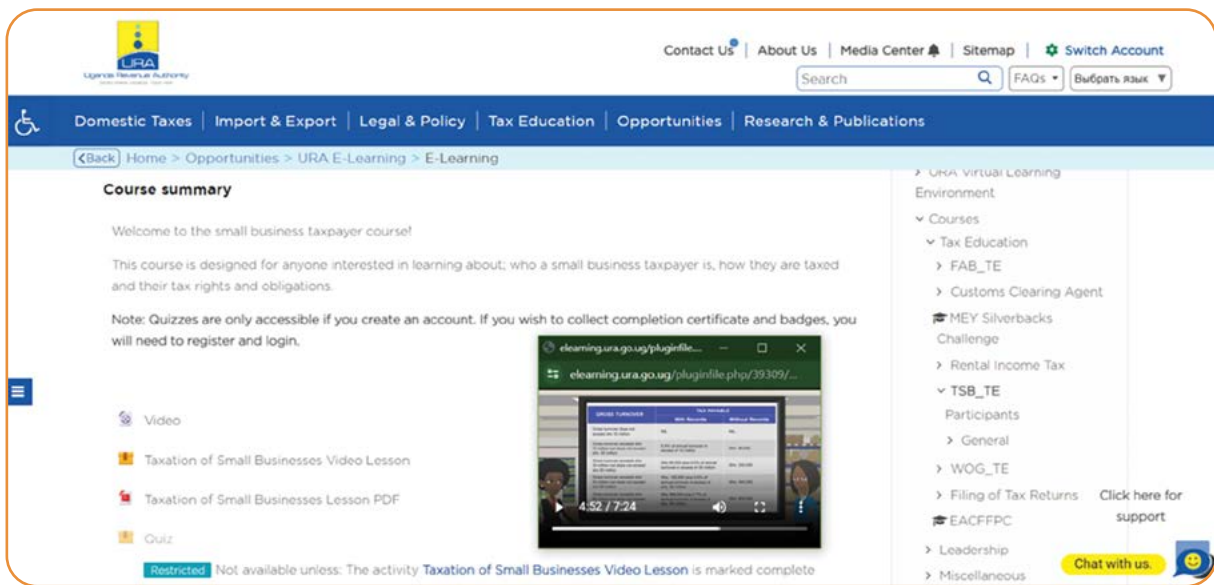
investment licenses), the links to e-services on other portals (e.g. reserving a business name, registering a company, applying for a work permit, tax registration, etc.), business ideas and information on investment opportunities. The transactions via the portal require signing up.

**The NSME portal<sup>31</sup> provides information and services for small and medium enterprises.**

## e-Taxes



Source: Payment Registration. Uganda Revenue Authority (URA)<sup>34</sup>.



Source: e-Learning. Course on Taxation for Small Businesses. Uganda Revenue Authority (URA).

31 National SME Portal. URL: <https://mybusiness.go.ug/>

### The Integrated Tax Administration System (e-Tax)<sup>32</sup>

was introduced by the Uganda Revenue Authority to provide online services to taxpayers, including tax registration (TIN registration) and payments. URA also developed a digital platform for delivering educational content<sup>33</sup>, training materials, and online courses.

Payments can also be generated on the Integrated Revenue Administration System (IRAS)<sup>35</sup>, the online payment platforms of KCCA<sup>36</sup> and the Ministry of Local Government<sup>37</sup>, which provide access to online transactions, reference materials on local services, electronic application submission and tracking of application.

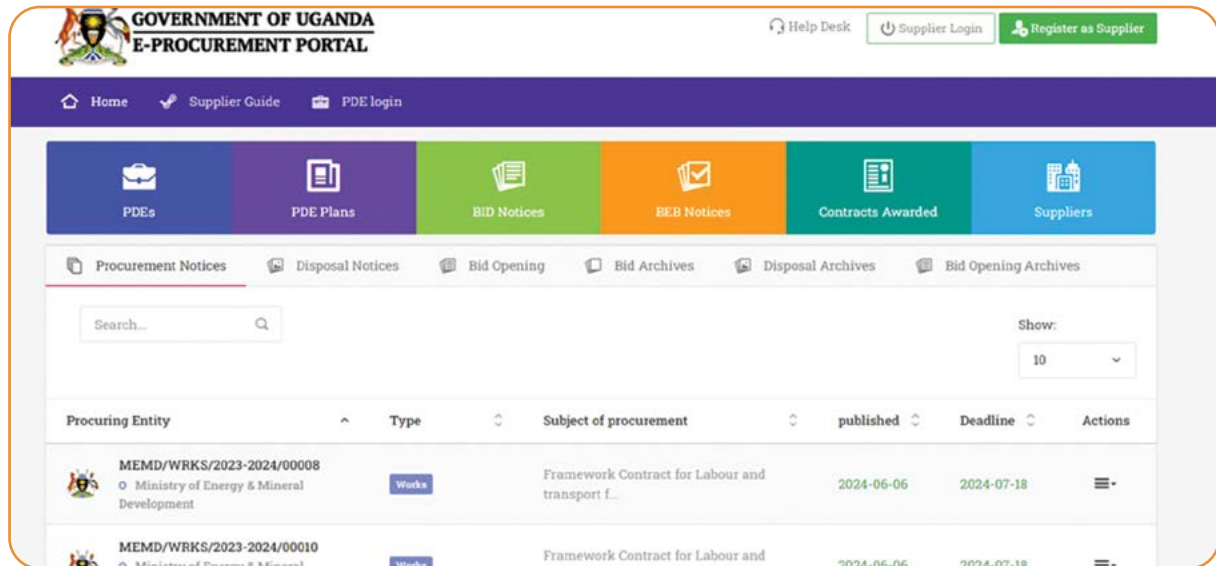
The online payment system is designed for paying taxes, fees, rents (national and local ones) as a series of procedures, including payment registration (getting a payment reference number which is necessary for making a payment in a bank or using mobile payment), online payment, and checking the payment status.

## Public Procurement

In 2021, the **Electronic Government Procurement System**<sup>38</sup> was launched by The Public Procurement and Disposal of Public Assets Authority (PPDA)<sup>39</sup> as a pilot project in 12 selected entities. In 2022,

**26 ministries, agencies, and departments of the government, two local governments signed up for the system, about 6308 local companies registered on the platform**<sup>40</sup>

The current procurement systems (e.g. GPP, IFMS, ROP) are semi-automated, largely paper based, and they handle a few components of the procurement process. The e-GP is being developed to improve the current systems and integrate with them<sup>41</sup> while making all the procurement processes electronic.



Source: The E-procurement Portal of the Government of Uganda

32 e-Tax. Uganda Revenue Authority (URA). URL: <https://ura.go.ug/en/etax-login/>  
 33 e-Learning. Uganda Revenue Authority (URA). URL: <https://ura.go.ug/en/opportunities/e-learning-platform/e-learning/>  
 34 Payment Registration. Uganda Revenue Authority (URA). URL: <https://ura.go.ug/en/domestic-taxes/make-a-payment/generate-a-payment-slip/>  
 35 Integrated Revenue Administration System (IRAS). URL: <https://iras.go.ug/>  
 36 KCCA. URL: <https://ecitie2.kcca.go.ug/portal/payment/>  
 37 Ministry of Local Government (MoLG). URL: <https://e-logrev.go.ug/dashboard/>  
 38 E-procurement Portal of the Government of Uganda. URL: <https://egpuganda.go.ug/bid-notices>  
 39 Public Procurement and Disposal of Public Assets Authority. URL: <https://www.ppda.go.ug/>  
 40 New Vision, 2022. URL: [https://www.newvision.co.ug/category/news/over-6300-local-companies-register-for-electr-NV\\_136004](https://www.newvision.co.ug/category/news/over-6300-local-companies-register-for-electr-NV_136004)  
 41 FAQ for procuring and disposing entities and providers. Public Procurement and Disposal of Public Assets Authority. URL: [https://www.ppda.go.ug/wp-content/uploads/2023/01/UPDATED-FAQS\\_compressed-2.pdf](https://www.ppda.go.ug/wp-content/uploads/2023/01/UPDATED-FAQS_compressed-2.pdf)

# Data Management

At the Mobile World Congress with Huawei Technologies in Spain on 27th Feb to 2nd March 2023 the Minister of ICT and National Guidance Dr. Chris Baryomuns pointed<sup>42</sup> to the importance of implementing e-Government and creating a national cloud platform and data centers for storing data. The Government of Uganda has a **Tier III (Level 3) Data Center** which was opened<sup>43</sup> in 2019. It relies on various cloud solutions (IAAS, PAAS, SAAS, Disaster Recovery AS A Service and BAAS) and serves 132 Government and Local public institutions.

**The National Data Centre allows to enhance security of the information and makes government services more available and efficient.**

E-Government services are possible due to creating and developing the requisite platforms that secure Government communication and information sharing (e.g. Unified Messaging and Communications System), services delivery to citizens (e.g. Ughub), online payments (e.g. e-Pay).

# Artificial Intelligence

**Digital Umuganda**<sup>44</sup>, a Rwanda-based private company which is developing AI solutions in language technology has created a Kinyarwanda Dataset with voice and texts under the Mozilla Commonvoice Project. Additionally, the company has designed the **Mbaza AI Chabot**<sup>45</sup> for the Rwanda Biomedical Centre (RBC), the national health authority. The application contains up-to-date information on COVID-19 symptoms, prevention and treatment, as well as daily statistics and is available from the mobile phones. It uses natural language processing including voice technology in order to facilitate the access

to information and enable the citizens to provide feedback to the authorities in their mother tongue. With its voicing feature, the application also addresses the issue of illiteracy.

# Internet of Environment

Uganda also has a system for monitoring water in reservoirs in real time. In 2019, UNHCR launched a project to monitor water levels in Ugandan reservoirs.

The system uses **level sensors supporting LoRaWAN technology** (a new open energy-efficient long-range network protocol developed by IBM in 2015). Data from these sensors is transmitted through

Kerlink network<sup>46</sup> gateways to a cloud network within which constantly updated dashboards are formed<sup>47</sup>, on the basis of which any decisions can then be made. Furthermore, in Eastern Uganda, the River Manafwa has caused extensive damage to farmlands, houses and other property in Butaleja District through recurring flooding. In response to this ongoing issue, the Government of Uganda, in collaboration with the International Telecommunication Union (ITU), deployed solar-powered flood early warning systems<sup>48</sup> to alert residents about rising water levels. The first system was established on the Namulo Bridge in Butaleja District in 2014, the second one was installed in 2015.

The warning system consists of **three key components:**

1. A sensor situated in the river
2. A solar-powered siren located near the river
3. Equipped solar-powered control center at the district headquarters.
4. Siren is automatically activated upon reaching a threshold on the sensor.

42 Ministry of ICT and National Guidance. URL: <https://ict.go.ug/2023/03/13/the-ministry-of-ict-ng-represents-uganda-in-the-2023-mobile-world-congress-2023/>

43 Tech Point Magazine, 2019. URL: <https://techpointmag.com/nita-tier-iii-data-center/>

44 Digital Umuganda. URL: <https://digitalumuganda.com/>

45 MBaza . European Commission. URL: [https://international-partnerships.ec.europa.eu/policies/programming/projects/mbaza-chatbot-giving-access-covid-19-information-throughout-rwanda\\_en](https://international-partnerships.ec.europa.eu/policies/programming/projects/mbaza-chatbot-giving-access-covid-19-information-throughout-rwanda_en)

46 Kerlink. URL: <https://www.kerlink.com/blog/2020/02/26/kerlink-lorawan-gateway-technology-powering-un-water-monitoring-program-serving-refugees/>

47 Smart Water Magazine, 2020. URL: <https://smartwatermagazine.com/news/kerlink/un-refugee-agency-successfully-implements-water-monitoring-pilot-program-using-kerlink>

48 ITU. URL: [https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Pages/Projects/EWS\\_UGANDA.aspx](https://www.itu.int/en/ITU-D/Emergency-Telecommunications/Pages/Projects/EWS_UGANDA.aspx)

